



# **Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment for Huntly Mine – Holyoake - East Area Addendum**

## **Pinjarra Alumina Refinery Revised Proposal**

Alcoa of Australia Limited

20 February 2025

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# 1. Introduction

## 1.1 Project Background

Alcoa of Australia Limited (Alcoa) is proposing to increase production at the Pinjarra Alumina Refinery by 5 per cent from 5 million tonnes per annum (Mtpa) to 5.25 Mtpa and transition the Huntly Bauxite Mine to the proposed Myara North and Holyoake mine regions (the Proposal). The Proposal is located in the Peel Region of Western Australia (WA), approximately 100 km south-east of Perth.

The Proposal will be assessed by the Environmental Protection Authority (EPA) under Part IV of the WA *Environmental Protection Act 1986* (EP Act), and the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act) via the bilateral agreement. The Proposal will be assessed via a Public Environmental Review (PER).

A Terrestrial Vertebrate Fauna Survey and Black Cockatoo Habitat Assessment has been prepared to support the EPA assessment of the Proposal and addresses the Holyoake region of the Proposal. Separate reports address the Myara North region, Pinjarra Refinery, Short-Range Endemic (SRE) invertebrate fauna, aquatic fauna, and subterranean fauna.

GHD conducted a Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment for the Holyoake region in 2021 (GHD, 2025). The 2021 survey area is presented in Figure 1. This addendum presents the survey undertaken for an additional eastern area of Holyoake, which comprises approximately 515 hectares (ha) (see Figure 1). The additional eastern area was included as it reflects changes in the Holyoake Development Envelope subsequent to the 2021 survey, which are described in the Environmental Review Document for the Proposal. The survey for the Holyoake additional eastern area was undertaken as part of a wider program of surveys within Alcoa's mining lease ML1SA to inform Alcoa's long term planning. This addendum reports the survey method and results extracted from that wider survey program that are relevant to the Holyoake eastern area.

## 1.2 Purpose and Scope of this Report

This addendum presents additional information in relation to the Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment for the Holyoake region (GHD, 2025) and should be read in conjunction with that report. It should not be read as a standalone report.

This addendum presents the field survey method and results for Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment undertaken within the Holyoake additional eastern area (see Figure 1). The desktop assessment and likelihood of occurrence of listed fauna species, including literature review and full references, is presented in the Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment for the Holyoake region (GHD, 2025).

## 1.3 Limitations and Assumption

This report has been prepared by GHD for Alcoa of Australia Limited and may only be used and relied on by Alcoa of Australia Limited for the purpose agreed between GHD and Alcoa of Australia Limited as set out in Section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Alcoa of Australia Limited arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

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The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. Site conditions may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

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GHD has prepared this report on the basis of information provided by Alcoa of Australia Limited and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

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## 2. Methodology

### 2.1 Field Survey

#### 2.1.1 Survey area

The survey area comprises the Holyoake eastern area, which is approximately 515 ha in extent and lies immediately east of the 2021 survey area as documented in GHD (2025) (see Figure 1).

#### 2.1.2 Survey details and timing

Field survey comprised a multi-phase field program comprising a reconnaissance survey, two target surveys with basic fauna assessment, and a final site visit to collect remote recording devices. All phases are detailed below in Table 1. The field surveys were led by Senior Zoologist, Glen Gaikhorst and assisted by other GHD Zoologists. The experience of these staff members is presented in Table 2.

**Table 1** Field survey timing, type and details

Phase/Survey type	Date	Tasks	Personnel
Reconnaissance survey	4 <sup>th</sup> – 7 <sup>th</sup> August 2022	Preliminary habitat assessment, assessment of access tracks, target significant species remote camera deployment, selection of target trapping sites, opportunistic fauna observations.	Brad Maryan Jack Eastwood
Phase 1 targeted and basic	12 <sup>th</sup> – 23 <sup>rd</sup> September 2022	Install and run target trapping sites, remote equipment collection and redeployment (camera, bird acoustic, bat detector), significant fauna target searches and habitat mapping, black cockatoo assessment, basic fauna survey/opportunistic species inventory observations.	Glen Gaikhorst Brad Maryan Robert Browne-Cooper Emma de Mamiel Lynnette Greer Jack Eastwood Alon Ridgard Sarah Flemington
Phase 2 targeted and basic	21 <sup>st</sup> November to 1 <sup>st</sup> December 2022	Run target trapping sites, remote equipment collection and redeployment (camera, bird acoustic, bat detector), significant fauna target searches and habitat mapping, black cockatoo assessment, basic fauna survey/opportunistic species inventory observations.	Glen Gaikhorst Brad Maryan Robert Browne-Cooper Sarah Flemington Emma de Mamiel Jack Eastwood Dylan Goldspink
Remote Gear collection	13 <sup>st</sup> – 16 <sup>th</sup> December 2022	Remote camera collection	Brad Maryan Jack Eastwood

**Table 2** Personnel experience

Name	Years of experience	Role	Phase
Glen Gaikhorst	20+	Senior Zoologist and field lead	Phase 1, Phase 2 targeted and basic
Robert Browne-Cooper	20+	Senior Zoologist	Phase 1, Phase 2 targeted and basic
Brad Maryan	20+	Senior Zoologist	All survey assessments
Emma de Mamiel	5+	Zoologist	Phase 1, Phase 2 targeted and basic
Sarah Flemington	5+	Zoologist	Phase 1, Phase 2 targeted and basic
Lynnette Greer	5+	Zoologist	Phase 1 targeted and basic

Name	Years of experience	Role	Phase
Jack Eastwood	2+	Graduate Zoologist	All survey assessments
Dylan Goldspink	2+	Graduate Zoologist	Phase 2 targeted and basic
Alon Ridgard	2+	Graduate Environmental Scientist	Phase 1 targeted and basic

### 2.1.3 Survey effort

The below searches were conducted in the survey area with the same methodology outlined in the Holyoake 2021 survey report (GHD 2025), Section 2.3.6 and 2.3.7 (Figure 2):

- Bat detector
- Camera traps
- Bird acoustics
- Two hectare Black Cockatoo plots

It is important to note that the survey effort was designed for a wider program of survey within the ML1SA and was not designed specifically for the survey area. The survey effort should be considered with regard to the survey effort in the Holyoake 2021 survey area including coverage across fauna habitat types.

**Table 3** Summary of fauna survey effort

Survey phase	ID	Habitat type	Northing	Easting	Date deployed	Date collected	Nights deployed
Bat detector							
2	SM4 10	Major drainage line	427628	6384632	11/25/2022	11/27/2022	2
Camera traps							
Recon	CAM 2	Hillslope	428382	6384405	8/05/2022	9/14/2022	40
2	CAM 8	Flooded Gum, Melaleuca, B. littoralis.	427550	6384574	11/23/2022	11/30/2022	7
2	CAM 4	Jarraah woodland	428213	6384666	11/23/2022	11/30/2022	7
2	CAM 23	Flooded Gum woodland with Melaleuca	427295	6384450	11/22/2022	11/30/2022	8
2	CAM 11	Jarraah woodland with Blackbutt	427827	6384635	11/23/2022	11/30/2022	7
2	CAM 6	Flooded Gum woodland with Melaleuca	427021	6384388	11/22/2022	11/30/2022	8
Bird acoustics							
2	SM4-AC3	Major drainage line	427646	6384673	11/25/2022	11/27/2022	2
Two hectare Black Cockatoo plots							
	BC-41						-
	BC-64						-

#### 2.1.3.1 Malleefowl transects

Target searches for Malleefowl were conducted by undertaking targeted transects in areas of potential Malleefowl habitat, searching for and recording evidence of prints, scats, feathers, and mounds in accordance with the guidelines National Recovery Plan for Malleefowl (Benshemesh, 2007). Transects were recorded via GPS and secondary evidence verified by Glen Gaikhorst. The locations and survey effort for targeted searches are recorded in Table 4.

Table 4 Malleefowl survey effort

Survey phase	ID	Northing	Easting	Date	Distance (m)
Malleefowl transect					
1	31 – 2160m	428697	6383289	9/21/2022	2160
2	40 – 2164 m	427768	6384754	11/28/2022	2164

## 2.2 Climate Data for Survey Period

The site weather conditions were generally cool and wet during Phase 1 and mild with minimal rainfall during Phase 2. The weather data over the survey period is presented below in Table 5. Temperature data was obtained from the Bureau of Meteorology closest weather station to the site, Dwellingup Station (No. 009538) which is approximately 25 km west of the Holyoake East Survey Area.

Table 5 Weather data for survey period (Phase 1 and 2)

Date	Minimum temp (°C)	Maximum temp (°C)	Rainfall (mm)
Phase 1			
12 Sept. 2022	7.0	21.3	0
13 Sept. 2022	10.1	15	6.4
14 Sept. 2022	9.4	15	5.4
15 Sept. 2022	8.0	16	2.4
16 Sept. 2022	7.8	17.5	0.4
17 Sept. 2022	8.4	18.2	0.4
18 Sept. 2022	5.7	17.8	0
19 Sept. 2022	9.3	14.6	0
20 Sept. 2022	7	16.9	15.0
21 Sept. 2022	9.6	18.1	3.2
22 Sept. 2022	4.7	16	0.8
23 Sept. 2022	3	17	1.2
Phase 2			
21 November 2022	9	27.0	0
22 November 2022	10.5	31.8	0
23 November 2022	14.6	25.9	6.2
24 November 2022	14.9	20.9	0
25 November 2022	10.4	21.8	0
26 November 2022	8.8	23.6	0
27 November 2022	9	24.9	0
28 November 2022	9.7	28.3	0
29 November 2022	11.9	33.9	0
30 November 2022	20.4	32.7	0
1 December 2022	16.2	19.6	0.6

# 3. Survey Results

## 3.1 Fauna Habitats

There were four broad fauna habitat types delineated throughout the survey area during the field survey (Table 6, Figure 5). The extent of the habitats varies widely from very limited (Bullich Forest) to very extensive (Jarrah-Marri forest). The habitat types are categorised based on flora species, hydrology, landform, soil and topography. They have also been delineated to align broadly with the vegetation types identified by Mattiske (2025) for the Holyoake region by grouping similar vegetation community types to form the broad fauna types.

Table 6 Fauna habitats

Fauna habitat type	Area (ha)	Proportion (%)
Bullich Forest	0.04	<0.01
Flooded Gum Woodland	16.71	3.25
Jarrah Marri Forest	474.21	92.08
Melaleuca Dampland	24.06	4.68
Total	515	100

The majority (92%) of the survey area comprised the Jarrah Marri Forest habitat type.

Kennedy's Pool is a permanent water body in the region and lies in the western portion of the survey area. GHD (2025) recorded a number of listed species in the vicinity of Kennedy Pool including Quokka (*Setonix brachyurus*) from remote camera in the supportive riparian vegetation of the pool, Carnaby's Cockatoo (*Zanda latirostris*) via sighting. A further three nesting trees (two known and one suitable breeding trees) are present within the area on top of those identified in Figure 4.

Kennedy's Pool is a significant water feature for fauna within the region. It is the only permanent water body within the area and provides a water source for all three Black Cockatoo and riparian habitat for Quokka and Chuditch.

## 3.2 Conservation Significant Fauna

Four conservation significant fauna species were recorded within the survey area:

- Baudin's Cockatoo (*Zanda baudinii*) – listed as Endangered under the BC Act and Endangered under the EPBC Act
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) listed as Vulnerable under the BC Act and Vulnerable under the EPBC Act
- Chuditch (*Dasyurus geoffroi*) listed as Vulnerable under the BC Act and Vulnerable under the EPBC Act
- Quokka (*Setonix brachyurus*) listed as Vulnerable under the BC Act and Vulnerable under the EPBC Act (identified from GHD2025b)
- Carnaby's Black Cockatoo (*Zanda latirostris*) listed as Endangered under the BC Act and EPBC Act. (identified from GHD2025b)
- Western Brush Wallaby (*Notamacropus Irma*) – listed as Priority 4 by the DBCA

### 3.2.1 Forest Red-tailed Black Cockatoo

Forest Red-tailed Black Cockatoo were recorded at three locations in the survey area (Table 7). Three were observed flying overhead, and breeding evidence and foraging evidence on Jarrah were recorded.

Table 7 Forest Red-tailed Black Cockatoo recorded

Phase	Date	Observation type	Easting	Northing	Number of Individuals
1	9/20/2022	Foraging evidence on Jarrah	428756	6383176	-
2	11/23/2022	Observed flying	427658	6384713	3
2	11/23/2022	Breeding evidence	427826	6384636	1

One confirmed nesting observation (known test tree) was recorded within western portion of the Survey Area in a large Jarrah, approximately 100 m south of Kennedys Pool. Plate 1 shows the female Forest Red-tailed Black Cockatoo leaving the hollow. Tony Kirkby inspected the hollow after fledging with the hollow demonstrating extensive internal chews. An interesting note was termites were recorded active in the main nesting area and appeared to have cleaned (eaten) all of the debris and waste from the breeding event (Plate 2).



Plate 1 Female Forest Red-tailed Black Cockatoo leaving hollow, Plate 2 Internals of hollow after fledging (picture Tony Kirkby)

### 3.2.2 Baudin's Cockatoo

A Baudin's Cockatoo was heard calling from within the survey area.

Table 8 Baudin's Cockatoo recorded

Phase	Date	Observation type	Easting	Northing	Number of individuals
2	11/25/2022	Heard calling	427759	6384815	1

### 3.2.3 Western Brush Wallaby

Western Brush Wallaby were recorded by remote camera in two instances (see Plate 2). An additional opportunistic record of Western Brush Wallaby was made.

Table 9 Western Brush Wallaby recorded

Phase	Date	Observation type	Easting	Northing	Number of individuals
1	11/22/2022	Remote camera	427827	6384635	1
1	11/22/2022	Remote camera	427295	6384450	4 <sup>1</sup>
1	11/22/2022	Opportunistic	428702	6381885	1



Plate 2 Western Brush Wallaby captured on camera during Phase 1 survey

<sup>1</sup> This number is events recorded on camera and does not imply number of specimens

## 3.2.4 Chuditch

One Chuditch was recorded via remote camera (Table 10).

Table 10 Chuditch recorded

Phase	Date	Observation type	Easting	Northing	Number of individuals
2	11/30/2022	Remote camera	427021	6384388	1



Plate 3 A Chuditch caught on a remote camera trap during Reconnaissance Survey

## 3.3 Black Cockatoo Habitat

### 3.3.1 Breeding habitat

The survey area contains several broad habitat types considered to be breeding habitats for all three locally occurring threatened Black Cockatoo species. The broad fauna habitat types considered as breeding habitat include Jarrah-Marri forest and Flooded Gum woodland. The Jarrah-Marri forest in particular provides extensive high quality foraging habitat relevant to local cockatoo breeding.

### 3.3.2 Foraging habitat

Foraging habitat for all three Black Cockatoo species is extensive across the mapped habitat types and ranges from high for Jarrah-Marri forest to moderate for Flooded gum woodland. Foraging evidence for Forest Red-tailed Black Cockatoo was found in the survey area, with additional extensive foraging evidence recorded across the wider Holyoake East survey area.

### 3.3.3 Roosting habitat

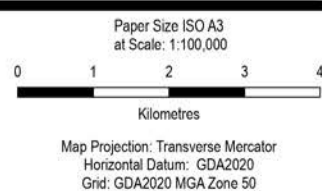
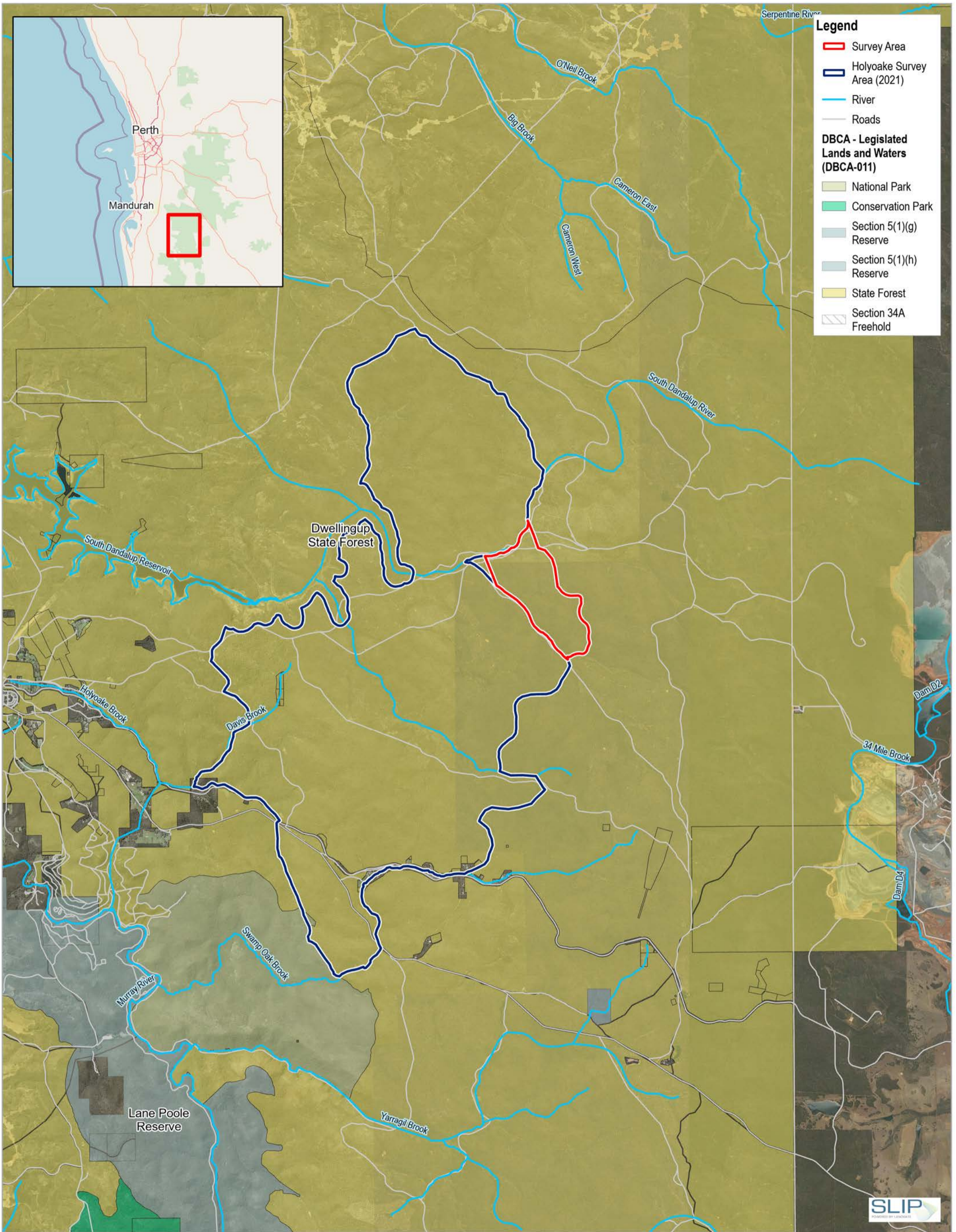
One potential roosting tree was identified in the survey area, which was the Jarrah tree with a known Forest Red-tailed Black Cockatoo hollow.

## 4. References

- Benshemesh, J. (2007). *National Recovery Plan for Malleefowl*. South Australia: Department of Environment and Heritage.
- GHD. (2023). *Terrestrial Fauna Assessment Holyoake Mine Development - Holyoake East*.
- GHD. (2025). *Alcoa Holyoake Environmental Assessments - Kennedy West Pre-clearance Fauna Survey*. Unpublished Report.
- GHD. (2025). *Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment for Huntly Mine - Holyoake*.

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# Figures

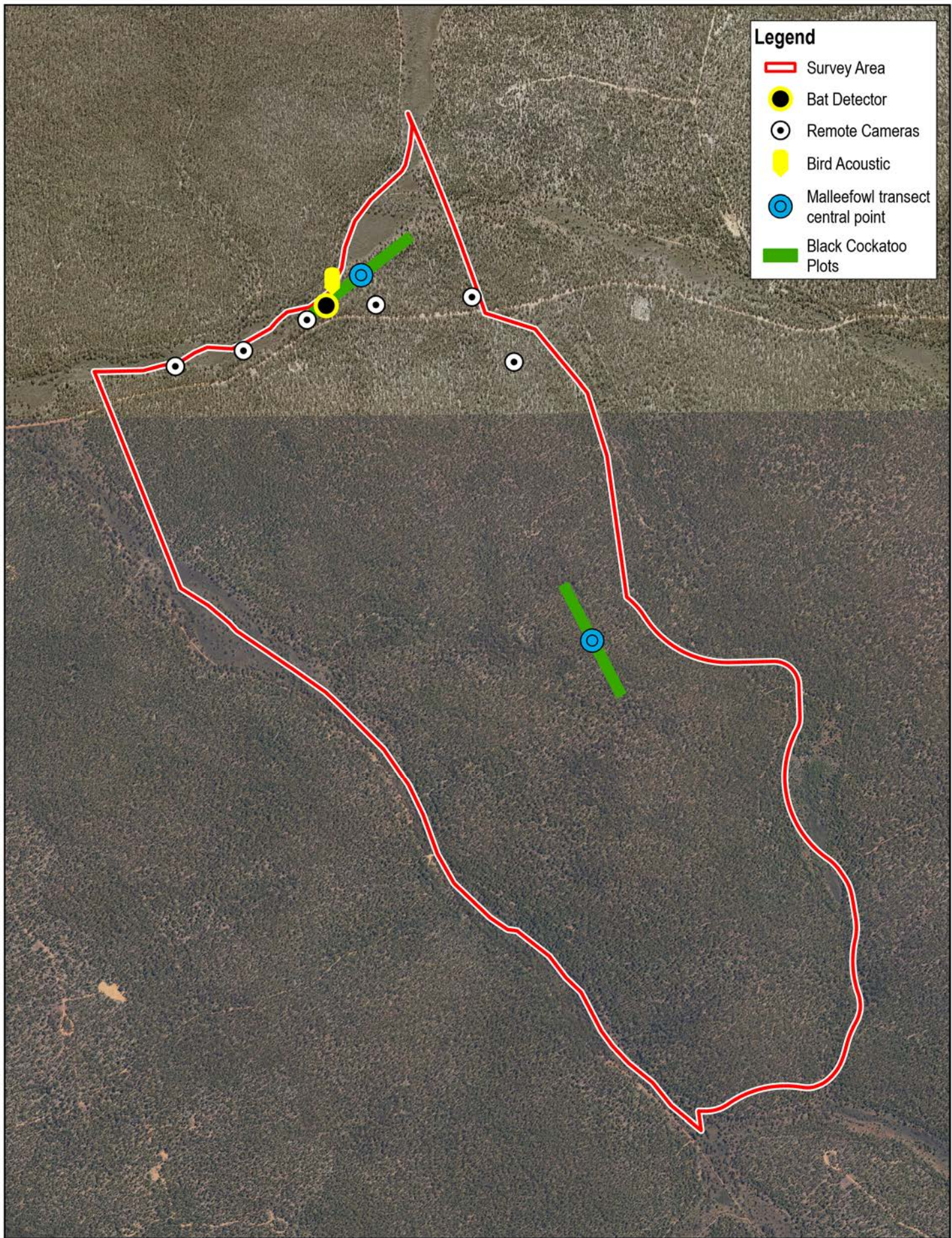


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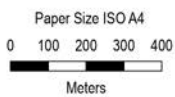
Survey Location

FIGURE 1



**Legend**

- Survey Area
- Bat Detector
- Remote Cameras
- Bird Acoustic
- Malleefowl transect central point
- Black Cockatoo Plots



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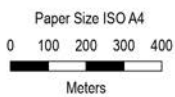
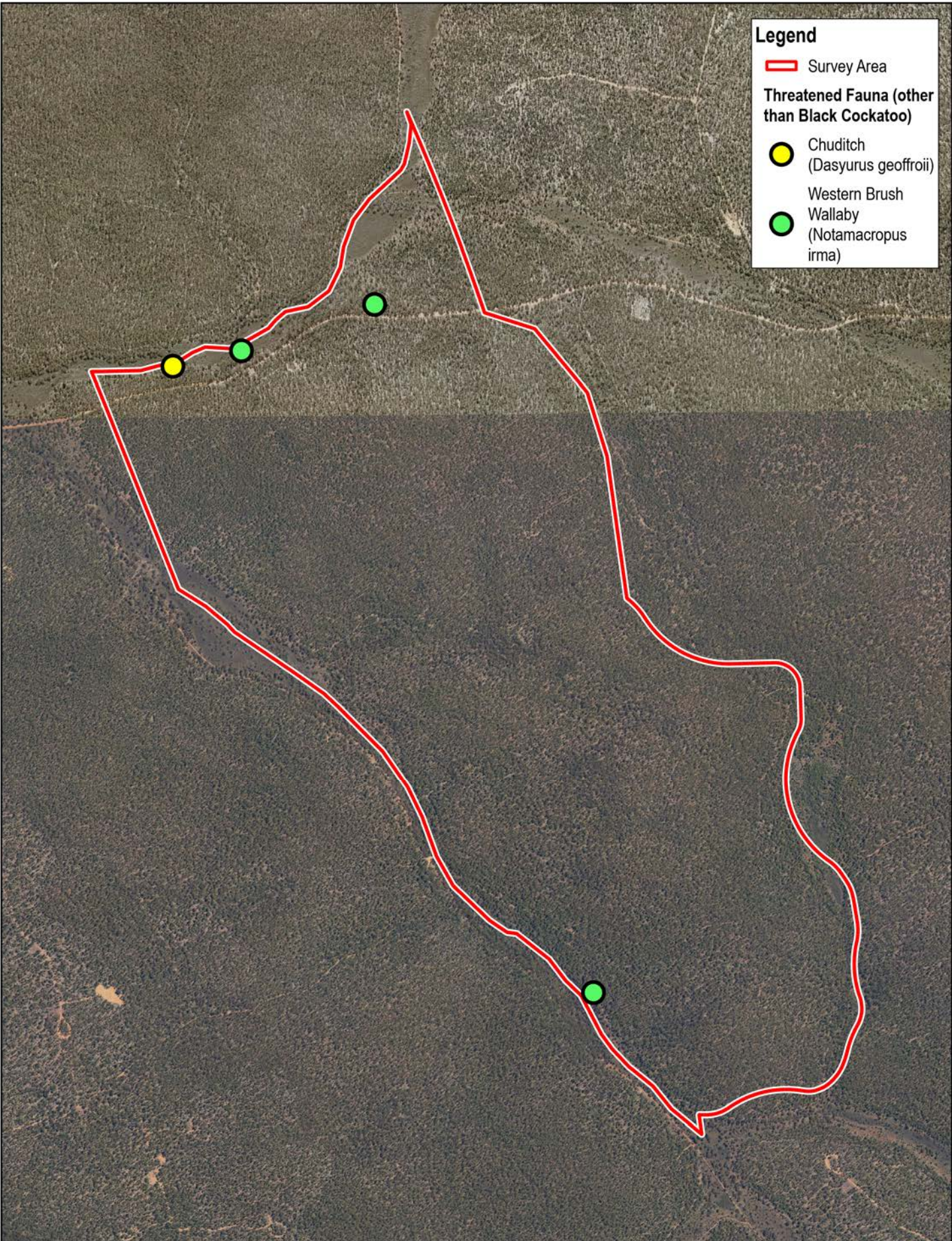
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 Horizontal Datum: GDA2020  
 Grid: GDA2020 MGA Zone 50

**Fauna Survey Methods**

**FIGURE 2**

**Legend**

-  Survey Area
- Threatened Fauna (other than Black Cockatoo)**
-  Chuditch (*Dasyurus geoffroii*)
-  Western Brush Wallaby (*Notamacropus irma*)



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**Threatened Fauna (other than Black Cockatoo)**

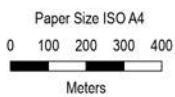
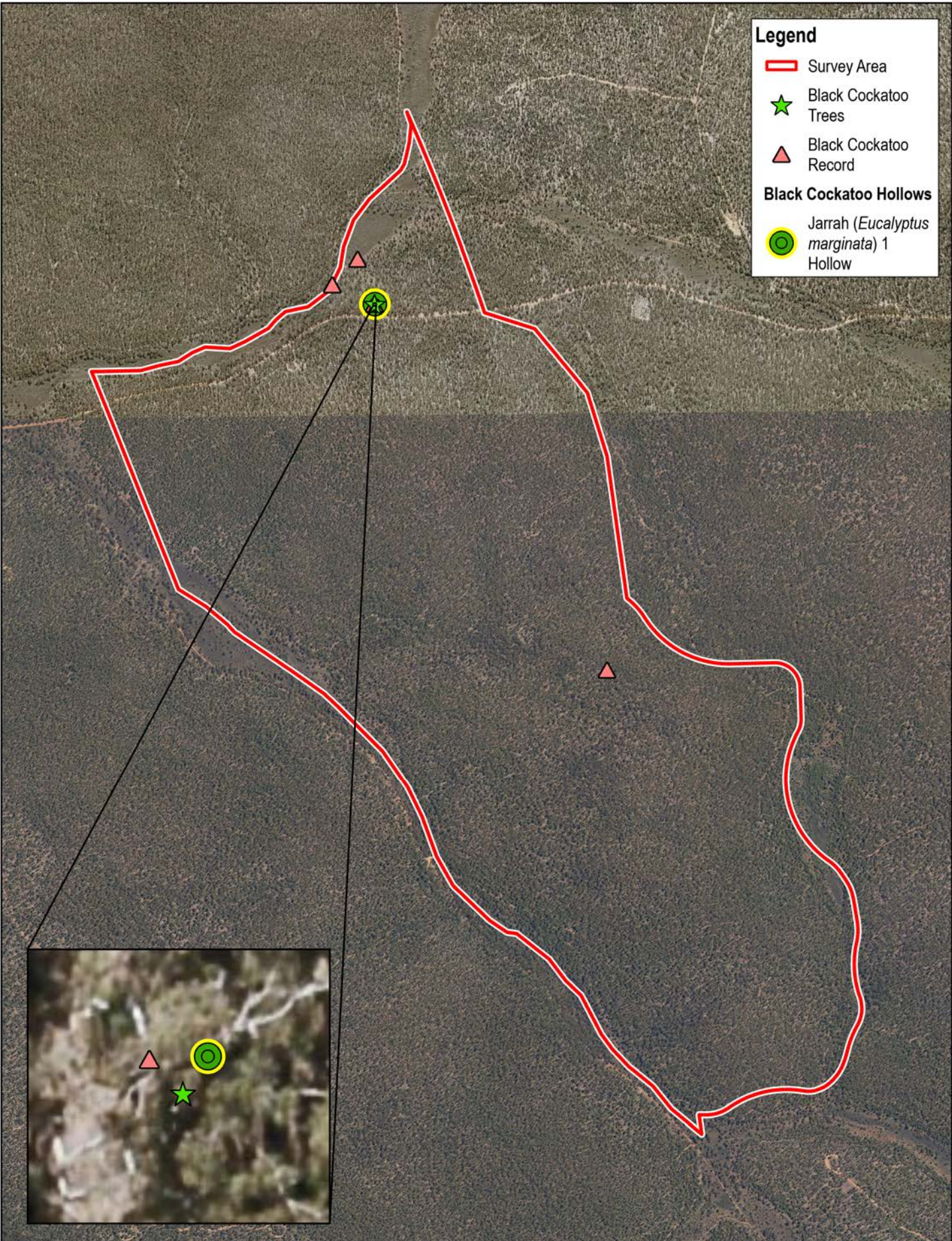
**FIGURE 3**

**Legend**

-  Survey Area
-  Black Cockatoo Trees
-  Black Cockatoo Record

**Black Cockatoo Hollows**

-  Jarrah (*Eucalyptus marginata*) 1 Hollow



Map Projection: Transverse Mercator  
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 Grid: GDA2020 MGA Zone 50

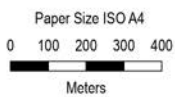
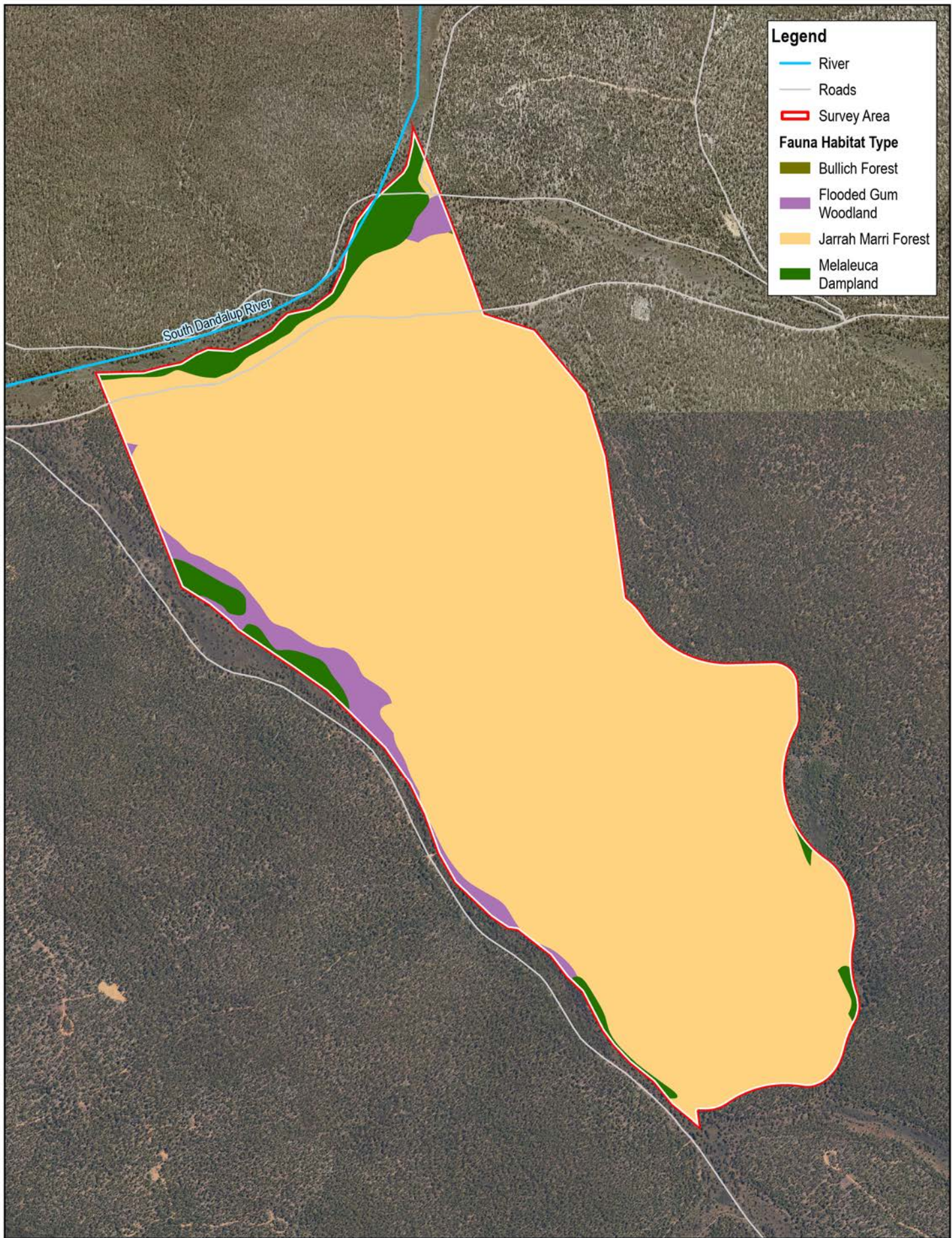


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**Black Cockatoo Results**

**FIGURE 4**



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Map Projection: Transverse Mercator  
 Horizontal Datum: GDA2020  
 Grid: GDA2020 MGA Zone 50

**Fauna Habitats**

**FIGURE 5**



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