



# Ecological Assessment – May 2022

Square Kilometre Array

06-Jul-2022



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## Executive Summary

AECOM Australia Pty Ltd (AECOM) were engaged by Wajarri Enterprises Group (Wajarri) to conduct a flora and vegetation assessment and a fauna assessment for the Square Kilometre Array Low Project (SKA1-Low) on Boolardy Station in the Murchison region.

The survey area includes the proposed sites for a construction camp and fibre cable corridor, a contractor compound and access road, and an emergency airstrip. A flora and vegetation assessment and basic fauna assessment was undertaken in May 2022 by Botanist Celia Mitchell and Ecologist Cassandra House. Information from surveys originally undertaken in 2014 and 2020 was used to describe the existing environment of the new survey area.

A summary of the results is presented below:

- No Threatened or Priority Ecological Communities were considered likely to occur and none were recorded in the survey area.
- Two native vegetation communities were mapped.
- Nine Priority flora species were considered likely to occur, of which none were confirmed to occur in the survey area.
- Three fauna habitats were defined and mapped within the survey area. Much of the habitat is in non-pristine condition and so habitat corridors remain a valuable asset to local fauna. Within the survey area these linkages consist of the more significant drainage channels and creek lines.
- One Dasyuridae mammal of unknown species and conservation status was recorded within the survey area. The individual was disturbed resting in the entrance of a burrow at the base of a tree, likely sunbathing, and retreated rapidly down the burrow upon approach. Five dasyurid species have been outlined as a potential identification for this individual based on distribution and ecology, including two Priority species.

No suitable habitat for the Threatened skink was identified and no trapdoor spider burrows were recorded. The Project was completed successfully with two limitations identified. Firstly, the seasonality of the survey meant that annual Priority flora would not have been present at the time. Furthermore, one fauna individual (likely belonging to the family Dasyuridae) was unable to be confirmed to species level and may represent a Priority.



## 1.0 Introduction

### 1.1 Background

The Square Kilometre Array (SKA) Project is a large international radio telescope project which aims to answer key cosmological questions using radio waves from across the universe to look back into the cosmic dark ages. As with all big science projects, the SKA project will draw on the skills, experiences and support of 14 countries working collaboratively to construct and operate elements of the SKA project, with the first phase of the project being hosted by South Africa and Australia. Australia will host the SKA1-Low Frequency Aperture Array (SKA1-Low).

SKA1-Low is an entirely new array and will consist of up to 512 array stations. Each array station will consist of up to 256 individual antennas, representing more than 130,000 antennas in total. The majority of array stations will be in a densely populated core and the remainder located in groups of six stations at multiple locations along three spiral arms.

Following ecological surveys undertaken by AECOM (2014, 2021), additional areas requiring clearing were identified.

### 1.2 Location

The SKA Project will be located on the Murchison Radio Astronomy Observatory (MRO) that will expand to encompass Boolardy Pastoral Station. The survey area is approximately 350 km northeast of Geraldton, and 770 km north of Perth (Figure 1) by road.

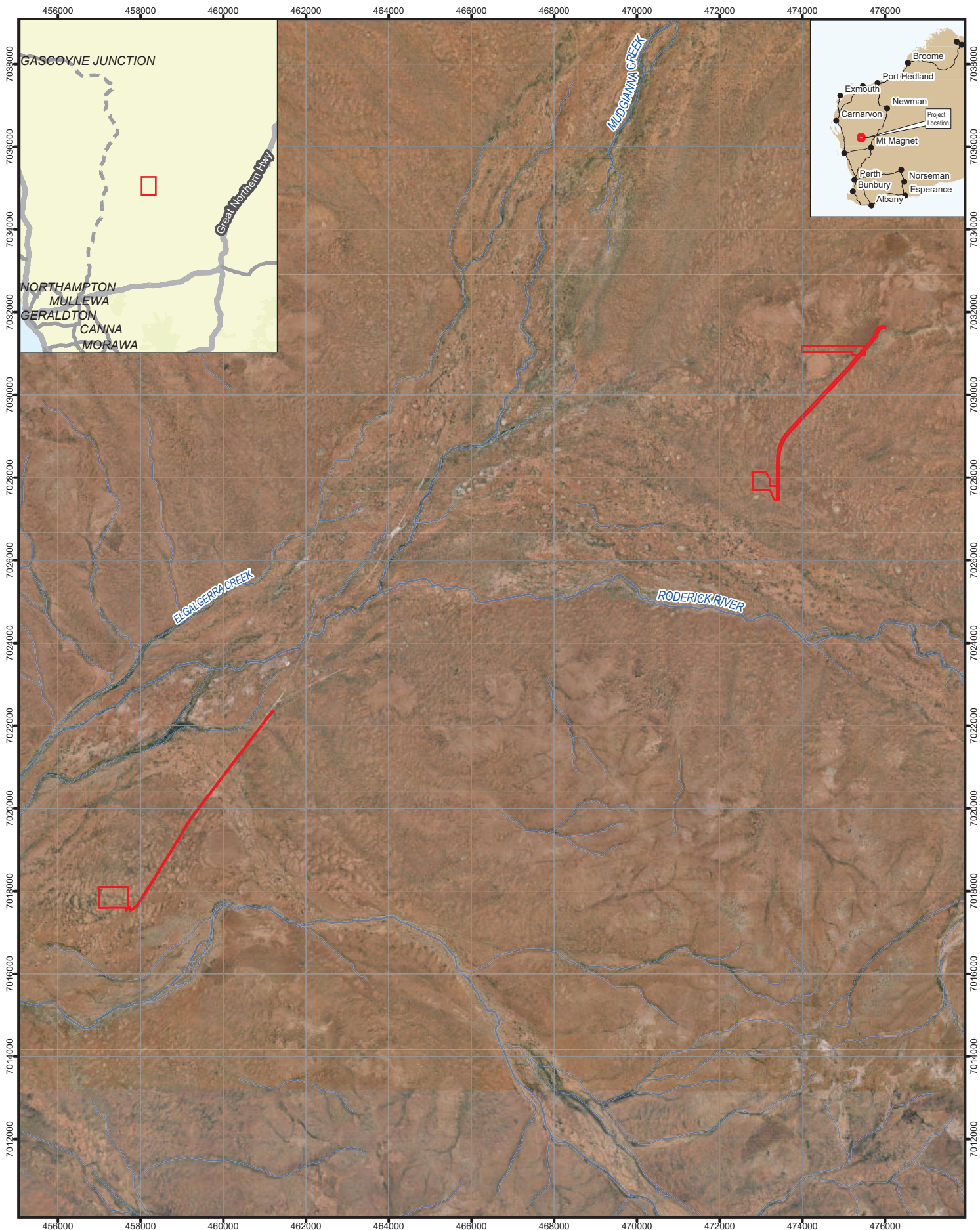
Boolardy Pastoral Station was selected to host the SKA1-Low array due to its excellent radio-quiet environment and proximity to services and infrastructure. This area has been established for the development and use of future radioastronomy services and activities and the Murchison Radio-astronomy Observatory (MRO) which hosts the Australian SKA Pathfinder (ASKAP) and Murchison Widefield Array. The MRO was excised from Boolardy Station in 2009 and will now also host SKA1-Low and to do so expand to encompass Boolardy Pastoral Station. Within the expanded MRO, native vegetation clearing areas are proposed to accommodate the following project components:

- Construction camp.
- AARNET fibre cable to Construction Camp.
- SKA core access road.
- contractor compound on Kalli road.
- Emergency airstrip.

### 1.3 Objectives

The objective of the assessment was to describe the flora and vegetation values, and fauna habitat present within the defined survey area. The outcome of the assessment will characterise the flora, vegetation communities and fauna habitat present, and identify significant environmental values that may require additional management or avoidance. Specifically, the scope included:

- Desktop study of available flora and vegetation data for the survey (e.g. reports, databases).
- Preparation of a sample plan for the survey area.
- Reconnaissance field survey of the area shown in Figure 1 to delineate flora and fauna species, vegetation communities and fauna habitat.
- Opportunistic assessment of any areas with significant flora or fauna species.
- Preparation of a report and provision of GIS data that meets the requirements for IBSA submission.



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 CREATED BY WYATTK2  
 APPROVED BY C. HOUSE  
 LAST MODIFIED 13 JUN 2022

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**LEGEND**  
 Survey Area

**Survey Area**

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 FLORA, VEGETATION AND FAUNA  
 ASSESSMENT – SQUARE KILOMETRE  
 ARRAY (SKA) PROJECT

**Figure 1**



## 2.0 Existing Environment

### 2.1 Climate

The Shire of Murchison receives an arid climate with a mean annual rainfall of 190-240 mm (Curry et al., 1994). Rainfall varies significantly depending on the occurrence of sporadic significant rainfall events that are driven by cyclonic weather from the north and cold fronts from the southwest. The summer months are hot and consist of long periods where the temperature exceeds 37.5 degrees Celsius. Winters are cool and sunny with cold evenings and mild days.

The closest weather station to the survey area is Murchison (station 006099) located approximately 55 km west of Boolardy Station and the adjacent Kalli Station (Figure 2). An annual average rainfall of 227.1 mm has been recorded since 1987. The regional average annual evaporation is between 2,800 and 3,600 mm (BoM, 2022). Total rainfall for the 12 months preceding the survey was 182.5 mm, 44.6 mm below the annual average (BoM, 2022). There was below average rainfall recorded in eight of the 12 months preceding the survey, with December receiving no rainfall. The presence of species may be influenced by the survey timing (May 2022) which was conducted outside of the spring flowering season.

Higher than average rainfall received during March and April, following a long period of low rainfall, may increase the population of insects within the surrounding area. This in turn may influence the results of the fauna survey as higher populations than normally observed of reptiles, birds and small mammals may be present. Potential implications of weather conditions and seasonal timing is further discussed in Section 4.0.

Average maximum temperatures peak between December and February, with the highest recorded daily temperature of 47.2°C in January 2022 and the lowest recorded daily temperature of -0.8°C in August 2021. The maximum and minimum temperatures do not always coincide with rainfall averages due to the high variability in rainfall for this region (BoM, 2022).

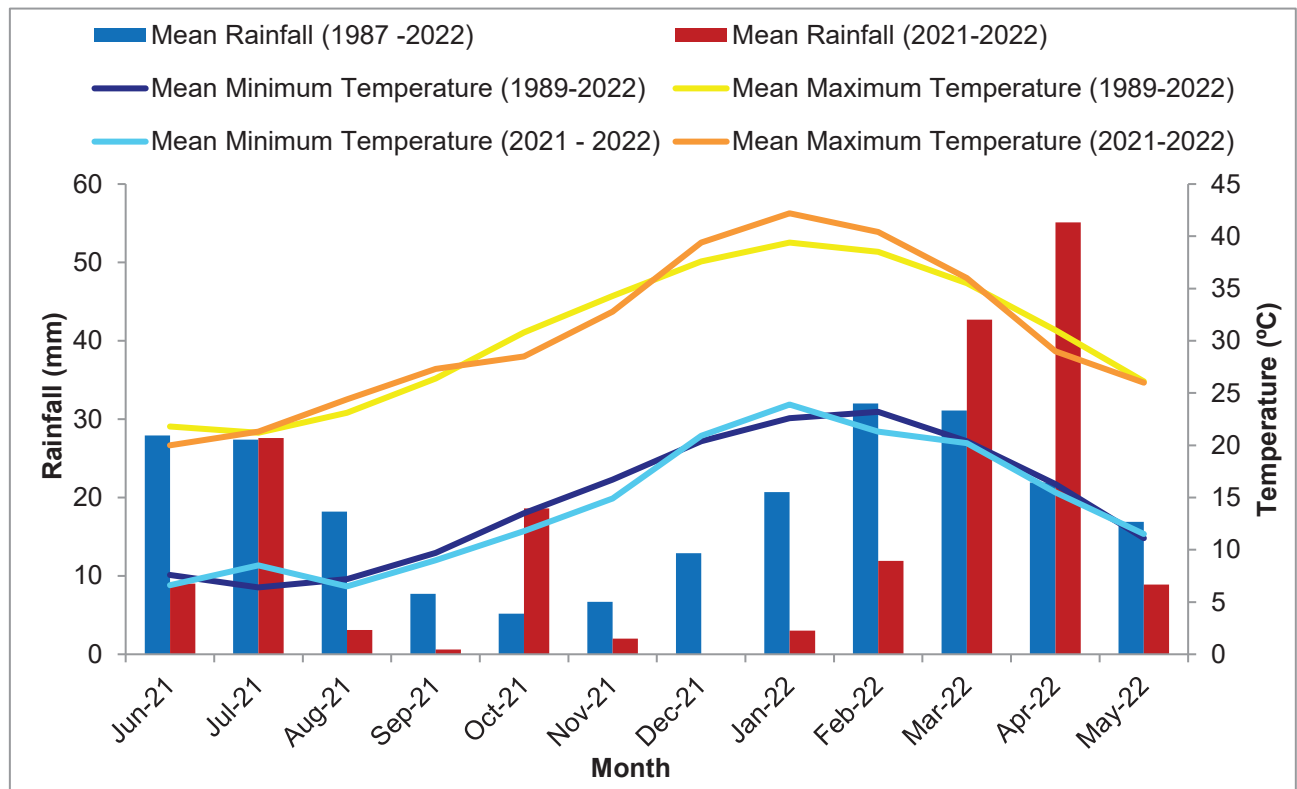


Figure 2 Rainfall and temperature data for Murchison Station (Station 006099 BoM, 2022) for the 12 months preceding the survey



## 2.2 IBRA Region

There are 89 recognised Interim Biogeographical Regions of Australia (IBRA) that have been defined based on climate, geology, landforms and characteristic vegetation and fauna (CALM, 2002). The SKA project is located in the Murchison IBRA bioregion, in the centre of the Western Murchison Subregion. The Murchison bioregion is on the northern part of the Yilgarn Craton which is divided into the Eastern and Western Murchison. There are six wetlands (lakes) of national importance in the bioregion including Ballard, Barlee, Marmion, Wooleen, Breberle and Anneen Lakes.

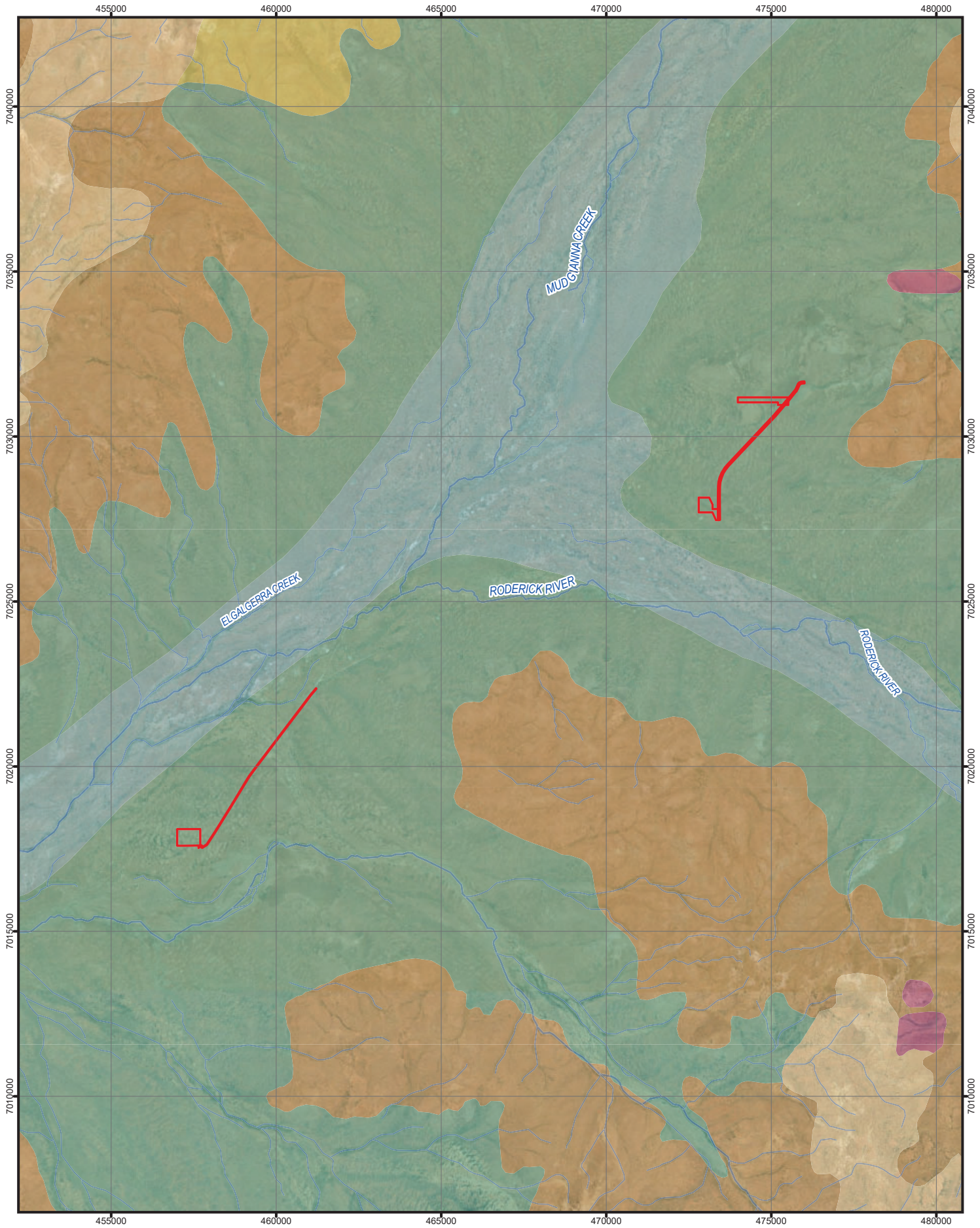
The Western Murchison subregion, described by Desmond *et al.* (2001), supports low Mulga woodlands with bunch grasses and ephemerals (annuals). Landscape features include outcrop and extensive fine-textured hardpan washplains. Quaternary sandplains support hummock grasslands, calcareous soils support Saltbush and saline alluvia support *Halosarcia* low shrublands. The subregion contains the headwaters of the Murchison and Wooramel Rivers which drain westwards to the coast. Rare features of the area include calcrete aquifers with short-range endemics, rare fauna, and flora. The land use is predominantly grazing native pastures (96%) and Crown Reserves (2.8%).

## 2.3 Vegetation

The survey area intersects with one vegetation association mapped by Beard (1976) representing pre-European vegetation (Table 1; Figure 3). This association has more than 90% remaining within the Murchison IBRA region and the Shire of Murchison (Govt. of WA, 2019).

**Table 1 Pre-European vegetation associations that intersect with the survey area**

Veg. Assoc.	Description	Area (ha)	% Remaining	
			Murchison IBRA Region	Shire of Murchison
29	Sparse low woodland; Mulga, discontinuous in scattered groups	123.8	99.98	100.00



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 0 1 2 3  
 km

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 Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2010)  
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**LEGEND**

Survey Area

Pre-European Vegetation (DPIRD-006)

- 18
- 29
- 39
- 204
- 341
- 2081

**Pre-European Vegetation**

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Figure  
**3**

## 2.4 Land Systems

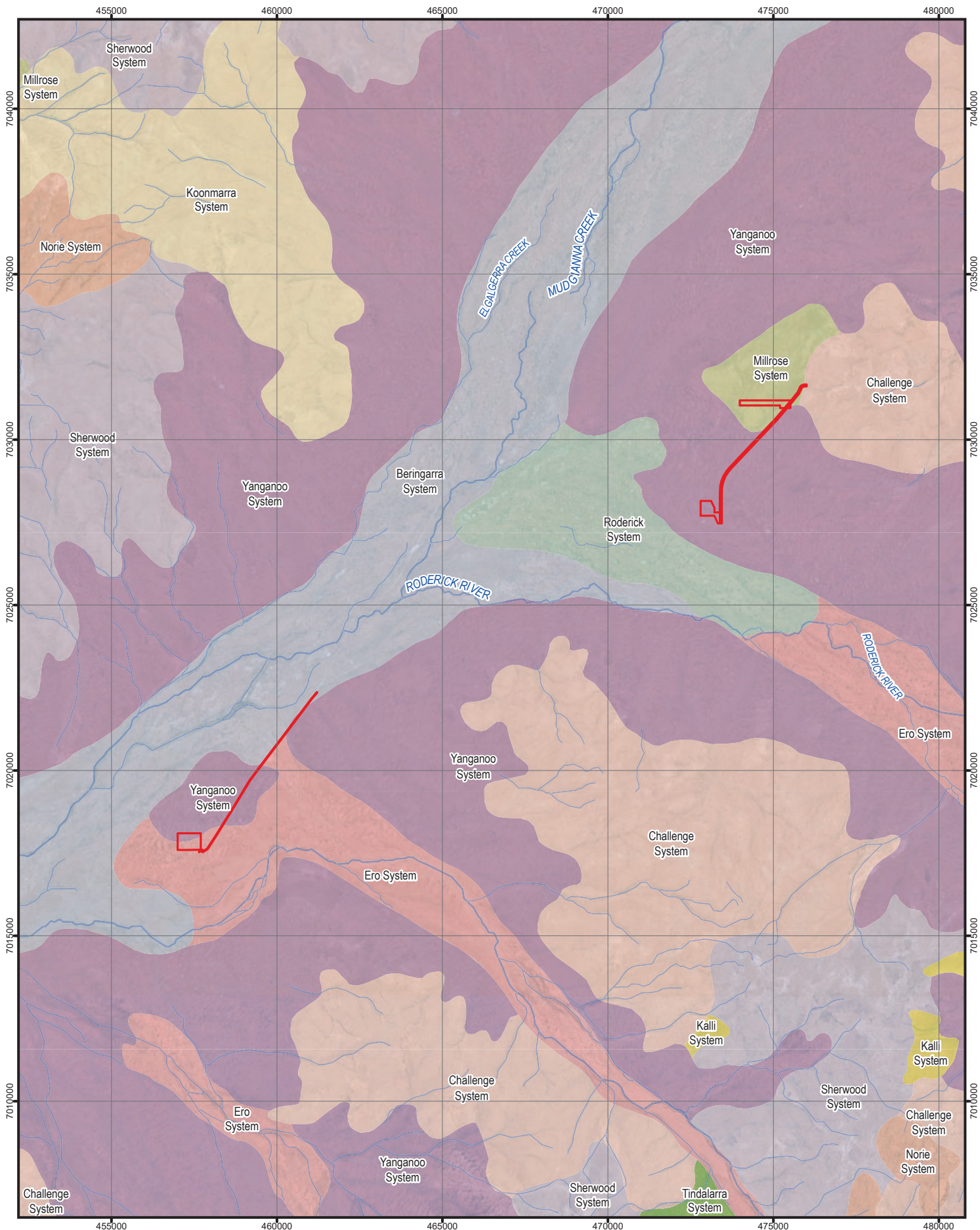
The mapping of soils, landscapes and vegetation in the Rangelands of Western Australia was conducted in the Wiluna-Meekatharra region in 1963 (Tille, 2006). This became the responsibility of the Department of Agriculture using a procedure developed by the CSIRO. The survey adopted the land system approach, where a land system is defined as an area or group of areas throughout which there is a recurring pattern of topography, soils and vegetation (Tille, 2006).

There are four land systems that intersect with the survey area, described in Table 2 and mapped in Figure 4.

**Table 2 Land systems of the survey area**

Land System	Description	Area (ha)
Challenge	Gently undulating gritty-surfaced plains, occasional granite hills, tors and low breakaways, with <i>Acacia</i> shrublands.	0.4
Beringarra	Riverine plains with floodplains and channels, supporting halophytic shrublands, mixed acacia shrublands and low woodlands with minor perennial grasses.	1.7
Ero	Tributary floodplains with shallow, erodible duplex soils on red-brown hardpan, more or less saline and supporting <i>Acacia</i> shrublands with halophytic and non-halophytic undershrubs; grazed preferentially and widely degraded and eroded.	24.5
Millrose	Level or very gently undulating stony plains on hardpan and granite with irregularly distributed sandy Wanderrie banks, supporting mostly scattered Mulga shrublands with minor Wanderrie grasses.	30.4
Yanganoo	Almost flat hardpan wash plains, with or without small Wanderrie banks and weak grooving; supporting Mulga shrublands and Wanderrie grasses on banks.	66.8
<b>Total Area (ha)</b>		<b>123.8</b>





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 Service Layer Credits: WMS

**LEGEND**

Survey Area

Soil Landscape Mapping - Land Systems (DPIRD-064)

- Beringarra System
- Challenge System
- Ero System
- Kalli System
- Millrose System
- Norie System
- Roderick System
- Sherwood System
- Tindalarra System
- Yanganoo System

**Land Systems**

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**Figure 4**

## 3.0 Legislative Framework

### 3.1 Overview

Table 3 summarises the key legislation governing the protection and management of Western Australia's conservation significant species and communities, which are further discussed below.

**Table 3 Relevant legislation, regulations and guidance**

Legislation	Purpose
<b>Commonwealth of Australia</b>	
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	Provides for the protection of the environment and the conservation of biodiversity.
<b>Western Australia</b>	
<i>Biodiversity Conservation Act 2016</i> (BC Act)	Provides for the conservation and protection of Western Australia's biodiversity and biodiversity components.
<i>Environmental Protection Act 1986</i> (EP Act)	Preventing, controlling and abating environmental harm and conserving, preserving, protecting, enhancing and managing the environment.
<i>Biosecurity and Agriculture Management Act 2007</i> (BAM Act)	Provides for the management, control and prevention of certain plants and animals, and for the protection of agriculture and related resources generally.
EPA Technical Guidance – Terrestrial Fauna Surveys for Environmental Impact Assessment, 2020	Provides guidance on the standard of survey required to assist in collecting the appropriate data for decision-making associated with the protection of Western Australia's terrestrial fauna.
EPA Technical Guidance – Flora and vegetation Surveys for Environmental Impact Assessment, 2016	Provides guidance to ensure adequate flora and vegetation data of an appropriate standard are obtained and used in EIA.

### 3.2 *Environment Protection and Biodiversity Conservation Act 1999*

#### 3.2.1 Matters of National Environmental Significance

Matters of national environmental significance include:

- Listed threatened species and ecological communities.
- Migratory species protected under international agreements.
- Ramsar wetlands of international importance.
- The Commonwealth marine environment.
- World Heritage properties.
- National Heritage places.
- Great Barrier Reef Marine Park.
- A water resource, in relation to coal seam gas development and large coal mining development.
- Nuclear actions.

If an action is likely to have a significant impact on MNES this action must be referred to the Minister for the Environment for a decision on whether assessment and approval is required under the EPBC Act.

#### 3.2.2 Flora and Fauna

The EPBC Act is the main piece of Federal legislation protecting biodiversity in Australia. Species at risk of extinction are recognised at a Commonwealth level and are categorised in one of six categories as outlined in Table 4, with an additional category for other specially protected fauna.

**Table 4 Categories of species listed under Schedule 179 of the EPBC Act**

Code	Conservation Category
Ex	Extinct Taxa
ExW	Extinct in the Wild
CE	Critically Endangered
E	Endangered
V	Vulnerable
CD	Conservation Dependent

### 3.2.3 Vegetation Communities

Communities can be classified as Threatened Ecological Communities (TECs) under the EPBC Act. The EPBC Act protects Australia's ecological communities by providing for:

- identification and listing of ecological communities as threatened
- development of conservation advice and recovery plans for listed ecological communities
- recognition of key threatening processes
- reduction of the impact of these processes through threat abatement plans.

Categories of federally listed TECs are described in Table 5.

**Table 5 Categories of TECs that are listed under the EPBC Act**

Code	Conservation Category
<b>CE</b>	<b>Critically Endangered</b> If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
<b>E</b>	<b>Endangered</b> If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future.
<b>V</b>	<b>Vulnerable</b> If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future.

## 3.3 Western Australian Legislation

### 3.3.1 Flora and Fauna

Under the BC Act, flora and fauna can be listed as Threatened (T) or extinct (X). Threatened flora are plants which have been assessed as being at risk of extinction (DBCA, 2019). The Minister for the Environment may declare species of flora to be protected if they are considered to be in danger of extinction, rare or otherwise in need of special protection (WAH, 1998-).

Plants and animals that are considered Threatened and need to be specially protected because they are under identifiable threat of extinction are listed under the BC Act. These categories are defined in Table 6.



Table 6 Conservation codes for flora and fauna listed under the *Biodiversity Conservation Act 2016*

Code	Conservation Category
<b>CR</b>	<b>Critically Endangered Species</b> Threatened species considered to be facing an extremely high risk of extinction in the wild in the immediate future.
<b>EN</b>	<b>Endangered Species</b> Threatened species considered to be facing a very high risk of extinction in the wild in the near future.
<b>VU</b>	<b>Vulnerable Species</b> Threatened species considered to be facing a high risk of extinction in the wild in the medium-term future.
<b>EX</b>	<b>Extinct Species</b> Species where there is no reasonable doubt that the last member of species has died.
<b>MI</b>	<b>Migratory Species</b> Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth. Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the <i>Convention on the Conservation of Migratory Species of Wild Animals</i> (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.
<b>CD</b>	<b>Species of special conservation interest (conservation dependent fauna)</b> Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
<b>OS</b>	<b>Other specially protected species</b> Fauna otherwise in need of special protection to ensure their conservation.

Species that have not yet been adequately surveyed to warrant being listed under the BC Act, or are otherwise data deficient, are added to Priority Lists under Priorities 1, 2 or 3 by the State Minister for Environment. 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. Categories and definitions of Priority Flora and Fauna species are provided in Table 7.

### 3.3.2 Vegetation Communities

TECs are naturally occurring biological assemblages that occur in a particular type of habitat and that may be subject to processes that threaten to destroy or significantly modify the assemblage across its range. TECs are listed by both State and Commonwealth legislation.

Vegetation communities in Western Australia are described as TECs if they have been endorsed by the Western Australian Minister for Environment following recommendations made by the Threatened Species Scientific Committee. Categories of TECs are defined in Table 8.

Department of Biodiversity, Conservation and Attractions (DBCA) maintains a database of state listed TECs which is available for online searches via their website. Possible TECs that do not meet survey criteria or are not adequately defined are listed as Priority Ecological Communities (PECs) under Priorities 1, 2 and 3. Ecological communities that are adequately known and are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. Conservation dependent communities are classified as Priority 5. PECs are endorsed by the Minister for Environment and are described in Table 9.

DBCA requires that all Priority and Threatened ecological communities are considered during environmental impact assessments and clearing permit applications.

**Table 7 Conservation codes for WA flora and fauna listed by DBCA and endorsed by the Minister for Environment**

Code	Conservation Category
<b>P1</b>	<b>Priority One – Poorly Known Species</b> 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.
<b>P2</b>	<b>Priority Two – Poorly Known Species</b> 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.
<b>P3</b>	<b>Priority Three – Poorly Known Species</b> 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.
<b>P4</b>	<b>Priority Four – Rare, Near Threatened and other species in need of monitoring</b> 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. Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

**Table 8 Conservation codes for State listed ecological communities**

Conservation Code	Category
PD	Presumed Totally Destroyed
CR	Critically Endangered
EN	Endangered
VU	Vulnerable

**Table 9 Conservation categories for Priority Ecological Communities**

Code	Conservation Category
P1	Priority One: poorly-known ecological communities
P2	Priority Two: poorly-known ecological communities
P3	Priority Three: poorly known ecological communities
P4	Priority Four: ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list.
P5	Priority Five: conservation dependent ecological communities

### 3.3.3 **Biosecurity and Agriculture Management Act 2007**

Biosecurity is the management of the risk of animal and plant pests and diseases entering, emerging, establishing or spreading in WA to protect the economy, environment and community. Biosecurity is managed under the BAM Act which came into effect 1 May 2013. Exotic animals and plants can become an invasive species if they can establish in new areas where local conditions are favourable for their growth. Each organism listed under the BAM Act comes with certain legal / import requirements:

- Declared Pest, Prohibited - s12. Prohibited organisms are declared pests by virtue of section 22(1) and may only be imported and kept subject to permits.
- Permitted - s11. Permitted organisms may be subject to an import permit if they are potential carriers of high-risk organisms.
- Declared Pest - s22(2). Declared pests may be subject to an import permit if they are potential carriers of high-risk organisms and may also be subject to control and keeping requirements once within Western Australia.
- Permitted, Requires Permit - r73. Regulation 73 permitted organisms may only be imported subject to an import permit.

Declared pests can be assigned to a C1, C2 or C3 control category under the Biosecurity and Agriculture Management Regulations 2013:

- C1 Exclusion - Organisms which should be excluded from part or all of Western Australia.
- C2 Eradication - Organisms which should be eradicated from part or all of Western Australia.
- C3 Management - Organisms that should have some form of management applied that will alleviate the harmful impact of the organism, reduce the numbers or distribution of the organism or prevent or contain the spread of the organism.
- Unassigned - Declared pests that are recognised as having a harmful impact under certain circumstances, where their subsequent control requirements are determined by a Plan or other legislative arrangements under the BAM Act.



## 4.0 Methodology

### 4.1 Desktop Assessment

The 2022 desktop assessment utilised information from previous surveys undertaken for SKA, along with public databases and government records. Sources used to inform the desktop assessment included:

- DBCA threatened species and communities database.
- Western Australian Herbarium (WAH) records.
- EPBC Act Protected Matters Search Tool (PMST) database.
- Alexander Holm & Associates (2008) Radio Astronomy Project Environmental Assessment.
- AECOM (2014) Square Kilometre Array Ecological Assessment.
- AECOM (2021) Square Kilometre Array Ecological Assessment.
- Atlas of Living Australia.
- NatureMap.
- Birdlife Australia.

All flora and fauna of conservation significance identified in the desktop assessment was assessed for their likelihood of occurrence in the survey area (Table 10).

Available literature was consulted including Beard (1976) vegetation mapping, Land Systems Mapping (Department of Agriculture, 1991), a review of the Western Murchison subregion (Desmond *et al.*, 2001) and environmental studies conducted by Alexander Holm & Associates (2008) for the MRO area. These documents were used to define the existing environment and provide local and regional context for the survey results.

**Table 10** Categories of likelihood of occurrence for species of conservation significance identified in the desktop assessment

Category	Flora	Fauna	Communities
Likely	Habitat is present in the survey area and it has been recorded in close proximity	Survey areas are within the known distribution of the species, habitat is present in the survey area and it has been recorded in close proximity previously	Known occurrences of the community in close proximity to the Survey area. Vegetation looks the same within the known occurrence and survey area based on aerial imagery. Geographic location is similar to the survey area
May	Habitat may be present in the survey area and/or it has been previously recorded in close proximity	Survey area are within the known distribution of the species, marginal habitat may be present and/or it has been previously recorded in close proximity	Known occurrence of the community in the local area, and/or vegetation looks the same within known occurrence and survey area based on aerial imagery. Geographic location is similar to the survey area
Unlikely	No suitable habitat is present and there have been no recorded locations in close proximity to the survey area	Survey areas are outside known distribution for that species, or no suitable habitat is present and there have been no recent recorded locations in close proximity to the survey areas	Known occurrence of the community in close proximity to the Survey area however geographic location does not occur in survey area

## 4.2 Flora and Vegetation

A reconnaissance flora and vegetation assessment was undertaken between 17 and 20 May 2022 utilising methods outlined in the Technical Guidance – Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016). The assessment was completed by Celia Mitchell (collection permit FB62000077-2). Celia Mitchell has 3 years' experience undertaking flora and vegetation assessments.

Floristic data was sampled from five relevés, defined as unbounded quadrats. Relevés follow the guidance for a reconnaissance survey with low level sampling and were determined to be a better representation of vegetation due to the sparse foliage cover and isolated occurrence of many species. In 2022 the survey team had a good understanding of the expected vegetation communities therefore more focus was placed on targeting significant flora species, using relevés to support the delineation of vegetation communities as necessary.

Data collected at sample point locations included the presence of plant species, their cover abundance, structural composition of vegetation, physical environment, and presence/absence of disturbance. Each sample point location was given a unique site number, and the following parameters recorded:

- Date.
- Location using hand-held GPS (accuracy of 5 m).
- Photograph .
- Soil details (type, colour, moisture) .
- Topography.
- Vegetation condition using the Keighery (1994) scale.
- Disturbance notes .
- Fire history.
- Species present:
  - Estimated height.
  - Estimated percentage cover.

Any species unable to be identified in the field were collected for identification in AECOM's in-house herbarium and the specimens and taxonomic references and keys at the Western Australian Herbarium (WAH). Naming of species followed the convention of the WAH.

### 4.2.1 Vegetation Mapping

Vegetation communities were described and mapped based on changes in dominant species composition and landform. The 2022 dataset was compared to the 2020 and 2014 datasets to analyse floristic similarity of sample point locations (see survey effort in Figure 5). Only data collected from within the survey area is included in this report.

Vegetation community descriptions were based on the National Vegetation Information System (NVIS) framework at level V Association (DotEE, 2017a). This is consistent with the AECOM (2014) and AECOM (2021) vegetation mapping.

Vegetation condition was determined using the Keighery (1994) condition scale (Table 11). The scale is based on disturbance (e.g. grazing, erosion), degree of alteration to community and habitat structure and site ecology.

**Table 11 Bushland condition ratings (Keighery, 1994)**

Descriptor	Explanation
Pristine	Pristine or nearly so, no obvious signs of disturbance
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species
Very Good	Vegetation structure altered obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance of vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as "parkland cleared" with the flora comprising weed or crop species with isolated native trees or shrubs

#### 4.2.2 Targeted Searches

Targeted searches were conducted for conservation significant flora in the desktop assessment considered likely to occur. This was informed by the desktop assessment and the 2014 and 2020 results.

Where targeted Threatened or Priority Flora species were observed, the following data were collected:

- Location using a hand-held GPS.
- The number of individuals in the immediate population, or an estimate of the size (number) of the population with an estimated radius of its spatial extent.
- Vegetation condition.
- Associated dominant species.
- Soil type and colour .
- Topography.

### 4.3 Fauna

AECOM has conducted two basic fauna surveys in surrounding areas in 2014 and 2020.

The 2022 basic fauna survey was conducted between 17<sup>th</sup> and 20<sup>th</sup> May 2022 by Ecologist Cassandra House. Cassandra has over 5 years' experience in the environmental industry and completed a Bachelor of Science and Master of Science in Conservation Biology. The survey was conducted in accordance with Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA, 2020). The survey was conducted concurrently with the flora and vegetation survey, which enables consistent mapping of the fauna habitats and vegetation communities.

The field survey was undertaken following completion of the desktop assessment, with the survey primarily focused on verifying the findings of the desktop assessment and identifying and mapping (significant) fauna habitat. Signs of threatened fauna species with potential to utilise the habitats of the survey area were searched for during the basic fauna survey.

Fauna habitats were assessed for specific habitat components, including consideration of structural diversity and refuge opportunities for fauna, in order to determine the potential for these habitats to support conservation significant species. The fauna habitat assessments included:

- Location.
- General habitat description.
- Habitat condition and disturbance types.
- Dominant / characteristic flora species and vegetation layers.
- Presence and abundance of key habitat features such as large mature trees, small and large hollows, fallen logs, coarse and fine litter, decorticating bark, bare ground, grass, stones and boulders, rock crevices, soil cracks, vines, dense shrubs, water bodies etc.
- Presence of fauna and secondary signs (e.g. scats, digging, tracks, burrows, eggshell, bones, feathers etc).
- Connectivity of habitat.

In addition to recording all observed fauna and birds identified from distinctive calls, details of indirect evidence such as scats, tracks and diggings was documented. In particular, attention was given to conservation significant species identified in the desktop assessment as having the potential to occur in the area.

The taxonomy and nomenclature of vertebrate species for mammals, reptiles and amphibians is consistent with the Western Australian Museum's Checklist of Vertebrates of Western Australia (2022) and the Australian Faunal Directory (<https://biodiversity.org.au/afd/home>) for avian species.

### 4.4 Survey Limitations

The objective of the reconnaissance flora and vegetation and basic fauna assessment are considered to have been met. Two limitations have been identified that have influenced the outcome of the survey, including survey timing, and fauna species identification.

Survey timing was not optimal for the detection of annual Priority flora species, and perhaps also perennial Priority flora species. When surveying outside the ideal detection period (the flowering period), the ability to confidently identify significant flora species is reduced.

One fauna individual (likely belonging to the family Dasyuridae) was unable to be confirmed to species level and may represent a Priority.

Seven limitations were considered as defined in the EPA Technical Guide (2016). These are discussed in Table 12.

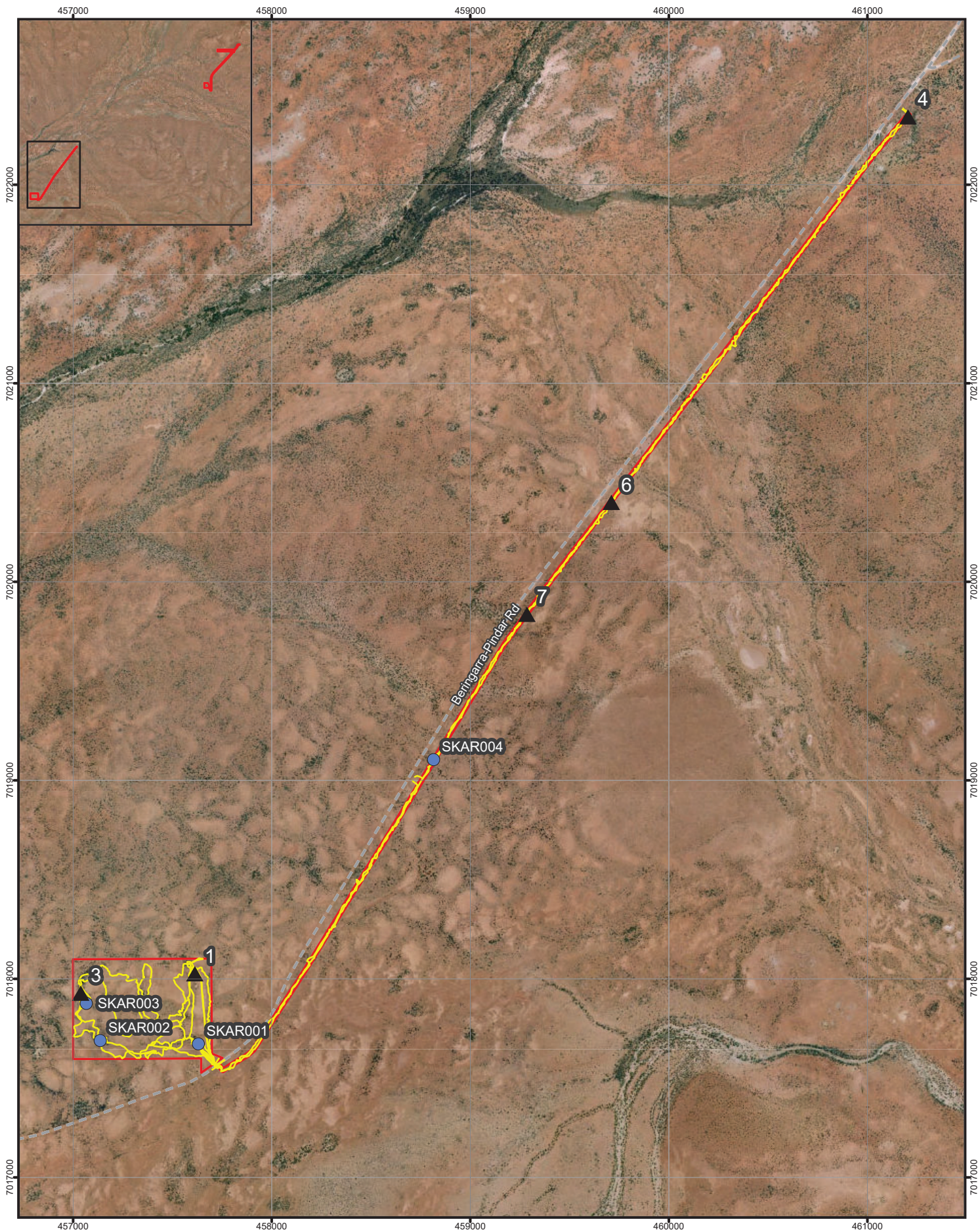


Table 12 Limitations of the ecological survey

Limitation	Flora and Vegetation Assessment	Basic Fauna Survey
Availability of contextual information on the region	<p><b>Not a limitation</b></p> <p>Sufficient resources were available to provide contextual information. These included NatureMap, DBCA databases, FloraBase, Alexander &amp; Holmes (2008) and AECOM (2014, 2021) ecological survey reports.</p>	<p><b>Not a limitation</b></p> <p>Sufficient resources were available to provide contextual information. These included NatureMap and DBCA database, AoLA EPBC Act PMST, Alexander Holm &amp; Associates (2008), AECOM (2014), Phoenix Environmental Sciences (Phoenix [2015]) and various field guides.</p>
Competency/experience of consultant conducting survey	<p><b>Not a limitation</b></p> <p>The flora and vegetation assessment was led by Celia Mitchell who has 3 years' experience conducting surveys of similar scope. Celia had guidance from Floora de Wit who has conducted the previous two flora and vegetation assessments at Boolardy Station. The extent of knowledge for the Project through historical surveys meant that Celia had enough guidance to negate her minimal specific project experience.</p>	<p><b>Not a limitation</b></p> <p>The fauna survey was undertaken by Ecologist Cassandra House who has more than 5 years' experience in the environmental industry in WA.</p>
Proportion of flora/fauna identified, recorded and/or collected (based on sampling, timing and intensity)	<p><b>Not a limitation</b></p> <p>Survey effort was over two days in mid May 2022 completing five relevés and meandering foot traverses. Vegetation communities were determined by comparing floristic data from 32 relevés and 65 quadrats completed in 2014 and 2020. Survey effort is shown in Figure 5. Species richness was low in 2022, likely due to the season in which the survey occurred.</p>	<p><b>Not a limitation</b></p> <p>The survey was conducted in May 2022 over a two-day period, completing nine habitat assessments to accurately assess the habitats of the survey area. Nocturnal and crepuscular species are likely underrepresented as the survey was limited to daylight hours, however this does not impact the meeting of basic fauna survey objectives.</p>
Completion (is further work needed)	<p><b>Not a limitation</b></p> <p>The reconnaissance flora and vegetation assessment objective was met. The survey was undertaken outside the ideal survey season (spring), as such, annual species were absent and four samples were unable to be identified to species level. Samples unable to be accurately identified were considered to have a low likelihood of representing significant flora species.</p>	<p><b>Minor limitation</b></p> <p>The objectives of the basic fauna survey were met, however one individual fauna species recorded was not able to be identified past Family level (Dasyuridae). This individual was located within the Construction Compound and Access area.</p>
Remoteness and/or access problems	<p><b>Not a limitation</b></p> <p>Survey areas were easily accessible by vehicle and on foot.</p>	<p><b>Not a limitation</b></p> <p>The survey area was accessed by vehicle and traversed on foot.</p>

Limitation	Flora and Vegetation Assessment	Basic Fauna Survey
Timing, weather, season, cycle	<p><b>Moderate limitation</b> Annual species were absent and four species lacked suitable material for confident identification.</p>	<p><b>Not a limitation</b> The survey was conducted during the hours of 0700 and 1700 and as a result species observed are largely limited to diurnal species, unless otherwise detected from traces such as tracks and scat. However, this did not significantly impact the basic fauna survey.</p>
Disturbances (e.g. fire flood, accidental human intervention) which affected results of the survey	<p><b>Not a limitation</b> No disturbances were observed that may have influenced the outcome of the survey.</p>	<p><b>Not a limitation</b> The fauna survey was not disrupted or impacted.</p>





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Datum: GDA2020 MGA Zone 50  
 0 100 200 300 400 metres

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 (when printed at A4)

Data sources:  
 Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2010)  
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**LEGEND**

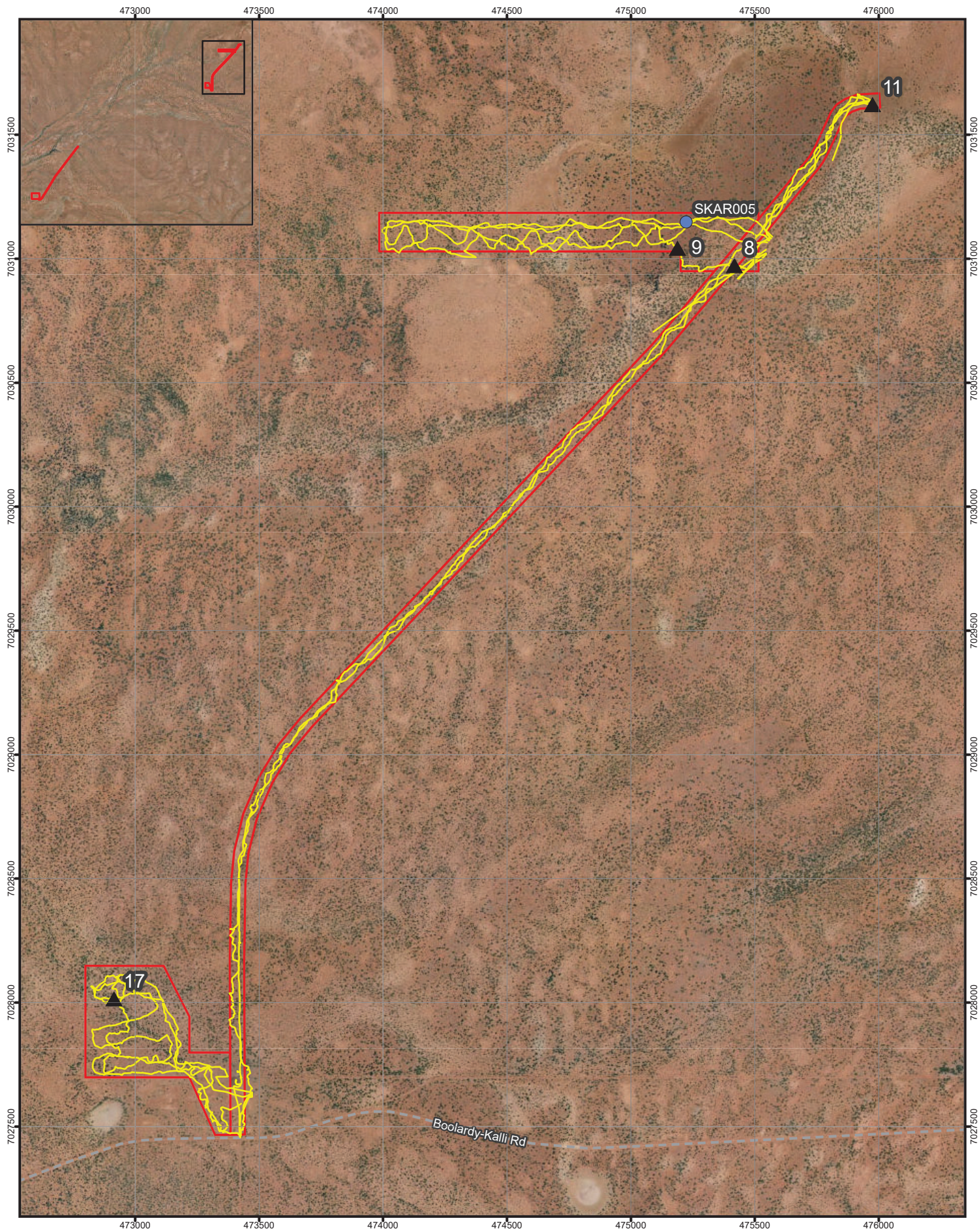
- ▭ Survey Area
- Tracklog
- Flora Sample Sites
- ▲ Fauna Habitat Assessment Sites

**Survey Effort**

**DEPARTMENT OF INDUSTRY, SCIENCE, ENERGY AND RESOURCES**  
 FLORA, VEGETATION AND FAUNA ASSESSMENT – SQUARE KILOMETRE ARRAY (SKA) PROJECT

**Figure 5.1**





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**LEGEND**

- Survey Area
- Tracklog
- Flora Sample Sites
- ▲ Fauna Habitat Assessment Sites

**Survey Effort**

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**Figure 5.2**



## 5.0 Desktop Study Results

### 5.1 Conservation Significant Communities

There are no EPBC Act listed TECs identified in the desktop assessment.

### 5.2 Conservation Significant Flora

No flora species listed as Threatened under the EPBC Act or BC Act were identified in the desktop assessment as potentially occurring in the survey area. Sixty-six Priority flora species were determined to potentially occur. Of these, nine species are considered likely to occur, 11 species may occur, and the remaining 46 species are unlikely to occur. Species considered likely to, or may occur, are detailed in Table 13.

Numerous species considered unlikely to occur are associated with Mt Weld and Weld Ranges, therefore suitable habitat is not present within the survey area. The comprehensive desktop results are presented in Appendix A and mapped on Figure 6.

**Table 13 Significant flora considered known or likely to occur in the survey area**

Species	WA Cons. Code	Habitat	Justification
<i>Calandrinia butcherensis</i>	P1	Red sands on flats	Located directly adjacent to survey area, habitat present
<i>Calandrinia</i> sp. Boolardy Station (P. Jayasekara 719-JHR-01)	P1	Flat. Low plain. Red/orange sand/clay.	Recorded close to survey area
<i>Eremophila muelleriana</i>	P3	Red sand, sandy clay, lateritic sand. Flats, sand dunes, hills.	Known to occur within the area directly adjacent to the survey area, habitat present
<i>Eremophila simulans</i> subsp. <i>megacalyx</i>	P3	Found on rangeland plains road verge with red, sandy gravel laterite.	Known to occur within the area adjacent to the survey area
<i>Gunniopsis divisa</i>	P3	Loam, quartz. Roadsides. IN the Murchison, Yalgoo IBRA regions	Recorded during 2014 surveys, suitable habitat present
<i>Hemigenia tysonii</i>	P3	Red Sands, plains and gently undulating dunes.	Recorded during 2014 surveys, suitable habitat may be present.
<i>Ptilotus beardii</i>	P3	Clayey soils. Saline flats, low breakaways.	Recorded during 2014 surveys, suitable habitat present.
<i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94)	P3	Red sand. Plains.	Recorded during 2014 and 2020 surveys, suitable habitat present.
<i>Verticordia jamiesonii</i>	P3	Sandy clay soils. Lateritic breakaways.	Recorded during 2014 surveys, suitable habitat present.

Priority Species Department of Environment and Conservation's Priority Species List: Priority 1, P2, P3, P4

### 5.3 Conservation Significant Fauna

The desktop fauna assessment identified 26 conservation significant fauna species that could potentially occur within the survey area. This included four species (Golden Gudgeon *Hypseleotris aurea*, Night Parrot *Pezoporus occidentalis*, Woma *Aspidites ramsayi* [southwest subpop] and Arid bronze azure butterfly *Ogyris subterrestris petrina*) DBCA specifically requested AECOM to assess in 2020.

The likelihood of occurrence of fauna species was determined by assessing the likely presence of suitable habitat in the survey area and reviewing the recent records and distribution of the species. This assessment determined that:

- Three species are 'likely to occur'.
- Twelve species 'may occur'.
- Eleven species are 'unlikely to occur'.

The fifteen species considered as 'likely to occur' and 'may occur' in the survey area include eight bird, one mammal, one reptile and one invertebrate species. Table 14 identifies these species and provides relevant ecological information. The conservation significant categories as defined by DBCA, the BC Act and the EPBC Act are defined in Section 3.0. The full desktop assessment for all fauna species and their likelihood of occurrence in the survey area are presented in Appendix A2.



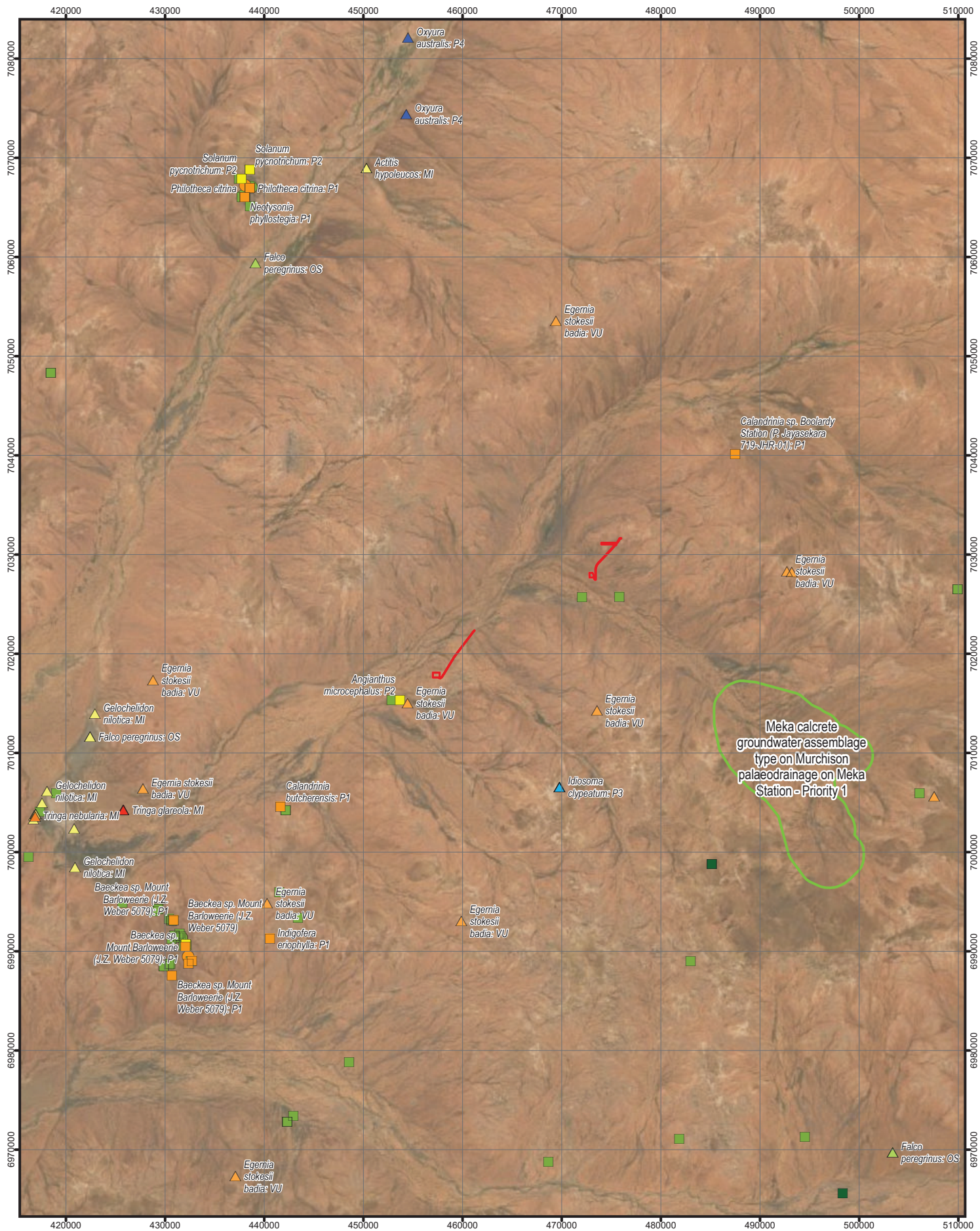
Table 14 Conservation significant fauna species that are likely to and may occur in the survey area

Scientific Name	Common Name	Conservation Status		Ecology
		State	EBPC Act	
<b>Birds</b>				
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR	CE	In Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. In Western Australia, they are widespread around coastal and sub coastal plains from Cape Arid to the south-west Kimberley. Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas and less often recorded inland around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand.
<i>Calidris subminuta</i>	Long-toed Stint	MI	Ma, MI	In Western Australia this species is found mainly along the coast, with a few scattered inland records. It is distributed along most of the Australian coastline with large densities on the Victorian and Tasmanian coasts. The Red-necked Stint has been recorded in all coastal regions, and found inland in all states when conditions are suitable.
<i>Chalcites osculans</i>	Black-eared Cuckoo	MI	Ma, MI	The Black-eared Cuckoo is widespread on mainland Australia, but avoids the wet, heavily forested areas on the east coast and the south-west corner of Western Australia. It is an occasional vagrant to offshore islands and Tasmania. The Black-eared Cuckoo is found in drier country where species such as mulga and mallee form open woodlands and shrublands. It is often found in vegetation along creek beds (BirdLife, 2021).
<i>Falco peregrinus</i>	Peregrine Falcon	OS	-	A well-known falcon, the Peregrine inhabits a vast array of environs in Australia. Usually uncommon and migratory (Pizzey & Knight, 2007). This species lays its eggs in recesses of cliff faces, tree hollows or large abandoned nests (Bamford, 2009)
<i>Gelochelidon nilotica</i>	Gull-billed Tern	MI	MI	Gull-billed Terns are found in freshwater swamps, brackish and salt lakes, beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands and grasslands. They are only rarely found over the ocean.
<i>Merops ornatus</i>	Rainbow Bee-eater	MI	Ma, MI	The Rainbow Bee-eater occurs in open woodlands and shrublands, including mallee, and in open forests that are usually dominated by eucalypts. It also occurs in grasslands and, especially in arid or semi-arid areas, in riparian, floodplain or wetland vegetation assemblages (Gibson 1986; Longmore 1978; Storr 1977; Woinarski et al. 1988).

Scientific Name	Common Name	Conservation Status		Ecology
		State	EBPC Act	
<i>Motacilla cinerea</i>	Grey Wagtail	MI	Ma, MI	The Grey Wagtail is a scarce but regular visitor to northern Australia, typically arriving in October and leaving in March. The species is most commonly associated with water and are found across a wide variety of wetlands, watercourses and on the banks of lakes and marshes (Referral guideline for 14 birds listed as migratory species under the EPBC Act, (DAWE, 2021)
<i>Oxyura australis</i>	Blue-billed Duck	P4	-	The Blue-billed Duck is endemic to south eastern and south western Australia. It prefers deep water in large permanent wetlands and swamps with aquatic vegetation. This species of duck is fully aquatic and rarely comes onto land (OoEH, 2018)
<i>Rostratula australis</i>	Australian Painted Snipe	EN	E	The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains.
<i>Tringa glareola</i>	Wood Sandpiper	MI	Ma, MI	The Wood Sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially Melaleuca and River Red Gums <i>Eucalyptus camaldulensis</i> and often with fallen timber. They also frequent inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops. They are also found at some small wetlands only when they are drying (Higgins & Davies, 1996).
<i>Tringa nebularia</i>	Common Greenshank	MI	Ma, MI	The species is found in inland wetlands and sheltered coastal habitats (DotE, 2015). The Common Greenshank is generally absent from the Western Deserts although there are a few records from the Great Sandy Desert and the Nullarbor Plain. It occurs around most of the coast from Cape Arid in the south to Carnarvon in the north-west. In the Kimberleys, it is recorded in the south-west and the north-east, with isolated records from the Bonaparte Archipelago (Higgins & Davies, 1996).
<b>Invertebrates</b>				
<i>Idiosoma clypeatum</i>	Northern Shield-backed Trapdoor Spider	P3	-	<i>Idiosoma clypeatum</i> is one of seven highly autapomorphic species in the polyphyletic 'sigillate complex'. <i>Idiosoma clypeatum</i> has a widespread distribution in Western Australia's inland arid zone, principally throughout the Yalgoo and Murchison bioregions where it is the only known species in the nigrum-group (excluding a population of <i>I. formosum</i> from the southern Yalgoo. It extends from near Paynes Find, the Blue Hill Range, Kadji Nature Reserve, and Karara in the south, north and north-east to at least Coolcalalaya Homestead, Jack Hills, Albion Downs, Yakabindie, and Yeelirrie. This distribution seems to be strongly correlated with annual rainfall of less than 250 mm (Rix et al., 2018)
<i>Idiosoma nigrum</i>	Shield-backed Trapdoor	EN	V	The Shield-backed Trapdoor Spider is endemic to semi-arid south-west Western Australia (WA). It occurs in a number of severely fragmented populations in the central and northern Wheatbelt (e.g. Minnivale and East Yorkkraine). Further north, the species occurs in more arid areas in the Midwest (e.g. large isolated ranges at Jack Hills, Weld Range

Scientific Name	Common Name	Conservation Status		Ecology
		State	EBPC Act	
	Spider, Black Rugose Trapdoor Spider			(Ecologia Environment, 2009) and Blue Hills (Ecologia Environment, 2013)) and coastal areas of the Midwest (e.g. Zuytdorp Station north of the Murchison River and Nanga Station south of Shark Bay) ( Anonymous, 2010). The arid Midwest populations are naturally fragmented or isolated because they persist only on ranges, but the Wheatbelt and coastal Midwest populations are all severely fragmented as a result of land clearing (Anonymous, 2010). In the Wheatbelt, the Shield-backed Trapdoor Spider typically inhabits clay soils whereas the arid Midwest populations are associated with rocky habitats, primarily in positions with increased moisture retention properties like gullies and drainage lines on southern facing slopes (Anonymous, 2010; Ecologia Environment, 2009).
<b>Reptiles</b>				
<i>Egernia stokesii badia</i>	Western Spiny-tailed Skink	VU	E	The Western Spiny-tailed Skink belongs to a group of moderately large, rock-dwelling reptiles (Chapple, 2003). Two colour forms exist; the brown form and black form, the latter is delineated from the former by its black colouration, lack of patterning in adults and differing head and scale morphology (DotE, 2015). The black form occupies rock crevices in large, isolated rocky outcrops, typically granite (Duffield & and Bull, 2002). Crevices are usually identifiable by a "latrine" or scat pile, resulting from regular defecation of all family members, in close proximity to the entrance (Chapple, 2003).
<b>Mammals</b>				
<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart	P4	-	The Long-tailed Dunnart inhabits exposed rock and stony soils with hummock grasses and shrubs. Flat-topped hills, lateritic plateaus, sandstone ranges and breakaways. Sparse mulga over spinifex. The species has been recorded in disjunct populations across arid Australia with populations recorded in the southern Carnarvon Basin.





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 (when printed at A4)

Data sources:  
 Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2010).  
 Service Layer Credits: World Imagery, Earthstar Geographics

**LEGEND**

Survey Area

Threatened and Priority Flora database (TPFL) (P1 labelled)

Threatened Fauna database (DFCA)

WA Herbarium database (WAHERB) (P1,P2 labelled)

■ P2  
■ P3  
■ P4  
■ Priority 1

▲ Critically Endangered  
▲ Endangered  
▲ Vulnerable  
▲ Migratory Species  
▲ Specially Protected  
▲ Priority 3  
▲ Priority 4

**Desktop Significant Flora, Fauna and Community Results**

DEPARTMENT OF INDUSTRY, SCIENCE, ENERGY AND RESOURCES  
 FLORA, VEGETATION AND FAUNA ASSESSMENT – SQUARE KILOMETRE ARRAY (SKA) PROJECT

Figure **6**

## 6.0 Field Survey Results and Discussion

### 6.1 Vegetation

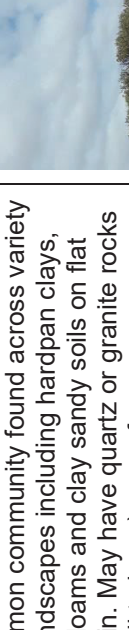
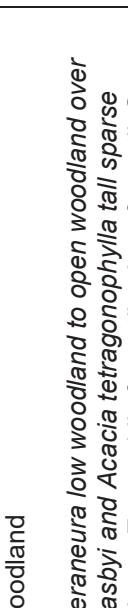
#### 6.1.1 Vegetation Communities

No TECs or PECs were anticipated to occur, and none were recorded in the survey area. Two native vegetation communities were defined and mapped by comparing floristic data from 5 relevés and past survey data (Table 15). The vegetation was largely homogenous, characterised by Mulga Open Woodlands on hard clay on flat terrain, sometimes with quartz on the surface.

Vegetation communities are mapped in Figure 7.



Table 15 Vegetation communities recorded in the survey area

Description	Site details	Photo
<p><b>Plains</b></p> <p><b>AfEfPo</b> Acacia Woodland</p> <p><i>Acacia fuscaneura</i>, <i>Acacia incurvaneura</i> and <i>Acacia victoriae</i> subsp. <i>victoriae</i> low open woodland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i>, <i>Acacia tetragonophylla</i> and <i>Eremophila phyllopoda</i> low to tall open shrubland over <i>Ptilotus obovatus</i>, <i>Solanum lasiophyllum</i> and <i>Maireana planifolia</i> low sparse shrubland.</p>	<p>Common community found across variety of landscapes including hardpan clays, clay loams and clay sandy soils on flat terrain. May have quartz or granite rocks (small to large) on surface.</p> <p>Amount within survey area (ha): 18.31</p> <p>Species richness:</p> <ul style="list-style-type: none"> <li>• 7 native species</li> </ul>	
<p><b>ApAgEf</b> Acacia Woodland</p> <p><i>Acacia pteraneura</i> low woodland to open woodland over <i>Acacia grasbyi</i> and <i>Acacia tetragonophylla</i> tall sparse shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i>, <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Eremophila fraseri</i> subsp. <i>parva</i> mid shrubland.</p>	<p>Undulating flat terrain with red-brown sandy loam soils.</p> <p>Amount within survey area (ha): 105.46</p> <p>Species richness:</p> <ul style="list-style-type: none"> <li>• 30 species</li> <li>• 2 weed species</li> </ul>	

### 6.1.2 Condition

Boolarly station has been used for sheep and cattle grazing since 1876. The impact of this, combined with a drying climate, is prevalent across the survey area (Plate 1). It has resulted in a loss of total biomass, erosion of the surface, and soil compaction. The 'native vegetation' currently present is unlikely to be a good reflection of pre-European vegetation. Lacking a suitable reference of condition, the entire survey area has been considered in 'Very Good' condition. Vegetation condition is mapped in Figure 7.



**Plate 1** Dry conditions in the survey area at Boolardy Station



## 6.2 Flora

### 6.2.1 Diversity

A total of 34 native flora species from 15 genera and 12 families were recorded. Two weed species were recorded during the survey: \**Cenchrus Ciliaris* and \**Erodium aureum*.

Three specimens that were collected for confirmation lacked suitable material for a confident identification. Two of these collections were submitted to the WA Herbarium for formal identification, as Priority species were identified within the desktop belonging to the same genus. One *Ptilotus* sp. was unable to be identified confidently to species level due to dry condition of the plant in situ, which precluded collection for formal identification. However, based on the appearance of the dried plant material in the field and the local habitat, this specimen was considered unlikely to be *P. beardii*.

The complete species list is provided in **Appendix B**. All site data is presented in **Appendix C**.

### 6.2.2 Conservation Significant Flora

No Threatened flora species listed under the EPBC Act or the BC Act and no Priority flora listed by DBCA were recorded. Rationale as to why these species may not have been identified during the field survey is included below in Table 16.

**Table 16 Rationale for the absence of Priority flora considered likely to occur in the initial desktop assessment**

Species	WA Cons. Code	Habitat	Rationale
<i>Calandrinia butcherensis</i>	P1	Red sands on flats	No suitable habitat was identified for this species.
<i>Calandrinia</i> sp. Boolardy Station (P. Jayasekara 719-JHR-01)	P1	Flat. Low plain. Red/orange sand/clay.	Suitable habitat was identified for this species, however as it is an annual species it may not have been detectable due to the survey timing.
<i>Eremophila muelleriana</i>	P3	Red sand, sandy clay, lateritic sand. Flats, sand dunes, hills.	Marginal habitat was identified for this species, however if present it should have been identifiable when sterile.
<i>Eremophila simulans</i> subsp. <i>megacalyx</i>	P3	Found on rangeland plains road verge with red, sandy gravel laterite.	Suitable habitat was identified for this species, however if present it should have been identifiable when sterile.
<i>Gunnopsia divisa</i>	P3	Loam, quartz. Roadsides. In the Murchison, Yalgoo IBRA regions	Suitable habitat was identified for this species, however as it is an annual species it may not have been detectable due to the survey timing.
<i>Hemigenia tysonii</i>	P3	Red Sands, plains and gently undulating dunes.	No suitable habitat was identified for this species.
<i>Ptilotus beardii</i>	P3	Clayey soils. Saline flats, low breakaways.	No suitable habitat was identified for this species.
<i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94)	P3	Red sand. Plains.	No suitable habitat was identified for this species.
<i>Verticordia jamiesonii</i>	P3	Sandy clay soils. Lateritic breakaways.	No suitable habitat was identified for this species.

## 6.3 Fauna

### 6.3.1 Fauna Inventory

Sixty-two fauna species were recorded during the 2022 field survey comprising 45 bird, 11 mammal (including six introduced), five reptile and one amphibian species. The complete faunal species inventory is presented in **Appendix D**.

A fauna species of unknown conservation status was observed within the survey area, specifically within the Construction Compound and Access area. The individual was disturbed resting in the entrance of a burrow at the base of a tree, likely sunbathing. It retreated rapidly down the burrow upon approach and only general features were able to be observed. The animal was a mammal, small in size (approximately 8-16 cm in body size) and light brown in body colour. The species is unknown, but the appearance of the animal indicates that it belongs to the family Dasyuridae, which are carnivorous marsupials. The burrow had one main entrance, with a secondary small “pop hole” exit approximately a metre back (Plate 2). No clear tracks were located around the burrow and multiple types of scat were observed in close proximity, one of which was approximately 1-2 cm long and consisted of the remains of insects and small vertebrates (Plate 3). The observation was made in the afternoon, with the entrance of the burrow in partial sunlight.

Five species were determined to be potential options for the identity of the unknown animal. These species are outlined in Table 17, below, and are considered the most likely identification for the unknown animal based on size, habitat, behaviour and known distribution. It includes two Priority fauna species, one of which has been identified in the desktop assessment. In order to accurately identify this individual and eliminate any potential Priority species as the correct identity, it is recommended to install a camera trap near the burrow entrance.



Plate 2 Burrow





**Plate 3** Scat present near the burrow entrance

Table 17 Potential species identification for individual observed in the entrance of a burrow

Species	Conservation Status – WA	Size (cm)	Description <sup>1</sup>	Reasoning
Brush-tailed Mulgara <i>Dasyercus blythi</i>	P4	12-16.5	Sandy brown in body colour, black end of tail. Found throughout the arid zone, commonly associated with sand and spinifex grasslands. Burrows generally only have one entrance, with pop holes and small side tunnels. The Brush-tailed Mulgara is not strictly nocturnal and is known to sun-bathe at the entrance of its burrow during the day.	<p>This species was not identified during the initial desktop assessment, as the closest records are approximately 300-400 km away. However, the following factors have resulted in the species being included in this assessment:</p> <ul style="list-style-type: none"> <li>the burrow identified during the survey is very similar in style to those recorded as being created by the species (see Plate 4 below)</li> <li>their scat is similar in shape and size to that recorded near the burrow entrance (see Plate 5 below)</li> <li>the species is known to sun-bathe in the entrance of their burrows, which was what the unknown animal appeared to be doing upon approach</li> <li>physical similarities such as colour and size to the animal observed</li> <li>historical records have occurred within acacia woodlands and shrublands indicating the habitat may be suitable, although most burrows have been recorded near spinifex</li> </ul>
Stripe-faced Dunnart <i>Sminthopsis macroura</i>	-	7-10	Sandy brown with a prominent line of dark hairs running between the eyes to between the ears. It lives in a variety of habitats, including clay, sandy or stony soils. Vegetation ranges from Acacia shrublands and woodlands to open salt lakes. It often shelters during the day in soil cracks, under rocks and logs or within burrows constructed by other animals.	<p>The Stripe-faced Dunnart was included within the assessment due to the following factors:</p> <ul style="list-style-type: none"> <li>the species is known to occur within the region</li> <li>the habitat is suitable for the species</li> <li>physical similarities such as colour and size to the animal observed</li> <li>known to utilise burrows to hide during the day</li> </ul>
Kultarr <i>Antechinomys laniger</i>	-	7-10	Fawn grey to sandy brown body, long thin tail with dark brown to black hairs on the tip of the tail. It is nocturnal and inhabits stony and sandy land, populated by <i>Acacia</i> , <i>Eremophila</i> and <i>Cassia</i> . It is unknown whether this species digs its own burrows, however it is known to occupy burrows of other animals.	<p>The Kultarr was included within the assessment due to the following factors:</p> <ul style="list-style-type: none"> <li>the species is known to occur within the region</li> <li>physical similarities such as colour and size to the animal observed</li> <li>the habitat is suitable for the species</li> <li>known to utilise burrows to hide during the day</li> </ul>
Fat-tailed Dunnart <i>Sminthopsis crassicaudata</i>	-	6-9	Sandy brown body with swollen tail and large ears. Suitable habitat ranges from open woodland to spinifex grasslands on clay or sandy soils. The species is completely nocturnal and occupies nests during the day made of grass or other dried plant material beneath logs, rocks or cracks in the soil.	<p>The Fat-tailed Dunnart was included within the assessment due to the following factors:</p> <ul style="list-style-type: none"> <li>the species is known to occur within the region</li> <li>the habitat is suitable for the species</li> <li>physical similarities such as colour and size to the animal observed</li> </ul>
Long-tailed Dunnart <i>Sminthopsis longicaudata</i>	P4	8-10	Grey-brown with a very long brush-tipped tail. It is nocturnal and found in the arid zone. Its habitat ranges from rocky breakaways to Acacia woodlands on fine red soil.	<p>The Long-tailed Dunnart was included within the assessment due to the following factors:</p> <ul style="list-style-type: none"> <li>the species range occurs within the region and it was identified within the desktop assessment</li> <li>the habitat is suitable for the species</li> <li>physical similarities such as colour and size to the animal observed</li> </ul>

<sup>1</sup>Descriptions obtained from Van Dyck and Strahan, 2008.





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*Plate 97 Entrance to the burrow of a Mulgara near Ayers Rock, Northern Territory. The burrow had one large hole and one pop-hole (positions arrowed) (page 222).*

**Plate 4** Typical burrow for a Brush-tailed Mulgara (image obtained from Van Dyck and Strahan, 2008)



**Plate 5** Typical scat for a Brush-tailed Mulgara (image obtained from Van Dyck and Strahan, 2008)

### 6.3.2 Conservation Significant Fauna

Four conservation significant fauna species listed as Marine under the EPBC Act were recorded during the survey. These include:

- Black-faced Cuckoo-shrike *Coracina novae-hollandiae*.
- Whistling Kite *Haliastur sphenurus*.
- Welcome Swallow *Hirundo neoxena*.
- Australasian Pipit *Anthus australis*.

#### 6.3.2.1 Western Spiny-tailed Skink

The Western Spiny-tailed Skink *Egernia stokesii badia* is listed under the EPBC Act as Endangered and under the WC Act as Vulnerable. It belongs to the cunninghamii group; a group of moderately large, rock-dwelling reptiles (Chapple, 2003). Two colour forms exist; the brown form and black form, the latter is delineated from the former by its black colouration, lack of patterning in adults and differing head and scale morphology (DotEE, 2020). Western Spiny-tailed Skinks are saxicolous (rock dwelling), occupying rock crevices in large, isolated rocky outcrops, typically granite (Duffield & Bull, 2002).

Occasionally, hollow logs or semi-arboreal habitats are utilised for shelter, with the brown form predominantly occupying York Gum woodland (Chapple, 2003). Crevices occupied by the black form of Western Spiny-tailed Skink are usually identifiable by a "latrine" or scat pile, resulting from regular defecation of all family members, in close proximity to the entrance (Chapple, 2003). This species has previously been recorded within Boolardy Station during previous surveys and as such was the subject of a targeted search during the 2022 survey.

Granite outcrops were searched for during the field survey, however no suitable habitat was identified for the Western Spiny-tailed Skink.

#### 6.3.2.2 Northern Shield-back Trapdoor Spider

AECOM (2014) and a subsequent targeted survey by Phoenix (2015) recorded a threatened trapdoor spider species (*Idiosoma nigrum*) twice within the survey and surrounding area. However, in 2018, a conservation systematics review was published (Rix *et al.*, 2018) that detailed the revision of the genus *Idiosoma*. One of the results of this review was that *I. nigrum* was shown to contain multiple species and the distribution of *I. nigrum* included only those populations within the central and central-western Wheatbelt bioregion (Rix *et al.*, 2018).

The *Idiosoma* populations recorded through the Murchison bioregion are now regarded as the Northern Shield-backed Trapdoor Spider *I. clypeatum* (Rix *et al.*, 2018). The review concluded that *I. clypeatum* is the only known species from this genus in the Murchison bioregion (Rix *et al.*, 2018) and its distribution seems to be strongly correlated with annual rainfall of less than 250 mm. The species is Priority 3 listed by the DBCA.

No trapdoor spider burrows were observed during the field survey.

#### 6.3.2.3 Additional Species

Based on the desktop assessment and the field survey, the following additional conservation significant fauna species have the potential to utilise the habitats within the survey area:

- Six threatened, Marine and Migratory listed waders and waterbird species (Curlew Sandpiper *Calidris ferruginea*, Long-toed Stint *Calidris subminuta*, Gull-billed Tern *Gelochelidon nilotica*, Australian Painted Snipe *Rostratula australis*, Wood Sandpiper *Tringa glareola*, Common Greenshank *Tringa nebularia*) that may seasonally utilise the marginal channel and creek line habitats:
- Peregrine Falcon *Falco peregrinus* (listed as OS under the BC Act) may utilise the major channel creek lines with large eucalypts.
- Long-tailed Dunnart *Sminthopsis longicaudata* (listed as P4 by DBCA) may utilise the sandplain habitat which contains a higher density of grasses.

Refer to Table 18 and Appendix A for further detail on all of these conservation significant species.

### 6.3.3 Introduced and Naturalised Fauna

Six introduced and naturalised fauna species were recorded through anecdotal evidence such as scats and tracks:

- Camel *Camelus dromedaries*.
- Cat *Felis catus*.
- Dingo *Canis familiaris dingo*.
- European Cattle *Bos primigenius taurus*.
- Goat *Capra hircus*.
- Rabbit *Oryctolagus cuniculus*.

All of these species except for European Cattle are Declared Pests (C3 Management) under the BAM Act and were identified indirectly (scats and tracks) sporadically.

The C3 Management category is defined as the following:

*Organisms that should have some form of management applied that will alleviate the harmful impact of the organism, reduce the numbers or distribution of the organism or prevent or contain the spread of the organism.*

As these species are widespread throughout the state, management actions may consist of measures to limit their numbers. This could include the removal of artificial water sources such as unused livestock troughs, the use of professional shooters to remove feral camels, goats and cattle or the release of biological agents such as myxomatosis or calicivirus for rabbits.

Dingos are currently also listed as a Declared Pest as *Canis familiaris* under the BAM Act due to predation risk for livestock, however they are also considered a naturalised species within Australia.

### 6.3.4 Fauna Habitats

Fauna habitat throughout the survey area is homogenous, characterised by vegetation on hardpan plain with intermittent sandplains. Three habitat types were mapped; hardpan plains, areas of channels and creeks, and vegetation on sandplains.


Minimal variation in microhabitats and habitat complexity occurs throughout these habitat types, reflected in the density of understorey plants and the abundance of large logs. Dense understorey was restricted to small patches within the three habitat types. Dense understorey provided adequate fauna refuge that led to high species diversity in these areas detected through evidence of use. No boulders, outcrops, or large rocks were recorded, thereby reducing the availability of microhabitat.

The sandplains habitat included grasses as groundcover, providing suitable habitat for small mammal and reptile species. Grasses and annual herbs have likely increased in abundance since destocking occurred a few years ago.


Table 18 describes the three fauna habitats, includes the area and percentage these cover within the survey area, and the conservation significant fauna species that may utilise these habitats. Refer to Figure 7 for habitat mapping.



**Table 18 Fauna habitats of the survey area**

Fauna Habitat	Habitat for conservation significant fauna	Survey Area		Representative Photo
		Ha	%	
<p><b>Channels and creek line</b></p> <p>Major and minor drainage lines subject to occasional and seasonal flooding. Minor drainage areas tend to exhibit little variation in habitat characteristics to hardpan plains (when dry), apart from slightly higher vegetation cover and sandier soils. Major drainage channels tend to contain larger trees.</p> <p>The habitat quality for these areas ranges from moderate to high. The drainage lines and floodplains contain a variety of microhabitats and also provide an important wildlife corridor for many migratory species. Large logs were infrequently observed and no rocks were present.</p> <p>Standing water was observed at numerous locations, with a large amount of new grass and annual herbs. This would provide suitable foraging for larger herbivores and encourage insect populations which supports small mammals, reptiles and many bird species.</p>	<p>This habitat may seasonally provide habitat for waterbird species including:</p> <ul style="list-style-type: none"> <li>• Curlew Sandpiper <i>Calidris ferruginea</i></li> <li>• Long-toed Stint <i>Calidris subminuta</i></li> <li>• Gull-billed Tern <i>Gelochelidon nilotica</i></li> <li>• Australian Painted Snipe <i>Rostratula australis</i></li> <li>• Wood Sandpiper <i>Tringa glareola</i></li> <li>• Common Greenshank <i>Tringa nebularia</i>.</li> </ul> <p>May provide habitat for Peregrine Falcon <i>Falco peregrinus</i>.</p> <p>Possible habitat for the Northern Shield-backed Trapdoor Spider <i>Idiosoma clypeatum</i>.*</p>	11.62	9.4	

Fauna Habitat	Habitat for conservation significant fauna	Survey Area		Representative Photo
		Ha	%	
<p><b>Hardpan plain with intermittent sandplain</b></p> <p>This habitat contains sparse <i>Acacia</i> over mixed native shrubs on hardpan plain with intermittent sandplains.</p> <p>Density of understorey varied throughout this habitat type, ranging from bare ground to moderately dense shrubs. Surface leaf litter and small rocks occurred occasionally, with large logs rare throughout the survey area.</p> <p>Microhabitats were minimal, with the fauna observed primarily consisting of small birds moving in flocks through the survey area.</p> <p>Tracks, scats and bones of larger mammals were also observed throughout this habitat type.</p> <p>Habitat quality ranged from low to high primarily due to the lack of variety in microhabitats.</p>	<p>Possible habitat for the Northern Shield-backed Trapdoor Spider <i>Idiosoma clypeatum</i>.*</p> <p>Potential habitat for the Mulgara <i>Dasymercus blythi</i>. Although not identified in the initial desktop assessment, the suitability of habitat for this species has been assessed due to its inclusion in the assessment outlined in Section 6.3.1.</p>	104.64	84.5	

Fauna Habitat	Habitat for conservation significant fauna	Survey Area		Representative Photo
		Ha	%	
<p><b>Sandplain</b></p> <p>Alluvial plains of orange to brown sands (often with thin crust). Supports <i>Acacia</i>, <i>Eremophila</i> and <i>Ptilotus</i> species.</p> <p>The sandplain habitat contained a wider variety in microhabitats than the hardpan plains. Small logs were common, with medium sized logs (10-30 cm) occurring occasionally. Grass was abundant, with larger amounts of coarse leaf litter present than other sections of the survey area. Small stones also occurred occasionally on the surface.</p> <p>Tracks in a range of sizes were observed for both mammals and reptiles, along with numerous flocks of small birds.</p> <p>This habitat is moderate to high quality due to the variety in microhabitats present and the broad number of fauna observed.</p>	<p>Possible habitat for the Northern Shield-backed Trapdoor Spider <i>Idiosoma clypeatum</i>.*</p> <p>Potentially suitable habitat for the Long-tailed Dunnart <i>Sminthopsis longicaudata</i>.</p> <p>Potential habitat for the Mulgara <i>Dasyercus blythi</i>. Although not identified in the initial desktop assessment, the suitability of habitat for this species has been assessed due to its inclusion in the assessment outlined in Section 6.3.1.</p>	7.50	6.1	
<b>TOTAL Area (including Cleared – 0.04 ha)</b>		<b>123.80</b>	<b>100</b>	

Notes: \* Exact habitat requirements for this species are unknown. However, it generally occurs near the bases of *Acacia* or *Eremophila* (Tim Moulds [Invertebrate Solutions, pers comm., 2020]).



## 7.0 Conclusions

Ecological assessments including a flora and vegetation assessment and basic fauna assessment were undertaken on Boolardy Station for the Square Kilometre Array Project in May 2022. The assessment included a desktop assessment, field surveys and data analysis. A summary of the ecological assessments, with a focus on significant findings, is presented below:

- No Threatened or Priority Ecological Communities were anticipated to occur and none were recorded. Two native vegetation communities were recorded and mapped. None are considered regionally significant as vegetation communities were widespread and common in the area. The area comprises largely of Acacia open woodland.
- The region was noted to be very dry and has been impacted from extensive historical grazing. This has led to a reduced biomass, significant erosion, and compacted soil profile.
- No Threatened or Priority flora species were recorded.
- Three broad fauna habitats were defined and mapped, comprising hardpan plain and intermittent sandplain, channels and creek lines and sandplains.
- One mammal that was observed during the survey was unable to be accurately identified to species. Available information of indirect evidence (scat and burrow) suggest it is a member of the Dasyuridae family which includes two potential Priority species that may occur in the area. Further investigation would be required to verify the identification of this species.

No suitable habitat for the Threatened skink was identified and no trapdoor spider burrows were recorded. The Project was completed successfully with two limitations identified. Firstly, the seasonality of the survey meant that annual Priority flora would not have been present at the time. Furthermore, one fauna individual (likely belonging to the family Dasyuridae) was unable to be confirmed to species level and may represent a Priority.

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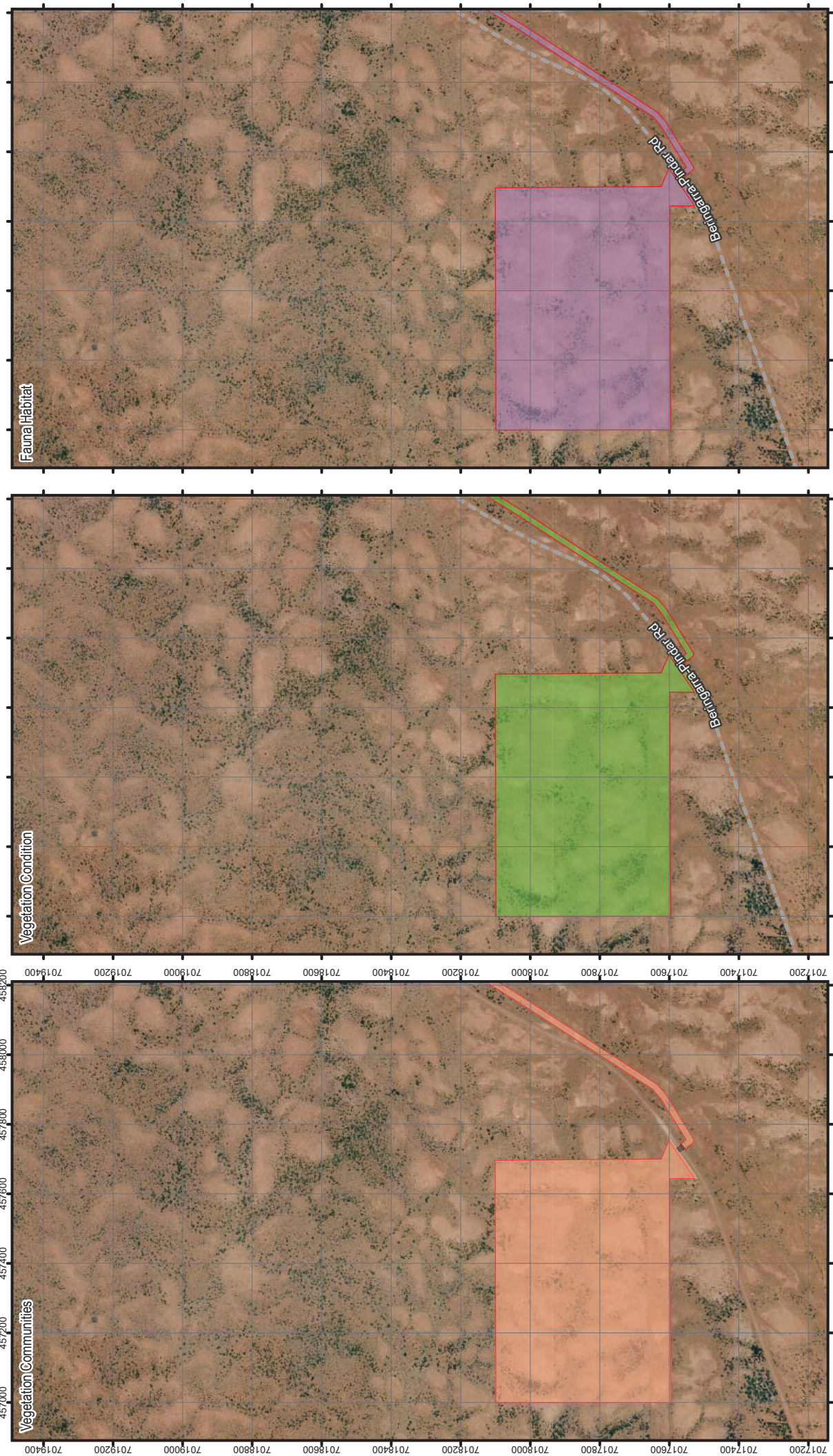


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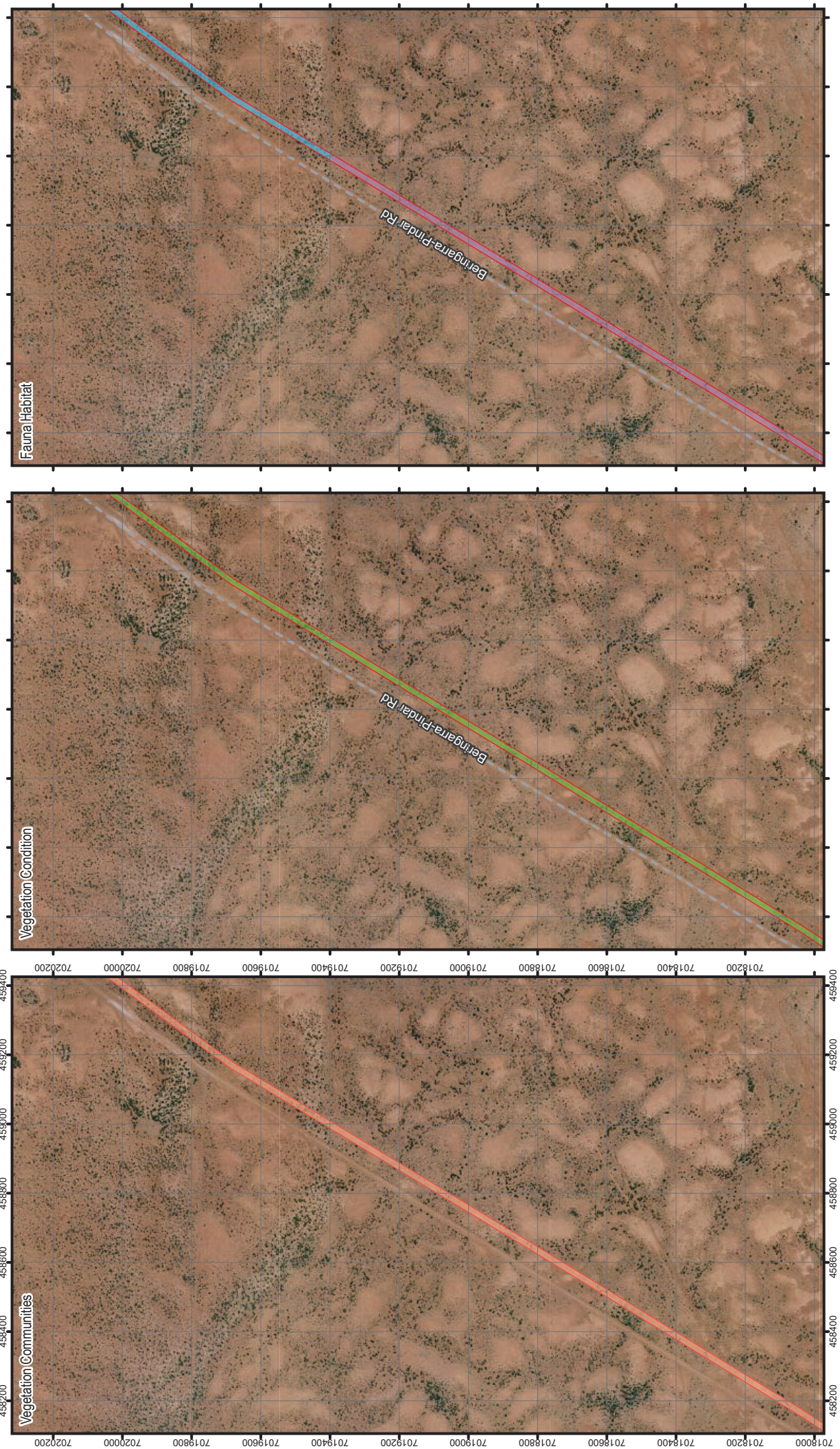
Woinarski JCZ, Tidemann SC, Kerin S, 1988. Birds in a tropical mosaic: the distribution of bird species in relation to vegetation patterns. *Wildlife Research*. 15:171-96.





<b>PROJECT ID</b> 60684770 <b>CREATED BY</b> WYATK2 <b>APPROVED BY</b> C. HOUSE <b>LAST MODIFIED</b> 13 JUN 2022	 <a href="http://www.aecom.com">www.aecom.com</a> Datum: GDA2020 MGA Zone 50 0 50 100 150 200 metres 1:15,000 (When printed at A4) <small>Data source:</small>	<b>LEGEND</b> Survey Area Vegetation Communities ApAgEf Cleared Fauna Habitat Cleared Hardpan plain and intermittent sandplain Vegetation Condition Very Good	<b>Vegetation Communities, Condition and Fauna Habitat</b>	<b>DEPARTMENT OF INDUSTRY, SCIENCE, ENERGY AND RESOURCES</b> <b>FLORA, VEGETATION AND FAUNA ASSESSMENT – SQUARE KILOMETRE ARRAY (SKA) PROJECT</b>	<b>Figure 7.1</b>
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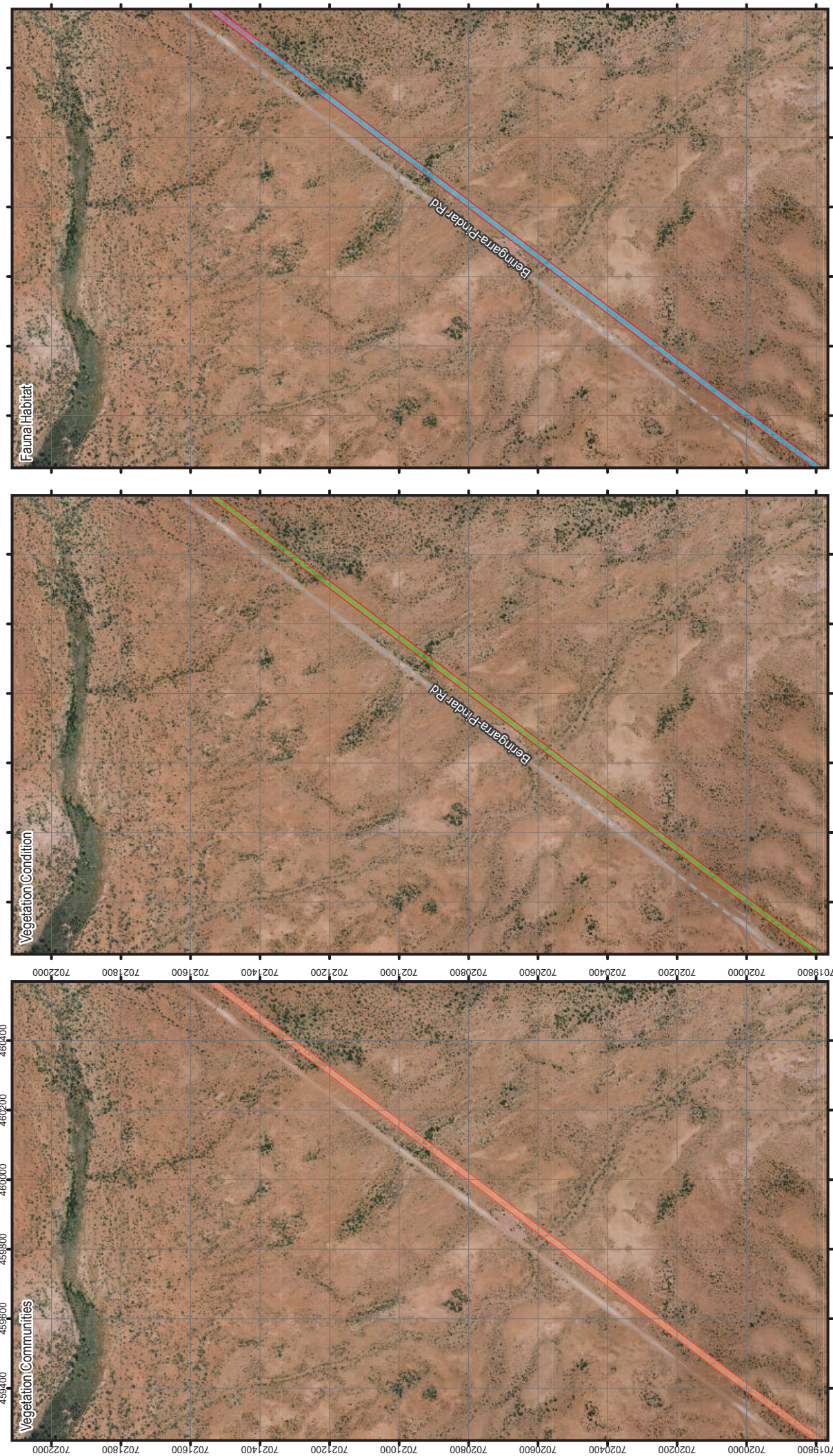


<b>PROJECT ID</b> 60684770 <b>CREATED BY</b> WYATK2 <b>APPROVED BY</b> C. HOUSE <b>LAST MODIFIED</b> 13 JUN 2022  <b>LEGEND</b> <span style="border: 1px solid red; display: inline-block; width: 10px; height: 10px; margin-right: 5px;"></span> Survey Area <span style="background-color: orange; display: inline-block; width: 10px; height: 10px; margin-right: 5px;"></span> Vegetation Communities  <span style="background-color: green; display: inline-block; width: 10px; height: 10px; margin-right: 5px;"></span> Vegetation Condition <span style="background-color: lightgreen; display: inline-block; width: 10px; height: 10px; margin-right: 5px;"></span> Very Good  <span style="border-bottom: 1px solid blue; display: inline-block; width: 10px; margin-right: 5px;"></span> Channels and creek line <span style="background-color: purple; display: inline-block; width: 10px; height: 10px; margin-right: 5px;"></span> Hardpan plain and intermittent sandplain  <span style="background-color: orange; display: inline-block; width: 10px; height: 10px; margin-right: 5px;"></span> ApAgE	<b>Vegetation Communities, Condition and Fauna Habitat</b>  DEPARTMENT OF INDUSTRY, SCIENCE, ENERGY AND RESOURCES FLORA, VEGETATION AND FAUNA ASSESSMENT – SQUARE KILOMETRE ARRAY (SKA) PROJECT	<b>Figure 7.2</b>

PROJECT ID 60684770  
 CREATED BY WYATK2  
 APPROVED BY C. HOUSE  
 LAST MODIFIED 13 JUN 2022  
 Datum: GDA2020 MGA Zone 50  
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 (When printed at A4)  
 Data sources:  
 Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2011) Geoscience Australia, Singapore

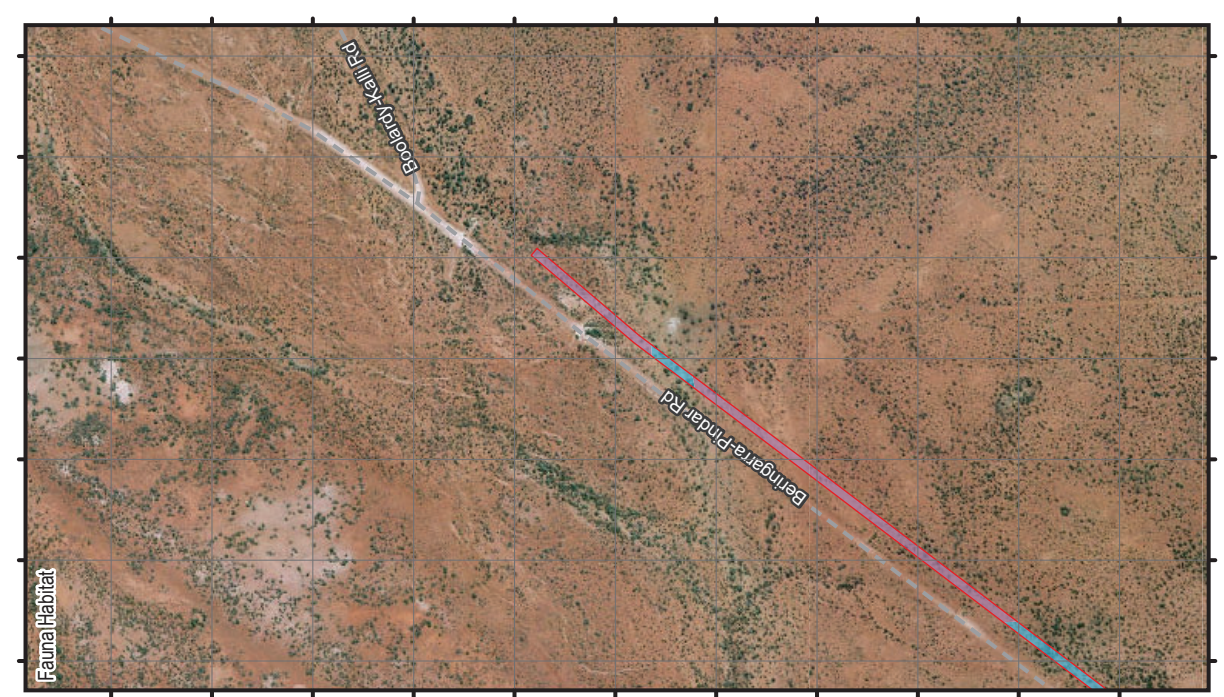
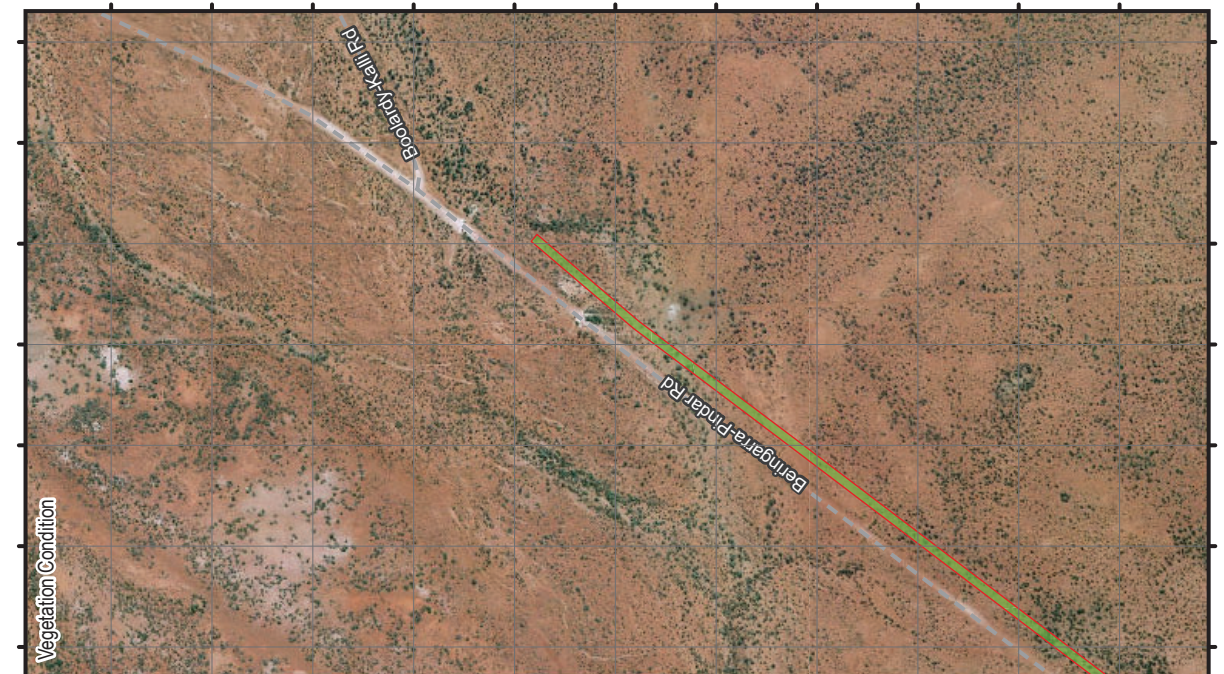
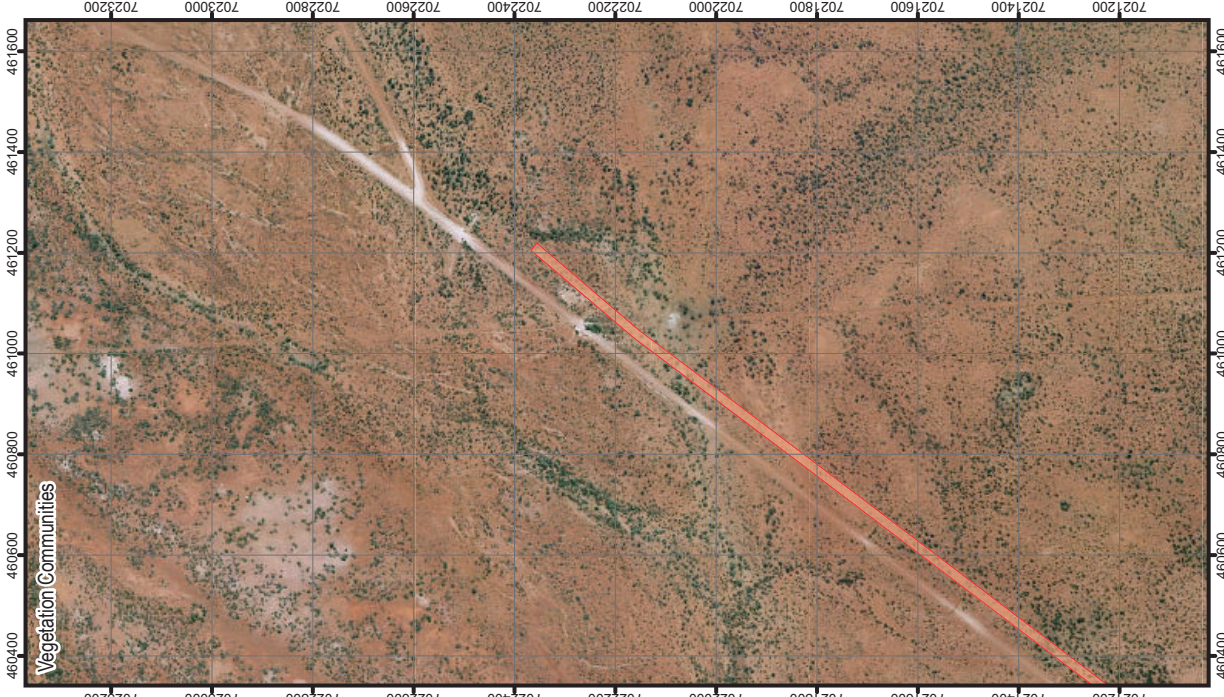
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 AECOM does not warrant the accuracy or completeness of information displayed in this map and any person using it does so at their own risk. AECOM shall bear no responsibility or liability for any errors, faults, defects, or omissions in the information.





<b>PROJECT ID</b> 60684770 <b>CREATED BY</b> WYATK2 <b>APPROVED BY</b> C. HOUSE <b>LAST MODIFIED</b> 13 JUN 2022		<b>LEGEND</b> Survey Area Vegetation Communities ApAgE1		<b>Fauna Habitat</b> Channels and creek line Hardpan plain and intermittent sandplain		<b>Vegetation Condition</b> Very Good	
<b>AECOM</b> www.aecom.com		Datum: GDA2020 MGA Zone 50 0 50 100 150 200 metres		1:15,000 (When printed at A4)		Data sources: <small>Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2010) Geospatial Australia, Shiregpo</small>	
<b>Vegetation Communities, Condition and Fauna Habitat</b>				<b>DEPARTMENT OF INDUSTRY, SCIENCE, ENERGY AND RESOURCES</b> <b>FLORA, VEGETATION AND FAUNA ASSESSMENT – SQUARE KILOMETRE ARRAY (SKA) PROJECT</b>			
				<b>Figure 7.3</b>			





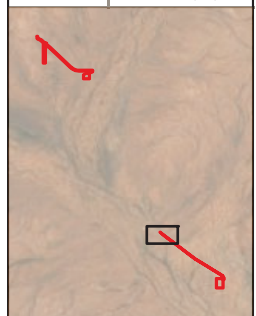
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 CREATED BY: WYATTK2  
 APPROVED BY: C. HOUSE  
 LAST MODIFIED: 13 JUN 2022  
 www.aecom.com

Datum: GDA2020 MGA Zone 50  
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 (When printed at A4)  
 Data source:

Scale bar: 0 50 100 150 200 metres

**LEGEND**

- Survey Area
- Vegetation Communities
- ApAgEF
- Vegetation Condition
- Very Good
- Fauna Habitat
- Channels and creek line
- Hardpan plain and intermittent sandplain

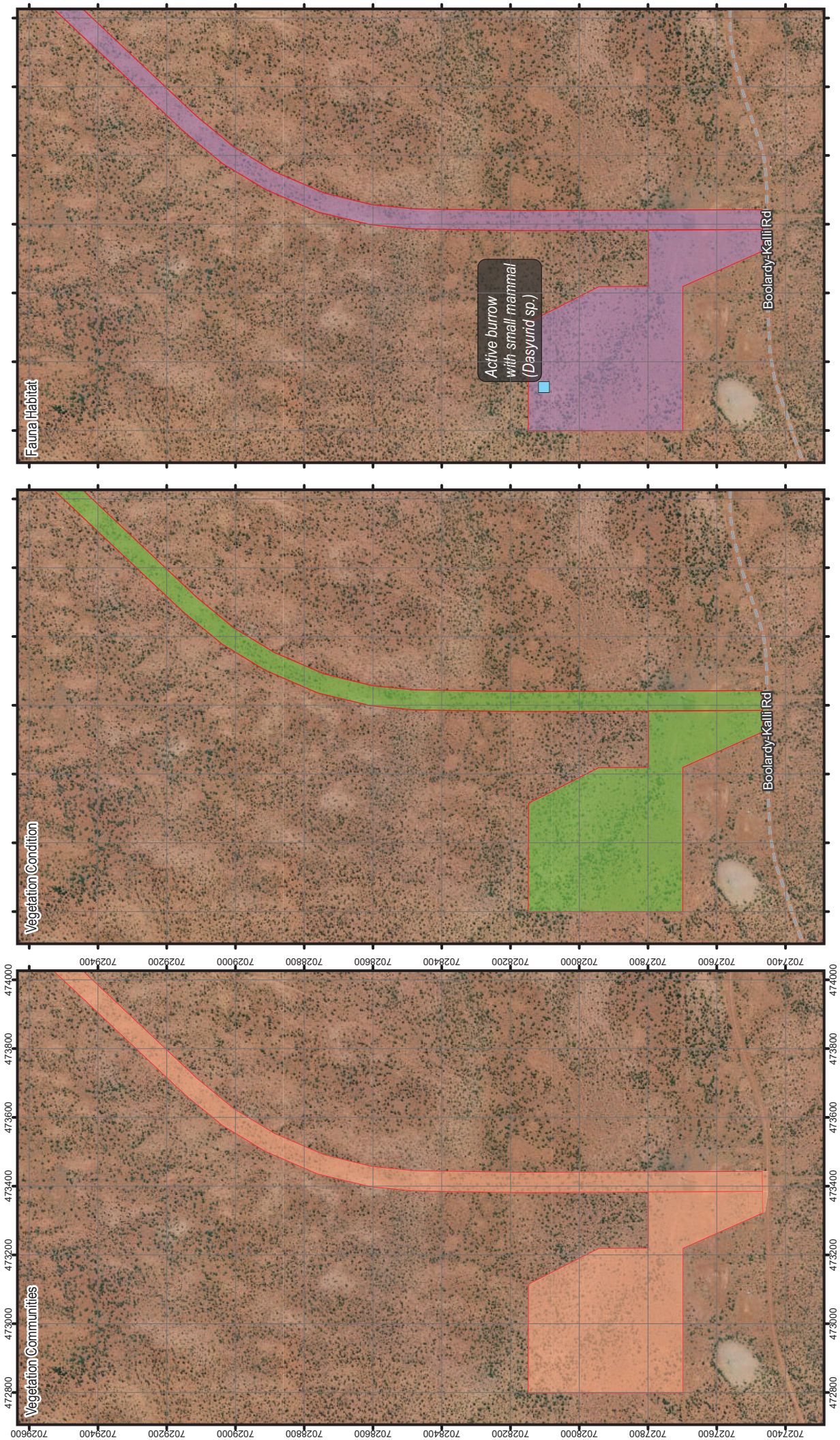


**Vegetation Communities, Condition and Fauna Habitat**

DEPARTMENT OF INDUSTRY, SCIENCE, ENERGY AND RESOURCES  
 FLORA, VEGETATION AND FAUNA ASSESSMENT – SQUARE KILOMETRE ARRAY (SKA) PROJECT

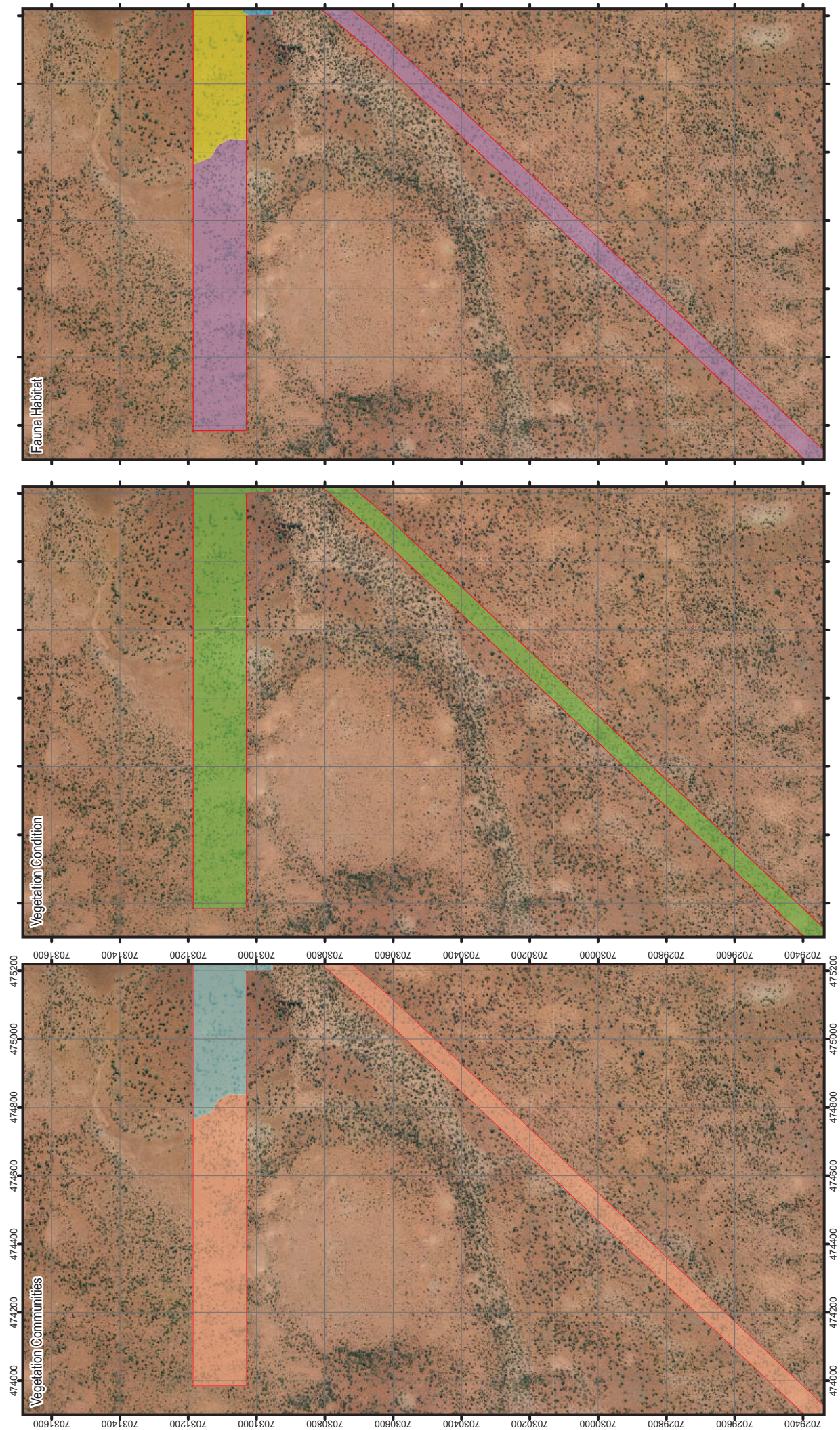
Figure **7.4**





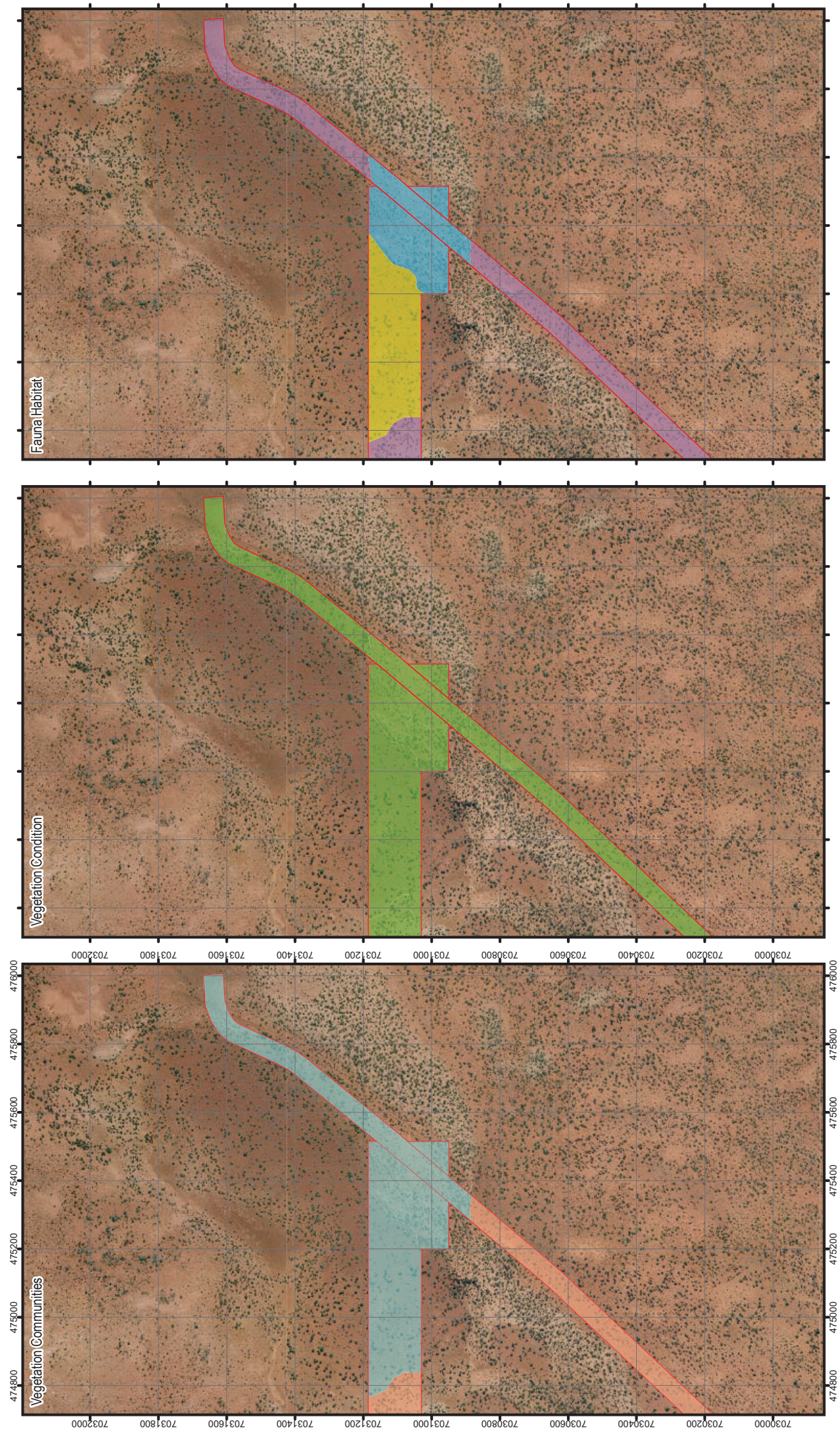
<p><b>PROJECT ID</b> 60684770  <b>CREATED BY</b> WYATK2  <b>APPROVED BY</b> C. HOUSE  <b>LAST MODIFIED</b> 13 JUN 2022</p> <p><b>AECOM</b>  <a href="http://www.aecom.com">www.aecom.com</a></p> <p>Datum: GDA2020 MGA Zone 50  0 50 100 150 200  metres</p> <p>1:15,000  (when printed at A4)</p> <p>Data source:  <small>(Base Data: © Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2011) Geospatial Australia, Shiregpo</small></p>	<p><b>LEGEND</b></p> <ul style="list-style-type: none"> <li>Survey Area</li> <li>Vegetation Communities</li> <li>ApAgE</li> <li>Potential Conservation Significant Fauna Species Fauna Habitat</li> <li>Hardpan plain and intermittent sandplain</li> </ul>	<p><b>Vegetation Condition</b></p> <ul style="list-style-type: none"> <li>Very Good</li> </ul>	<p><b>Vegetation Communities, Condition and Fauna Habitat</b></p> <p>DEPARTMENT OF INDUSTRY, SCIENCE, ENERGY AND RESOURCES  <b>FLORA, VEGETATION AND FAUNA ASSESSMENT – SQUARE KILOMETRE ARRAY (SKA) PROJECT</b></p>	<p><b>Figure 7.5</b></p>
	<p><b>Map Labels:</b></p> <ul style="list-style-type: none"> <li>Vegetation Communities</li> <li>Vegetation Condition</li> <li>Fauna Habitat</li> <li>Active burrow with small mammal (Dasyurid sp.)</li> <li>Boolardy-Kallii Rd</li> </ul>			<p><b>Map Title:</b> Vegetation Communities, Condition and Fauna Habitat</p>





<b>PROJECT ID</b> 60684770 <b>CREATED BY</b> WYATK2 <b>APPROVED BY</b> C. HOUSE <b>LAST MODIFIED</b> 13 JUN 2022	 <a href="http://www.aecom.com">www.aecom.com</a>	<b>LEGEND</b> Survey Area Vegetation Communities AIEP0 ApAgEf	<b>Vegetation Condition</b> Very Good	<b>Fauna Habitat</b> Channels and creek line Hardpan plain and intermittent sandplain Sandplain	<b>Vegetation Communities, Condition and Fauna Habitat</b>	<b>DEPARTMENT OF INDUSTRY, SCIENCE, ENERGY AND RESOURCES</b> <b>FLORA, VEGETATION AND FAUNA ASSESSMENT – SQUARE KILOMETRE ARRAY (SKA) PROJECT</b>	<b>Figure 7.6</b>
					 Datum: GDA2020 MGA Zone 50 1:15,000 (When printed at A4) Data sources:		





<p><b>PROJECT ID</b> 60684770  <b>CREATED BY</b> WYATTK2  <b>APPROVED BY</b> C. HOUSE  <b>LAST MODIFIED</b> 13 JUN 2022</p> <p><b>AECOM</b>  <a href="http://www.aecom.com">www.aecom.com</a></p> <p>Datum: GDA2020 MGA Zone 50          1:15,000          (When printed at A4)</p> <p>0 50 100 150 200          metres</p> <p><small>Data sources:          (Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2011) Geoscience Australia, Shiregpo</small></p>	<p><b>LEGEND</b></p> <ul style="list-style-type: none"> <li>Survey Area</li> <li>Vegetation Communities               <ul style="list-style-type: none"> <li>AIeIPo</li> <li>ApAgEf</li> </ul> </li> <li>Vegetation Condition               <ul style="list-style-type: none"> <li>Very Good</li> </ul> </li> <li>Fauna Habitat               <ul style="list-style-type: none"> <li>Channels and creek line</li> <li>Hardpan plain and intermittent sandplain</li> <li>Sandplain</li> </ul> </li> </ul>	<p><b>Vegetation Communities, Condition and Fauna Habitat</b></p> <p>DEPARTMENT OF INDUSTRY, SCIENCE, ENERGY AND RESOURCES          FLORA, VEGETATION AND FAUNA ASSESSMENT – SQUARE KILOMETRE ARRAY (SKA) PROJECT</p>	<p><b>Figure 7.7</b></p>
	<p><b>Vegetation Communities, Condition and Fauna Habitat</b></p>		



# Appendix A

## Desktop Results

A1 Flora Desktop  
A2 Fauna Desktop



## Appendix A1 Flora Desktop Results

Species	WA Cons. Code	Habitat <sup>1</sup>	Likelihood	Justification	Count Date
<i>Acacia atopa</i>	P3	Red clay & red loam. Sometimes in rocky situations. Distributed in the Canarvon, Gascoyne and Murchison IBRA Regions	Unlikely	Located 38 km from SW arm of survey corridor, habitat may be present in survey area	1/10/2011
<i>Acacia dilloniorum</i>	P1	found on red clay loam over exposed dolerite outcropping in Weld Range	Unlikely	Located on adjacent BIF range, located outside project area	25/08/2011
<i>Acacia</i> sp. Jack Hills (R. Meissner & Y. Caruso 4)	P1	Tall shrub to 2 m high, found on rocky banded iron formation on Jack Hills within the Shire of Meekatharra	Unlikely	Located 47 km from N arm of survey corridor, on BIF outcropping	21/11/2013
<i>Acacia</i> sp. Muggon Station (S. Patrick & D. Edinger SP 3235)	P2	Erect, single-stemmed tuberous, perennial, herb (with succulent green leaves), to 0.1 m high. Fl. white, Sep. Sand patches inside rocks, brown sandy clay, granite.	Unlikely	Located 37 km from survey area, habitat may be present	24/08/2008
<i>Acacia speckii</i>	P4	Depressions in rock outcrops, breakaways, flats. Decumbent or ascending annual, herb, 0.06-0.1(-0.21) m high. Fl. yellow, Sep to Dec. Sandy or clayey soils. Salt swamps & pans. More records towards coast i.e. Shark Bay	Unlikely	Habitat may be present, but located a substantial distance from Survey Area	15/07/2010
<i>Anacampteros</i> sp. Eremaean (F. Hort, J. Hort & J. Shanks 3248)	P1	Low rounded shrub, to 1 m high. Fl. pink, Aug. Brown loam. Breakaway. 400+ km west of Wiluna.	Unlikely	Recorded long distance from survey area, only one record	19/08/2008
<i>Angianthus microcephalus</i>	P2	Decumbent or ascending annual, herb, 0.06-0.1(-0.21) m high. Fl. yellow, Sep to Dec. Sandy or clayey soils. Salt swamps & pans.	May	Recorded in survey area, very old record	28/10/1953
<i>Baeckea</i> sp. Mount Bartoweerie (J.Z. Weber 5079)	P1	Shrub, 0.4-0.75 m high. Fl. pink/white, Aug or Oct. Sandy clay.	May	Located 7.5 km from survey area, habitat present	30/08/2008
<i>Beyeria lapidicola</i>	P1	Shrub to 1 m high, found on ironstone outcrops/breakaways on the mid-slopes of ranges. Found in three disjointed areas across the midwest of Western Australia (including Weld Range)	Unlikely	Located on Weld Range, far from survey area.	10/03/2009
<i>Calandrinia butcherensis</i>	P1	Red sands on flats	Likely	Located directly adjacent to survey area, habitat present	18/10/2016
<i>Calandrinia</i> sp. Boolbardi Station (P. Jayasekara 719-JHR-01)	P1	Flat. Low plain. Red/orange sand/clay.	Likely	Recorded close to survey area between the two southern arms.	18/10/2006
<i>Calotis</i> sp. Perrinvale Station (R.J. Cranfield 7096)	P3	Red Loam and red-orange sand clay-loam over banded ironstone formation	Unlikely	Long distance >30km from survey area, habitat may be present	9/09/2016
<i>Calytrix verruculosa</i>	P3	Sandy clay.	Unlikely	Unlikely, habitat 30 km from survey area	15/09/2009
<i>Chamaelucium</i> sp. Yalgoo (Y. Chadwick 1816)	P1	Granite outcrops	Unlikely	Far from survey area >60 km	12/09/2009
<i>Cithonoccephalus muellerianus</i>	P2	Red sand.	Unlikely	Unlikely, habitat 30 km from survey area	11/09/2016
<i>Dicrastylis linearifolia</i>	P3	Red sand. Sandplain.	Unlikely	Old record, >30 km from survey area	4/11/1997
<i>Dicrastylis</i> sp. Cue (A.A. Mitchell 764)	P1	Drainage area, near granite. Located in the Cue Local Government Area	Unlikely	Old record, >30 km from survey area	17/10/1980
<i>Dodonaea amplisemina</i>	P4	Red-brown sandy clay on basalt and gabbro and banded ironstone or on dolerite and quartzite. Rocky hills.	Unlikely	Located on Weld Range, far from survey area.	16/08/2009
<i>Drosera eremaea</i>	P1	Prostrate annual, herb, flowers minute. Fl. brown/brown & yellow, Aug to Sep. Red loam or clay. Near water.	Unlikely	Located on Weld Range, far from survey area, old record	21/07/1981
<i>Eleocharis papillosa</i>	P3	Red clay over granite, open clay flats. Claypans.	Unlikely	Long distance from survey area, relatively old record	19/08/1999
<i>Eremophila margaretha</i> subsp. straight sepals (G. Cockerton & B. McLean LCH 31310)	P1	On top of banded ironstone hill found in one location on a banded ironstone hill, at Jack Hills, Meekatharra	Unlikely	Long distance >40 km from survey area	25/08/2011
<i>Eremophila muelleriana</i>	P3	Red sand, sandy clay, lateritic sand. Flats, sand dunes, hills.	Likely	Recorded within the Project area directly adjacent to the survey area, habitat present	7/10/2016
<i>Eremophila obliquisepala</i>	P3	Sand. Open hardpan plains in Meekatharra and Upper Gascoyne	Unlikely	Located >40 km from survey area	10/05/1995
<i>Eremophila rhegos</i>	P1	Skeletal stony loam over granite. Meekatharra and Upper Gascoyne	Unlikely	Only recorded at Mt Weld	2/08/1995
<i>Eremophila shonae</i> subsp. <i>diffusa</i>	P3	Stony yellow or red sandy soils. Found in the Gascoyne and Murchison IBRA regions	Unlikely	Only recorded at Mt Weld	11/06/2009
<i>Eremophila similans</i> subsp. <i>megacalyx</i>	P3	Found on rangeland plains road verge with red, sandy gravel laterite.	Likely	Recorded within survey area	16/08/2009
<i>Eremophila</i> sp. Ironstone (G. Cockerton & B. McLean LCH 31311)	P1	Open, densely-leaved shrub, 0.3-0.6 m high. Laterite. Hills, salty places.	Unlikely	One record, over 50 km from survey area on BIF outcropping	25/08/2011
<i>Eremophila</i> sp. Murgoo (S.J.J. Davies s.n. 15/8/1960)	P3	Shrub, 0.5-2.3 m high, sometimes widely spreading with several stems or branches from the base. Red-orange sandy clay, orange-yellow sandy clay to clayey loam, coarse gravel, banded ironstone, laterite, quartz, basalt. Gently undulating plains, dry creek beds, hillcrests, ridges.	Unlikely	Old record, far from survey area	15/08/1960
<i>Frankenia confusa</i>	P4	Annual, herb.	May	Recorded during 2014 surveys however suitable habitat unlikely to be present.	19/09/1997
<i>Goodenia berringinensis</i>	P4	Red sandy loam. Along watercourses.	Unlikely	Recorded >30 km from survey area	12/06/2009
<i>Goodenia grandiflora</i>	P1	Sandy, gravelly soils. Rocky slopes & breakaways.	Unlikely	Only recorded at Mt Weld	23/08/2006

## Appendix A1 Flora Desktop Results

Species	WA Cons. Code	Habitat <sup>1</sup>	Likelihood	Justification	Count Date
<i>Goodenia neogoodenia</i>	P4	Red loam or clay. Near water.	May	recorded near (<7.5 km) from survey area, habitat may be present	19/08/1999
<i>Grevillea inconspicua</i>	P4	Erect shrub, 0.2-0.5 m high. Fl. white-cream. Sep. Red sandy soils.	Unlikely	Only recorded at Mt Weld	24/06/2011
<i>Gunnopsis divisa</i>	P3	Loam, quartz. Roadsides. IN the Murchison, Yalgoo IBRA regions	Likely	Recorded during 2014 surveys.	10/09/2016
<i>Hemigenia exilis</i>	P4	Prostrate herb. Fl. white. Sep to Oct. Sandy soils. Colluvial plains.	Unlikely	Recorded >40 km from survey area	24/08/2011
<i>Hemigenia tysonii</i>	P3	Red Sands, plains and gently undulating dunes.	Likely	Recorded during 2014 surveys, suitable habitat may be present.	8/09/2016
<i>Hemigenia virescens</i>	P3	Brown very rocky sand, on Beebyn and Madonga stations. In the Shire of Meekatharra	Unlikely	Recorded adjacent to Weld Range, long way from survey area	7/03/2011
<i>Hibiscus krichauffianus</i>	P3	Red sandy soils in disjointed populations recorded across the arid areas of Gascoyne, Wheatbelt and Nullabor Plain	Unlikely	Old record, far from survey area	/03/1981
<i>Hibiscus</i> sp. Nookawarra Station (S.J.J. Davies s.n. 1/3/1960)	P1	Found on breakaways in three locations within the Murchison Local Government Area	Unlikely	Recorded far from survey area, old record	26/03/1971
<i>Homalocalyx echinulatus</i>	P3	Shrub, to 1 m high, differs from other varieties in the linear acuminate leaves 6-20 mm long; cilia to 1.2 mm long. Fl. other, Sep to Oct. White sand, gravel. Open woodland. More common north east of Perth.	Unlikely	Recorded at Weld Range, far from survey area	13/09/2009
<i>Indigofera eriophylla</i>	P1	Sand on rises in the Canarvon and Murchison Local Government Areas	Unlikely	Recorded 25 km from survey area SW arm, habitat likely to be present	5/10/2016
<i>Indigofera fractiflexa</i> subsp. <i>augustensis</i>	P2	crest of banded ironstone with shallow red brown sandy loam soils.	Unlikely	Recorded >50 km from survey area on BIF	24/08/2005
<i>Lepidium scandens</i>	P3	Red sand, clay.	Unlikely	Old records, far from survey area	23/08/1931
<i>Maireana murrayana</i>	P3	Red clayey sand, dissected sandstone in the Murchison, Meekatharra and Upper Gascoyne Local Government Areas	Unlikely	Old records, within 10 km of survey area	20/09/1971
<i>Maireana prosthocochaeta</i>	P3	Laterite. Hills, salty places in the Central Kimberley, Gascoyne and Murchison IBRA regions	May	Recorded within survey area, record date not available	-
<i>Micromyrtus placooides</i>	P3	Red-orange sandy clay, orange-yellow sandy clay to clayey loam, coarse gravel, banded ironstone, laterite, quartz, basalt. Gently undulating. In the Cue, Greater Geraldton and Murchison Local Government Areas	May	Recorded 11 km from survey area, habitat present in survey area	27/08/2008
<i>Neotysonia phyllostegia</i>	P1	Found in 1908 and 1910 on Mount Narryer	Unlikely	very old record	/09/1910
<i>Petrophile pauciflora</i>	P3	Decaying & dissected granite breakaways in the inland semi-arid Midwest region of Western Australia	May	Recorded within 10 km of survey area, habitat present, old records	9/10/2016
<i>Petrophile vana</i>	P1	Shallow, white, gritty clay-soil pockets, laterite. Breakaways.	Unlikely	Recorded far from survey area, old records	17/09/1987
<i>Phlaothea citrina</i>	P1	Granite breakaways in the Murchison LGA	Unlikely	Recorded within 10 km of survey area, habitat present	10/09/2016
<i>Phyllanthus baeckeoides</i>	P3	Red lateritic & sandy clay soils. Granite outcrops. In the Eastern Murchison, Shieldand Western Murchison IBRA subregions	Unlikely	Recorded at Weld Range, far from survey area	28/08/2005
<i>Prostanthera ferricola</i>	P3	Shallow red-brown skeletal sandy loam on banded ironstone, laterite, basalt or quartz. Gently inclined mid to upper slopes of hills, rocky crests, outcrops.	Unlikely	Recorded on Mt Weld and northern BIF hill, both far from survey area	29/08/2007
<i>Prostanthera petrophila</i>	P3	Lateritic soil	Unlikely	Recorded on BIF hills far from survey area,	10/09/2006
<i>Prostanthera tysoniana</i>	P3	Red sandy soils in the Murchison LGA	May	Habitat present, recorded ~8 km from survey area	8/09/2016
<i>Psammodiandra ephedroides</i>	P3	Deep yellow or red sandy loams.	Unlikely	recorded far from survey area	4/10/2016
<i>Ptilotus beardii</i>	P3	Clayey soils. Saline flats, low breakaways.	Likely	Recorded during 2014 surveys, suitable habitat present.	14/10/2016
<i>Ptilotus crosslandii</i>	P3	Sandy soils. Colluvial plains in the Murchison and Upper Gascoyne LGAs	Unlikely	Recorded in survey area, extremely old record	26/02/1905
<i>Ptilotus lazaridis</i>	P3	Clay loam. Floodplains.	Unlikely	Recorded >70 km from survey area	/08/1985
<i>Saurospus</i> sp. Woogorong (M. Officer s.n. 10/8/94)	P3	Red sand. Plains.	Likely	Recorded during 2014 surveys, suitable habitat present.	13/10/2016
<i>Seringia exaltata</i>	T	Found on the Pindan Sandplain, deep red sands	Unlikely	Old record, ~100 km from survey area	/09/1981
<i>Solanum pycnanthum</i>	P2	Banded iron outcrops and shallow dry creeklines forming shallow gully on rocky siltstone hills. Red silty clay soil.	Unlikely	habitat present within survey area, recorded within 14 km of survey area	27/08/2008
<i>Stackhousia clementii</i>	P3	Skeletal soils. Sandstone hills. Sparsely distributed across Northern Western Australia north of Geraldton	Unlikely	Old record, >50 km from survey area	19/06/1985
<i>Stenanthemum patens</i>	P1	Rocky hillsides in the Murchison IBRA region	Unlikely	Recorded at Weld Range, far from survey area	24/08/2011
<i>Verticordia jamiisonii</i>	P3	Sandy clay soils. Lateritic breakaways.	Likely	Recorded during 2014 surveys, suitable habitat present.	15/08/2009
<i>Wurmbea murchisoniana</i>	P4	Clay, sandy clay, loam. Seasonally inundated clay hollows, rock pools.	Unlikely	Recorded 83 km from survey area	25/08/1988
<i>Wurmbea</i> sp. Muggon (T.D. Macfarlane & R. Davis TDM 3336)	P1	Stony slope of weathered sandstone.	Unlikely	Recorded 55 km from survey area	28/05/2014

1. Habitat derived from DAWE (2020) and Florabase (WAH, 1998-) unless otherwise cited



Scientific Name	Common Name	Conservation Status		DBCA	PMST	Ecology	Likelihood of Occurrence	Reasoning for likelihood or exclusion	Source
		State	Federal						
<i>Actitis hypoleucos</i>	Common Sandpiper	MI	Ma, MI	1980	2	The Common Sandpiper is widespread throughout Australia, with few important sites on the continent. They visit Australia during the non-breeding season. Preferred habitat is coastal wetlands with muddy margins or rocky shores but has also been recorded in inland wetlands and dams (DAWE, 2021).	Unlikely	Seasonal visitor	DBCA 2020
<i>Aspidites ramsayi</i>	Woma	P1	E	-	-	The south-west Woma subspecies is distributed from North to Yunta, south to Eedimung, inland to Mezeas and east to the western edge of the Nullarbor Plain (Cogger et al., 1993). The species is nocturnal and primarily inhabits sandplains characterised by woodlands, shrublands, or heath, with spinifex, but may also inhabit rocky areas as well.	Unlikely	Outside known distribution of the species	DBCA 2020 (email)
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	MI	Ma, MI	1978	3	They are widespread in Western Australia from the Pilbara region to the south-west. They prefer muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation (DAWE, 2021).	Unlikely	Far inland, habitat present in riverine sections of survey area	DBCA 2020
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR	CE	1978	2	In Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. In Western Australia, they are widespread around coastal and sub-coastal plains from Cape Arid to the south-west (Kimberley). Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas and less often recorded inland around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand (DAWE, 2021).	May	Habitat present within survey area and the survey area is within the species known distribution.	DBCA 2020
<i>Calidris melanotos</i>	Pectoral Sandpiper	MI	Ma, MI	-	-	The Pectoral Sandpiper occupies shallow, fresh waters often containing low grass or other small herbs. It is also observed in swamp margins, flooded pastures and saltmarshes. This species breeds in the northern hemisphere and is a regular though uncommon summer visitor to Australia (Pizzey & Knight, 2007). Rarely recorded in Western Australia (DAWE, 2021).	Unlikely	No records, rare visitor to Australia	PMST
<i>Calidris subminuta</i>	Long-toed Stint	MI	Ma, MI	1978	3	In Western Australia this species is found mainly along the coast, with a few scattered inland records. It is distributed along most of the Australian coastline with large densities on the Victorian and Tasmanian coasts. The Red-necked Stint has been recorded in coastal regions, and found inland in all states when conditions are suitable.	May	Habitat present within survey area and the survey area is within the species known distribution	DBCA 2020
<i>Chauleutes ocellans</i>	Black-eared Cuckoo	MI	Ma, MI	-	-	The Black-eared Cuckoo is widespread on mainland Australia, but avoids the wet, heavily forested areas on the east coast and the south-west corner of Western Australia. It is an occasional vagrant to offshore islands and Tasmania. The Black-eared Cuckoo is found in drier country where species such as mulga and mallee form open woodlands and shrublands. It is often found in vegetation along creek beds (BirdLife, 2021).	May	Habitat present within survey area and the survey area is within the species known distribution. However, no records of the species within the survey area.	PMST
<i>Egretta stokesii</i>	Western Spiny-tailed Skink	VU	E	2013	45	The Western Spiny-tailed Skink belongs to a group of moderately large, rock-dwelling reptiles (Chapple, 2003). Two colour forms exist, the brown form and black form, the latter is delineated from the former by its black colouration, lack of patterning in adults and differing head and scale morphology (DAWE, 2021). The black form occupies rock crevices in large, isolated rocky outcrops, typically granite (Duffield & Bull, 2002). Crevices occupied by the black form of Western Spiny-tailed Skink are usually identifiable by a "lathine" or scat pile, resulting from regular defecation of all family members, in close proximity to the entrance (Chapple, 2003).	Likely	Recorded in nearby locations during 2014 and 2020 surveys. Suitable habitat may be present in the survey area.	DBCA 2020
<i>Falco peregrinus</i>	Peregrine Falcon	OS	-	2011	7	The Peregrine Falcon inhabits a vast array of environments in Australia. Usually uncommon and migratory (Pizzey & Knight, 2007). This species lays its eggs in recesses of cliff faces, tree hollows or large abandoned nests (Bamford, 2009).	Likely	Habitat present, relatively recent records	DBCA 2020
<i>Glaucidium nleuca</i>	Gull-billed Tern	MI	MI	2006	12	Gull-billed Terns are found in freshwater swamps, brackish and salt lakes, beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands and grasslands. They are only rarely found over the ocean (DAWE, 2021).	May	Relatively old records, few records, habitat sporadically present	DBCA 2020
<i>Hypoleucis aurea</i>	Golden Gudgeon	P2	-	-	-	Inhabits rocky pools amongst dense clumps of submerged water weeds and dead branches. Presumably the species has a high tolerance to increased salinity levels and water temperatures, which typically occur in the habitat during drought periods. The species is found in the Murchison and Gascoyne rivers of south-central Western Australia.	Unlikely	Habitat not present within survey area and the survey area is within the species known distribution.	DBCA 2020 (email)
<i>Idesoma clypeatum</i>	Northern Shield-backed Trapdoor Spider	P3	-	2014	647	<i>Idesoma clypeatum</i> is one of seven highly autapomorphic species in the polyphyletic 'sigillate complex'. <i>Idesoma clypeatum</i> (formerly known by WAM identification code 'MYG018') has a widespread distribution in Western Australia's inland and zone, principally throughout the Yalgoo and Murchison bioregions where it is the only known species in the night-mound group (excluding a population of <i>I. formosum</i> from the southern Yalgoo. It extends from near Paynes Find, the Blue Hill Range, Kadjj Kadjj Nature Reserve, and Karara in the south, north and north-east to at least Coolakalpa Homestead, Jack Hills, Abloh Downs, Yakabindie, and Yealline. This distribution seems to be strongly correlated with annual rainfall of less than 250 mm. At the southern extent of its range it abuts the northern limit of the closely related species <i>I. kopelkaorum</i> , and on the Geraldton Sandplains is replaced by <i>I. arenaceum</i> and <i>I. Awonggan</i> (Rix et al., 2018)	Likely	Many records, habitat present in survey area, within species distribution, recorded in survey area	DBCA 2020
	Shield-backed Trapdoor Spider	EN	V	-	-	The Shield-backed Trapdoor Spider is endemic to semi-arid south-west Western Australia (WA). It occurs in a number of severely fragmented populations in the central and northern Wheatbelt (e.g. Minnivale and East Yorkraine). Further north, the species occurs in more arid areas in the Midwest (e.g. large isolated ranges at Jack Hills, Wild Range (Ecologia Environment, 2009) and Blue Hills (Ecologia Environment, 2013)) and coastal areas of the Midwest (e.g. Zuydorp Station north of the Murchison River and Nanga Station south of Shark Bay) (Anonymous, 2010). The arid Midwest populations are naturally fragmented or isolated because they persist only on ranges, but the Wheatbelt and coastal Midwest populations are all severely fragmented as a result of land clearing (Anonymous, 2010). In the Wheatbelt, the Shield-backed Trapdoor Spider typically inhabits clay soils whereas the arid Midwest populations are associated with rocky habitats, primarily in positions with increased moisture retention properties like gullies and drainage lines on southern facing slopes (Anonymous, 2010; Ecologia Environment, 2009).	May	Habitat present within survey area and the survey area is within the species known distribution.	PMST
<i>Leipoa ocellata</i>	Malleefowl	VU	VU	-	1	It is found principally in the semi-arid to arid zone in shrublands and low woodlands dominated by mallee and associated habitats such as such as Broombush ( <i>Melicope ucinata</i> ) and Scrub Pine ( <i>Callitris verticosa</i> ). In WA Malleefowl distribution was associated with podocypines that had lower rainfall, greater amounts of mallee and shrubland that occur as large remnants, and lighter soil surface textures (Barnetshesh, 2007). At a finer scale, malleefowl occurrence was associated with low shrubland and birch in the Rainbow Bee-eater range (Rix et al., 2008).	Unlikely	Unlikely due to lack of records and no evidence of species presence during 2014 survey	DBCA 2020
<i>Merops ornatus</i>	Rainbow Bee-eater	MI	Ma, MI	-	-	The Rainbow Bee-eater occurs in open woodlands and shrublands, including mallee, and in open forests that are usually dominated by eucalypts. It also occurs in grasslands and, especially in arid or semi-arid areas, in riparian, floodplain or wetland vegetation assemblages (Gibson 1988; Longmore 1978; Storr 1977; Wolnarski et al., 1988).	May	No recent records, seasonal visitor, suitable habitat may be present.	PMST
<i>Motacilla cinerea</i>	Grey Wagtail	MI	Ma, MI	-	-	The Grey Wagtail is a scarce but regular visitor to northern Australia, typically arriving in October and leaving in March. The species is most commonly associated with water and are found across a wide variety of wetlands, watercourses and on the banks of lakes and marshes (Referral guideline for 14 birds listed as migratory species under the EPBC Act, DAWE, 2021).	May	On edge of the species distribution, habitat present within survey area, no records with search area	PMST
<i>Motacilla flava</i>	Yellow Wagtail	MI	Ma, MI	-	-	The yellow wagtail favours wet meadows, marshland, grassy and muddy lakeshores. Within WA, the species is mostly found on the north coast (BirdLife, 2021; AclA, 2021).	Unlikely	On edge of the species distribution, habitat not present within survey area, no records with search area	PMST
<i>Ninox connexus</i> subsp. <i>connexus</i>	Barking Owl (southwest pop P2), Barking Owl	P2	-	-	-	Barking Owls are nocturnal birds, although they may sometimes be seen hunting during the day (BirdLife Australia, 2021). Barking Owls are found in open woodlands and the edges of forests, often adjacent to farmland. They are less likely to use the interior of forested habitat. They are usually found in habitats that are dominated by eucalyptus species, and prefer woodlands and forests with a high density of large trees and particularly sites with hollows. Ninox connexus occurs in eastern, south-eastern and south-western Australia (BirdLife Australia, 2021).	Unlikely	Unlikely due to unsuitable habitat.	NatureMap
<i>Oxyris subberesris</i>	Arid Bronze Azure Bittern	CR	CE	-	-	At the low known extent sites where this species occurs, the vegetation is mature mixed gum <i>Eucalyptus salubris</i> / <i>E. semiprostrata</i> woodlands on red-brown loam soils, with an open understorey. In addition to gum and sassafras gum, other smooth-barked eucalypts at these sites which have larval ant. colonies include <i>E. capitata</i> , <i>variegata</i> , smooth-barked <i>E. loxophleba</i> , <i>issophleba</i> and <i>E. sheariana</i> . The species is dependent on a host ant species ( <i>Camponotus</i> sp. nr. <i>terreus</i> ) to raise its young (DAWE, 2021).	Unlikely	Host ant species may occur in the survey area, unlikely though given the limited records of this species.	DBCA 2020 (email)
<i>Oxyura australis</i>	Blue-billed Duck	P4	-	2009	2	The Blue-billed Duck is endemic to south western Australia. It prefers deep water in large permanent wetlands and swamps with aquatic vegetation. This species of duck is fully aquatic and rarely comes onto land (DAWE, 2021)	May	Relatively old records, few records, habitat sporadically present	DBCA 2020
<i>Pezoporus occidentalis</i>	Night Parrot	CR	E	-	-	Night parrot roosting and nesting sites are in clumps of dense vegetation, primarily old and large spinifex (Triodia) clumps, but sometimes other vegetation types. Often the vegetation in these habitats will be naturally fragmented and therefore well protected from fire. Little is known about foraging sites, but favoured sites are likely to vary across the range of the species.	Unlikely	Survey area within the medium priority search area for this cryptic species but no habitat present.	DBCA 2020 (email)
<i>Plegadis facknelli</i>	Glossy Ibis	MI	Ma, MI	2006	4	Within Australia, the Glossy Ibis is generally located east of the Kimberley in Western Australia and Eyre Peninsula in South Australia. The species is also known to be patchily distributed in the rest of Western Australia. The Glossy Ibis preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. Glossy Ibis roost in trees or shrubs usually near, but sometimes far, from water bodies (Brown et al., 1982; Marchant & Higgins, 1990).	Unlikely	Seasonal Visitor, low likelihood of occurrence	DBCA 2020
<i>Rostratruda australis</i>	Australian Painted Snipe	EN	EN	2015	5	The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains (DAWE, 2021).	May	Only one record > 15km from survey area.	DBCA 2020

Scientific Name	Common Name	Conservation Status		DBCA	PMST	Ecology	Likelihood of Occurrence	Reasoning for likelihood or exclusion	Source
		State	Federal						
<i>Syrnithopsis longicaudata</i>	Long-Tailed Dumart	P4	-	-	-	The Long-tailed Dumart inhabits exposed rock and stony soils with hummock grasses and shrubs. Flat-topped hills, lateritic plateaus, sandstone ranges and breakaways. Sparse mulga over spinifex. The species has been recorded in disjunct populations across arid Australia with populations recorded in the southern Canarvon Basin (DAWE, 2021).	May	The habitat for the species occurs to present within the survey area, the survey area falls within the species distribution; however, the closest ALA records are >100km from the survey area.	DBCA 2020 (email)
<i>Tringa glareola</i>	Wood Sandpiper	MI	Ma, MI	1978	2	The Wood Sandpiper uses wet/vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially Melaleuca and River Red Gums <i>Eucalyptus camaldulensis</i> and often with fallen timber. They also frequent inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops. They are also found at some small wetlands only when they are drying. This species uses artificial wetlands, including open sewage ponds, reservoirs, large farm dams, and levee drains (Higgins & Davies, 1986). The Common Greenshank is generally absent from the Western Deserts although there are a few records from the Great Sandy Desert, and the Nullarbor Plain. It occurs around most of the coast from Cape Arid in the south to Camarvon in the north-west. In the Kimberleys it is recorded in the south-west and the north-east, with isolated records from the Bonaparte Archipelago (Higgins & Davies, 1986).	May	Seasonal visitor - Habitat present, old records	DBCA 2020
<i>Tringa nebularia</i>	Common Greenshank	MI	Ma, MI	2004	1		May	Seasonal visitor - Habitat present, only recorded once in search area	DBCA 2020



# Appendix B

Flora Species by Family  
by Community Matrix

## Appendix B - Flora Species by Family by Community Matrix

Family	Taxon	Vegetation Community	
		AfEfPo	ApAgEf
Amaranthaceae	<i>Ptilotus obovatus</i>		x
	<i>Ptilotus</i> sp.	x	
Apocynaceae	<i>Marsdenia australis</i>		x
Chenopodiaceae	<i>Salsola australis</i>		x
	<i>Sclerolaena densiflora</i>		x
	<i>Sclerolaena recurvicupsis</i>		x
Colchicaceae	<i>Wurmbea densiflora</i>		x
Fabaceae	<i>Acacia aptaneura</i>		x
	<i>Acacia fuscaneura</i>		x
	<i>Acacia incurvaneura</i>	x	
	<i>Acacia kempeana</i>	x	x
	<i>Acacia synchronicia</i>		x
	<i>Acacia</i> sp.	x	
	<i>Acacia tetragonophylla</i>		x
	<i>Senna artemisioides</i> subsp. <i>helmsii</i>		x
	<i>Senna artemisioides</i> subsp. <i>petiolaris</i>		x
	<i>Senna glaucifolia</i>	x	
	<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)		x
Frankeniaceae	<i>Frankenia pauciflora</i>		x
Geraniaceae	* <i>Erodium aureum</i>		x
Malvaceae	<i>Hibiscus burtonii</i>		x
Poaceae	* <i>Cenchrus Ciliaris</i>		x
	<i>Aristida holathera</i> var. <i>holathera</i>		x
	<i>Dactyloctenium radulans</i>		x
	<i>Eragrostis eriopoda</i>		x
	<i>Eragrostis leptocarpa</i>		x
	<i>Eriachne helmsii</i>	x	x
	<i>Tragus australianus</i>		x
Proteaceae	<i>Grevillea deflexa</i>		x
Scrophulariaceae	<i>Eremophila forrestii</i>		x
	<i>Eremophila pterocarpa</i>		x
	<i>Eremophila jucunda</i> subsp. <i>jucunda</i>		x
	<i>Scaevola spinescens</i>		x
Solanaceae	<i>Solanum lasiophyllum</i>	x	x



# Appendix C

## Flora Site Data

## Appendix C – Flora Site Data

<b>Site No:</b> SKAR001	<b>Date:</b> 2022	<b>Longitude:</b> 116.573064	<b>Latitude:</b> -26.962246
<b>Type:</b> Revele	<b>Soil Types:</b> Sand, Clay		
<b>Topography:</b> Plains	<b>Soil Description:</b> Red Dry		
<b>Outcrops:</b> None	<b>Fire:</b> 10+		
<b>Condition:</b> Very Good	<b>Condition Notes:</b> History of grazing		
<b>Vegetation Type:</b> ApAgEf			
<b>Vegetation Description:</b> <i>Acacia aptaneura</i> and <i>Acacia fuscaneura</i> tall shrubland over <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Ptilotus obovatus</i> low open shrubland over <i>Eriachne helmsii</i> scattered tussock grasses over <i>Aristida holathera</i> var. <i>holathera</i> scattered annual grasses over <i>Erodium aureum</i> scattered herbs			



Taxon	Height (m)	Cover (%)
<i>Acacia aptaneura</i>	3.7	5
<i>Acacia fuscaneura</i>	3.2	5
<i>Acacia tetragonophylla</i>	2.2	0.1
<i>Aristida holathera</i> var. <i>holathera</i>	0.2	0.5
<i>Dactyloctenium radulans</i>	0.1	0.1



Taxon	Height (m)	Cover (%)
<i>Eremophila forrestii</i>	1.1	0.1
<i>Eremophila jucunda</i> subsp. <i>jucunda</i>	0.8	2
<i>Eriachne helmsii</i>	0.5	1
* <i>Erodium aureum</i>	0.1	0.5
<i>Marsdenia australis</i>	1.7	0.1
<i>Ptilotus obovatus</i>	0.5	3
<i>Sclerolaena densiflora</i>	0.4	0.5
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.6	2
<i>Solanum lasiophyllum</i>	0.5	0.1
<i>Tragus australianus</i>	0.1	0.1

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**Site No:** SKAR002    **Date:** 2022    **Longitude:** 116.568110    **Latitude:** -26.962082

**Type:** Releve

**Soil Types:** Sand, Clay

**Topography:** Plains

**Soil Description:** Red, Dry

**Outcrops:** None

**Fire:** 10+

**Condition:** Very Good

**Condition Notes:** History of grazing

**Vegetation Type:** ApAgEf

**Vegetation Description:** *Acacia aptaneura* tall shrubland over *Senna artemisioides* subsp. *helmsii* and *Eremophila jucunda* subsp. *jucunda* open shrubland over *Ptilotus obovatus* scattered low shrubs



Taxon	Height (m)	Cover (%)
<i>Acacia aptaneura</i>	4.5	11
<i>Acacia tetragonophylla</i>	0.8	0.1
<i>Aristida holathera</i> var. <i>holathera</i>	0.2	0.1
<i>Eremophila forrestii</i>	0.5	0.1
<i>Eremophila jucunda</i> subsp. <i>jucunda</i>	1.1	0.5
<i>Ptilotus obovatus</i>	0.6	1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.5	2
<i>Solanum lasiophyllum</i>	0.5	0.1
<i>Wurmbea ?flavanthera</i>	0.1	0.1



<b>Site No:</b> SKAR003	<b>Date:</b> 2022	<b>Longitude:</b> 116.567405	<b>Latitude:</b> -26.960388
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**Type:** Revele**Soil Types:** Sand, Clay**Topography:** Plains**Soil Description:** Red, Dry**Outcrops:** None**Fire:** 10+**Condition:** Very Good**Condition Notes:** History of grazing**Vegetation Type:** ApAgEf

**Vegetation Description:** *Senna* sp. Meekatharra and *Senna artemisioides* subsp. *helmsii* open shrubland over *Salsola australis*, *Sclerolaena densiflora* and *Sclerolaena recurvicauspis* scattered low shrubs.



Taxon	Height (m)	Cover (%)
<i>Acacia kempeana</i>	1.3	0.1
<i>Aristida holathera</i> var. <i>holathera</i>	0.2	0.1
<i>Hibiscus</i> ?sp. <i>Gardneri</i>	0.4	0.1
<i>Salsola australis</i>	0.2	0.5
<i>Sclerolaena densiflora</i>	0.2	0.5
<i>Sclerolaena recurvicauspis</i>	0.3	0.5
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.4	1
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	1.8	5
<i>Solanum lasiophyllum</i>	0.6	0.1

<b>Site No:</b> SKAR004	<b>Date:</b> 2022	<b>Longitude:</b> 116.585067	<b>Latitude:</b> -26.949345
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**Type:** Revele**Soil Types:** Clay**Topography:** Plains**Soil Description:** Red, Dry**Outcrops:** None**Fire:** 5-10 years**Condition:** Very Good**Condition Notes:** History of grazing**Vegetation Type:** ApAgEf

**Vegetation Description:** *Eremophila pterocarpa* tall open shrubland over *Senna artemisioides* subsp. *petiolaris* and *Senna* sp. Meekatharra open shrubland over *Aristida holathera* var. *holathera* scattered annual grasses.



Taxon	Height (m)	Cover (%)
<i>Acacia synchronicia</i>	1.2	0.1
<i>Aristida holathera</i> var. <i>holathera</i>	0.3	0.5
<i>Eremophila pterocarpa</i>	2.3	6
<i>Scaevola spinescens</i>	1.6	0.1
<i>Senna artemisioides</i> subsp. <i>petiolaris</i>	1.4	2
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	1.1	0.5
<i>Solanum lasiophyllum</i>	0.4	0.1



**Site No:** SKAR005    **Date:** 2022    **Longitude:** 116.750571    **Latitude:** -26.841022

**Type:** Revele

**Soil Types:** Sand, Clay

**Topography:** Plains

**Soil Description:** Red, Dry

**Outcrops:** None

**Fire:** 5-10 years

**Condition:** Very Good

**Condition Notes:** History of grazing

**Vegetation Type:** AfEfPo

**Vegetation Description:** *Acacia incurvaneura*, *Acacia kempeana* and *Acacia ?sibina* scattered tall shrubs over *Solanum lasiophyllum* scattered low shrubs over *Eriachne helmsii* open tussock grassland over *Ptilotus* sp. scattered annual herbs



Taxon	Height (m)	Cover (%)
<i>Acacia ?sibina</i>	4	0.5
<i>Acacia incurvaneura</i>	3.6	1
<i>Acacia kempeana</i>	2.1	0.5
<i>Eriachne helmsii</i>	0.5	15
<i>Ptilotus</i> sp	0.7	0.5
<i>Senna glaucifolia</i>	1.4	0.1
<i>Solanum lasiophyllum</i>	0.7	0.5

# Appendix D

## Fauna Inventory



Appendix D - Fauna Species Inventory  
SKA May 2022 Ecological Survey

Faunal Group	Common Name	Species	EPBC Act Status	BC Act / WA Status	BAM Act Status	Observation Method
Amphibian	Little Red Tree Frog	<i>Litoria rubella</i>	-	-	-	Heard only
	Australasian Pipit	<i>Anthus australis</i>	Marine	-	-	Directly observed and call heard
	Australian Magpie	<i>Gymnorhina tibicen</i>	-	-	-	Directly observed and call heard
	Australian Owlet-nightjar	<i>Aegotheles cristatus</i>	-	-	-	Directly observed and call heard
	Australian Ringneck	<i>Barnardius zonarius</i>	-	-	-	Directly observed and call heard
	Banded Lapwing	<i>Vanellus tricolor</i>	-	-	-	Directly observed and call heard
	Black Honeyeater	<i>Sugomel niger</i>	-	-	-	Heard only
	Black-faced Cuckooshrike	<i>Artamus cinereus</i>	Marine	-	-	Directly observed and call heard
	Black-faced Woodswallow	<i>Coracina novaehollandiae</i>	-	-	-	Directly observed and call heard
	Boobook Owl	<i>Ninox boobook</i>	-	-	-	Seen only
	Common Bronzewing Pigeon	<i>Phaps chalcoptera</i>	-	-	-	Directly observed and call heard
	Brown Falcon	<i>Falco berigora</i>	-	-	-	Directly observed and call heard
	Budgerigar	<i>Melopsittacus undulatus</i>	-	-	-	Heard only
	Chestnut-rumped Thornbill	<i>Acanthiza uropygialis</i>	-	-	-	Directly observed and call heard
	Chiming Wedgebill	<i>Psophodes occidentalis</i>	-	-	-	Directly observed and call heard
	Crested Bellbird	<i>Oreoca gutturalis</i>	-	-	-	Directly observed and call heard
	Crested Pigeon	<i>Ocyphaps lophotes</i>	-	-	-	Directly observed and call heard
	Crimson Chat	<i>Epthianura tricolor</i>	-	-	-	Directly observed and call heard
Bird	Emu	<i>Dromaius novaehollandiae</i>	-	-	-	Tracks
	Grey Shrikethrush	<i>Colluricincla harmonica</i>	-	-	-	Directly observed and call heard
	Grey-crowned Babbler	<i>Pomatostomus temporalis</i>	-	-	-	Heard only
	Hooded Robin	<i>Melanodryas cucullata</i>	-	-	-	Heard only
	Inland Thornbill	<i>Acanthiza apicalis</i>	-	-	-	Directly observed and call heard
	Jacky Winter	<i>Microeca fascinans</i>	-	-	-	Directly observed and call heard
	Little Crow	<i>Corvus bennetti</i>	-	-	-	Directly observed and call heard
	Mulga Parrot	<i>Psephotellus varius</i>	-	-	-	Directly observed and call heard
	Pied Butcherbird	<i>Cracticus nigrogularis</i>	-	-	-	Directly observed and call heard
	Pied Honeyeater	<i>Certhionyx variegatus</i>	-	-	-	Directly observed and call heard
	Pink and Grey Galah	<i>Eolophus roseicapilla</i>	-	-	-	Directly observed and call heard
	Red-capped Robin	<i>Petroica goodenovii</i>	-	-	-	Directly observed and call heard
	Rufous Whistler	<i>Pachycephala rufiventris</i>	-	-	-	Heard only
	Slender-billed Thornbill	<i>Acanthiza iredalei</i>	-	-	-	Directly observed and call heard
	Southern Whiteface	<i>Aphelocephala leucopsis</i>	-	-	-	Directly observed and call heard
	Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>	-	-	-	Directly observed and call heard
	Splendid Fairywren	<i>Malurus splendens</i>	-	-	-	Heard only
	Torresian Crow	<i>Corvus orru</i>	-	-	-	Directly observed and call heard

Appendix D - Fauna Species Inventory  
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	Purple-backed Fairywren	<i>Malurus assimilis</i>	-	-	-	Directly observed and call heard	
Bird cont.	Welcome Swallow	<i>Hirundo neoxena</i>	Marine	-	-	Directly observed and call heard	
	Whistling Kite	<i>Haliastur sphenurus</i>	Marine	-	-	Directly observed and call heard	
	White-browed Treecreeper	<i>Climacteris affinis</i>	-	-	-	Directly observed and call heard	
	White-browed Babbler	<i>Pomatostomus superciliosus</i>	-	-	-	Directly observed and call heard	
	White-fronted Chat	<i>Epthianura albifrons</i>	-	-	-	Directly observed and call heard	
	White-winged Fairywren	<i>Malurus leucopterus</i>	-	-	-	Directly observed and call heard	
	Willie Wagtail	<i>Rhipidura leucophrys</i>	-	-	-	Directly observed and call heard	
	Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	-	-	-	Directly observed and call heard	
	Australian Zebra Finch	<i>Taeniopygia castanotis</i>	-	-	-	Scat	
						Directly observed and call heard	
Mammal	Camel	<i>Camelus dromedarius</i>	-	-	Declared Pest - s22(2) (C3 Exempt)	Tracks	
	Common Wallaroo	<i>Osphranter robustus erubescens</i>	-	-	-	Scat	
	Cow	<i>Bos primigenius taurus</i>	-	-	Permitted - s11	Scat	
	Dasyurid sp.	<i>Dasyuridae</i> sp.	-	-	-	Other	
	Dingo	<i>Canis familiaris dingo</i>	-	-	Declared Pest - s22(2) (C3 Exempt)	Tracks and scat recorded	
	Echidna	<i>Tachyglossus aculeatus acanthion</i>	-	-	-	Scat and tracks	
	European Rabbit	<i>Oryctolagus cuniculus</i>	-	-	Declared Pest - s22(2) (C3 Prohibited)	Tracks	
	Feral Cat	<i>Felis catus</i>	-	-	Declared Pest - s22(2)	Tracks	
	Goat	<i>Capra aegagrus hircus</i>	-	-	Declared Pest - s22(2) (C3 Exempt)	Bones	
	Hopping Mouse	<i>Notomys alexis</i> (based on known distribution and habitat preferences)	-	-	-	Tracks	
	Red Kangaroo	<i>Osphranter rufus</i>	-	-	-	Seen only	
	Reptile	Sand Goanna	<i>Varanus tristis</i>	-	-	-	Directly observed and tracks recorded
		Schomburgk's Striped Skink	<i>Ctenotus schomburgkii</i>	-	-	-	Seen only
		Snake	Unknown species	-	-	-	Tracks
		Western Bearded Dragon	<i>Pogona minor minor</i>	-	-	-	Seen only
Western Ring-tailed Dragon		<i>Ctenophorus caudicinctus</i>	-	-	-	Seen only	



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