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Project Name	Alcoa Holyoake Environmental Assessments		
Subject	McCoy Haul Road Fauna Pre-clearance Survey		

1. Introduction

Alcoa of Australia Limited (Alcoa) invited GHD Pty Ltd (GHD) to undertake a targeted Pre-clearance Survey within the McCoy Haul Road and O'Neil region for significant terrestrial fauna constraints. This survey work will build on the baseline studies undertaken at the regional scale since 2021, and specifically for the O'Neil region (GHD 2024a). Alcoa requires 'Targeted Pre-clearance Surveys' to be undertaken within the Conceptual Clearing Area. These results will be incorporated into Forest Clearing Advice (FCA) submission for the McCoy – O'Neil Haul Road Clearing Area.

1.1 Purpose of this Memorandum

The Purpose of the memorandum is to summarise the methodology of the survey, results and limitations of the targeted Pre-clearance assessment for the McCoy Haul Road.

1.2 Survey Area

The McCoy Haul Road Pre-Clearance Survey Area is located in the Peel Region of Western Australia (WA) approximately 27 kilometres (km) east from the township of Jarrahdale. The Survey Area is approximately 563.4 hectares (ha) in size, as shown on Figure 1, Appendix A.

1.3 Scope and limitations

1.3.1 Scope of work

The scope of works was as follows:

- Undertake targeted assessment to identify significant fauna constraints focussing on Significant fauna, including but not limited to, Baudin's Black Cockatoo, Carnaby's Black Cockatoo, Forest Red-tailed Black Cockatoo, Chuditch, Quokka, Woylie and Carters Freshwater Mussel
- Targeted Black Cockatoo Assessment, to assess the quality and extent of Breeding, roosting and foraging habitat and to identify Black Cockatoo Breeding trees and trees of significance
- Prepare a standalone memorandum which summarises findings (this document)
- Prepare a data package of the survey results for the Index of Biodiversity Surveys for Assessments (IBSA) submission. Submitted to Alcoa electronically as part of the reporting package.

1.3.2 Fauna survey limitations

The EPA (2016, 2020) technical Guidance states that flora and fauna survey reports for environmental impact assessments in WA should contain a section describing the limitations and constraints associated with this field survey as discussed in Table 1. Based on this assessment, the survey effort has been subject to two constraints (climate and human disturbances), which affect the results of the assessment. These

have been taken into account when forming the conclusions around the survey results. The constraints do not affect the accuracy or thoroughness of the assessment but do impact the overall results that might be expected for a survey in the region.

Table 1 *Field Survey limitations*

Aspect	Constraint	Comment
Sources of information and availability of contextual information.	Nil	Adequate information is available for the Survey Area, this includes: Broadscale (1:1,000,000) mapping by Beard (1979) and digitised by Shepherd et al. (2002) Database searches (DBCA and <i>NatureMap</i>). Previous surveys (GHD 2024 a, 2024b and 2024c). Previous broadscale vegetation mapping (Mattiske and Havel 1998)
Scope (what life forms were sampled etc.)	Nil	Significant terrestrial vertebrates were sampled during the survey. Basic fauna assessment sampled significant and non-significant species opportunistically. Terrestrial invertebrate fauna were not surveyed.
Proportion of fauna collected and identified (based on sampling, timing and intensity)	Minor	The Targeted fauna survey included undertaking specific tasks to focus on desired species. In permit application GHD applied for the use of cage traps to undertake trapping transects throughout the Survey Area. DBCA at the time declined the use of cage traps requesting substitution of camera transects instead. Camera transects replicated cage trapping design i.e. 10 units spaced at 200 m intervals and baited with a desirable lure. The advantage of cameras enabled continual data collection of a range of species over time rather than a one of per day. However, the identification of individuals was more difficult despite using the spotted pelage marking identification method. The survey timing was considered not ideal for the purpose of the targeted fauna assessment with five survey periods undertaken from March to June 2024 with below average rainfall. The fauna recorded is detailed in Section 3.2 and a full fauna species list is provided in Species list, Appendix B. A species inventory was compiled for this report as it assists in demonstrating effort when some species are not located.
Completeness and further work which might be needed (e.g. was the relevant area fully surveyed)	Nil	The Survey Area was accessed by vehicle and on foot. The Survey Area was adequately surveyed during the field survey in line with the scope. Additional opportunistic sampling was undertaken to develop a comprehensive species inventory although the primary goal of the survey was to target significant fauna. Habitats considered suitable for significant fauna were traversed by foot.
Mapping reliability	Nil	The fauna habitats were mapped using high-resolution aerial imagery obtained from Landgate, topographical features, previous broad scale mapping (Beard 1976) and field data from Mattiske 2023. Data was recorded in the field using hand-held GPS tools. Certain atmospheric factors and other sources of error can affect the accuracy of GPS receivers. The Garmin GPS units and GPS enabled tablets used for this survey are accurate to within 2 to 5 m on average.
Timing/weather/season/cycle	Moderate	The field survey was conducted in March to June 2024. The region has had prolonged drought like conditions from October 2023 to May 2024, leading to a decrease in fauna activity within survey for opportunistic observations.
Disturbances (e.g. fire, flood, accidental human intervention)	Moderate	Some of the Survey Area has been subjected to historical and recent disturbance events (e.g. clearing – logging and fire – prescribed burning); in some areas these events seem to be reducing the presence of fauna that are usually abundant. Despite all the survey effort no Brushtail Possum were recorded, and large hollow bearing (habitat) trees retained by loggers, have been burnt down in prescribed fires. This is reducing the amount of large habitat trees suitable for use by fauna in the forest. These disturbances impact on the results of the survey, as fauna are less likely to be utilising the area, and therefore less likely to be detected.

Aspect	Constraint	Comment
Intensity (in retrospect, was the intensity adequate)	Nil	The fauna of the Survey Area was sampled in accordance with EPA (2020). The Survey Area was sufficiently covered by the Senior and Principal zoologists during the survey.
Resources	Nil	Adequate resources were employed during the field survey which included nine staff over 53 person days spent undertaking the survey using two Senior and one Principal Zoologist.
Access restrictions	Nil	The Survey Area was accessible by vehicle and on foot. There were no access restrictions.
Experience levels	Nil	The Senior Zoologists and Principal Zoologist who executed the survey are practitioners suitably qualified and experienced in their respective fields: Senior Zoologist, Brad Maryan, was a field team lead with more than 25 years' experience leading and conducting fauna surveys. Senior Zoologist, Robert Browne-Cooper, was a field team lead with more than 25 years' experience leading and conducting fauna surveys. Zoologist Lucas Hurst has over 7 years' experience undertaking fauna surveys. Principal Zoologist Glen Gaikhorst was a field team lead with more than 25 years' experience leading and conducting fauna surveys.

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Accessibility of documents

If this Technical Memorandum is required to be accessible in any other format this can be provided by GHD upon request and at an additional cost if necessary.

2. Methods

2.1 Survey timing and personnel.

The survey was conducted during March – June 2024 and was led by GHD Zoologist Dylan Goldspink and accompanied by Senior Zoologists, Robert Browne-Cooper and Brad Maryan, and Zoologists Lucas Hurst and Melissa Wood. The Hollow assessments were conducted by GHD Principal Zoologist Glen Gaikhorst, Zoologist Lucas Hurst and Graduate Environmental Scientist Cheri van Rensburg. A breakdown of the field assessments is presented in Table 2.

Table 2 Survey Timing and Personnel

Date	Task	Personnel
Black Cockatoo habitat assessment and Remote camera deployment 05/03/2024 – 08/03/2024	Black Cockatoo Habitat Assessment identifying Black Cockatoo trees of a suitable Diameter at breast height (DBH). Deployment of remote cameras.	Robert Browne-Cooper Brad Maryan Lucas Hurst Dylan Goldspink
Black Cockatoo Habitat Assessment and remote camera collection 21/03/2024 – 26/03/2024	Remote camera collection and Black Cockatoo habitat assessment and Black Cockatoo hollow assessment.	Glen Gaikhorst Brad Maryan Lucas Hurst Dylan Goldspink
Significant tree verification 4/04/2024	Verification of DBH for significant trees	Dylan Goldspink Melissa Wood
Black Cockatoo habitat assessment and Remote camera deployment 4/05/2024 – 10/05/2024 & 21/05/2024 – 22/05/2024	Black Cockatoo Habitat Assessment identifying Black Cockatoo trees of a suitable Diameter at breast height (DBH). Deployment of remote cameras.	Dylan Goldspink Brad Maryan Melissa Wood
Black Cockatoo Hollow Assessment and Camera Collection 5/06/2024	Black Cockatoo Hollow assessment by ground assessment, pole camera or drone. Collection of remote cameras.	Dylan Goldspink Glen Gaikhorst Cheri van Rensburg

2.2 Field survey

2.2.1 Targeted Remote Camera

Targeted remote cameras were deployed within the Survey Area. A total of 25 Reconyx Remote cameras were deployed within the Survey Area, with a minimum spacing of 400 m apart, along the proposed haul road area. The remote cameras were baited with a combination of sardines, tuna and peanut butter and were deployed to target a number of significant fauna including but not limited to Chuditch (*Dasyurus geoffroii*), Quokka (*Setonix brachyurus*) and Woylie (*Bettongia penicillate ogilbyi*). For each remote camera deployed, the time and date deployed and collected, as well as the GPS coordinates were recorded and presented in Table 3.

Data (images/video) was uploaded to SD cards and downloaded for processing. Images were screened for fauna species present and identified to species level. Where species level could not be achieved, identification was made to species group or best determination to the highest taxonomic level possible. Species presence on camera was classified as an event, with one event occurring every 24 hours (dusk to dawn) unless individual specimens could be identified (i.e. Chuditch with spots or animal sizes or injury

marks). By restricting data to one event every 24 hours assumes some level of independence of the species.

All non-significant terrestrial fauna species were identified and added to the species list presented in Appendix B.

Chuditch Camera Capture (*Dasyurus geoffroi*) Physical Assessment data

Spot patterns of Chuditch were examined in detail and used to identify individuals from camera trap photographs. To use these patterns to identify individuals, accurate and proportionate sketches were made of the top of the head, back, left and right sides of individual Chuditch from the photographs taken by the remote cameras. Each sketch aimed to provide a useful summary that strongly aided subsequent recognition of individuals (Hohnen et al 2015). The spot patterns were examined to determine whether the Chuditch in question was new or a previously viewed individual. Often two or more key spot patterns were visible in a photograph of a single side (e.g. one group on the shoulder and one on the haunch). When these key collections of spots could be matched and no area of the coat had con-complementary patterns, it was deemed to be the same individual. Therefore, a clear view of a single side was sufficient to confirm the identity of the individual, if that individual had been previously identified. Only good quality images showing two or more clear spot patterns were used for identification and photographs with obscured or blurred patterns were not used (Hohnen et al 2015).

Chuditch spot analysis is presented in Appendix B.

Table 3 Targeted Camera deployment

Camera	Habitat Type	Latitude	Longitude	Date Deployed	Date Collected	Nights
CAM W6	Jarraah -Marri forest (Reveg)	-32.60283	116.19127	5/03/2024	22/03/2024	17
CAM W3	Jarraah -Marri forest	-32.55722	116.24230	5/03/2024	26/03/2024	21
CAM X1	Jarraah -Marri forest	-32.56057	116.23868	5/03/2024	26/03/2024	21
CAM R59	Jarraah -Marri forest	-32.56313	116.23425	5/03/2024	26/03/2024	21
CAM 16	Jarraah -Marri forest (Recently burnt reveg)	-32.54883	116.15943	6/03/2024	26/03/2024	20
CAM W10	Jarraah -Marri forest (Burnt reveg)	-32.55391	116.16163	6/03/2024	26/03/2024	20
CAM W11	Jarraah -Marri forest	-32.56060	116.15222	6/03/2024	26/03/2024	20
CAM X2	Jarraah -Marri forest	-32.56571	116.23098	6/03/2024	26/03/2024	20
CAM W9	Jarraah -Marri forest	-32.56807	116.22869	6/03/2024	25/03/2024	19
CAM W12	Jarraah -Marri forest	-32.56927	116.22608	6/03/2024	25/03/2024	19
CAM R57	Jarraah -Marri forest	-32.57125	116.22308	6/03/2024	25/03/2024	19
CAM X3	Jarraah -Marri forest	-32.57349	116.21987	6/03/2024	25/03/2024	19
CAM W15	Jarraah -Marri forest	-32.57795	116.21517	6/03/2024	25/03/2024	19
CAM 53	Jarraah -Marri forest	-32.58005	116.21270	6/03/2024	25/03/2024	19
CAM 15B	Jarraah -Marri forest	-32.55616	116.15595	7/03/2024	26/03/2024	19
CAM 20	Jarraah -Marri forest (Burnt)	-32.55700	116.16400	7/03/2024	26/03/2024	19
CAM 28	Jarraah -Marri forest	-32.55981	116.16628	7/03/2024	26/03/2024	19
CAM HF12	Jarraah -Marri forest	-32.55920	116.24656	7/03/2024	26/03/2024	19
CAM W2	Jarraah -Marri forest	-32.55992	116.25249	7/03/2024	26/03/2024	19
CAM YALGOO	Jarraah -Marri forest	-32.56286	116.16903	8/03/2024	26/03/2024	18
CAM 31	Jarraah -Marri forest (Burnt reveg)	-32.58122	116.18489	8/03/2024	22/03/2024	14
CAM R41	Jarraah -Marri forest (Burnt)	-32.59616	116.19253	8/03/2024	22/03/2024	14

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Camera	Habitat Type	Latitude	Longitude	Date Deployed	Date Collected	Nights
CAM 55	Jarrah -Marri forest	-32.59179	116.20027	8/03/2024	25/03/2024	17
CAM W7	Jarrah -Marri forest	-32.58603	116.20573	8/03/2024	25/03/2024	17
CAM W1	Jarrah -Marri forest	-32.55319	116.24634	8/03/2024	26/03/2024	18
CAM 31	Minor drainage line	-32.58392	116.19009	22/03/2024	25/03/2024	3
CAM C43	Jarrah -Marri forest	-32.55155	116.24485	7/05/2024	31/05/2024	24
CAM Z2	Jarrah -Marri forest	-32.55350	116.24214	7/05/2024	31/05/2024	24
CAM Z10	Jarrah -Marri forest	-32.55610	116.23865	7/05/2024	31/05/2024	24
CAM Z4	Jarrah -Marri forest	-32.55964	116.23626	7/05/2024	31/05/2024	24
CAM W8	Jarrah -Marri forest	-32.56126	116.23402	7/05/2024	31/05/2024	24
CAM P4	Melaleuca dampland	-32.56429	116.22960	7/05/2024	31/05/2024	24
CAM Z3	Jarrah -Marri forest	-32.56681	116.22735	7/05/2024	31/05/2024	24
CAM R56	Jarrah -Marri forest	-32.58096	116.21468	7/05/2024	5/06/2024	29
CAM HP2	Jarrah -Marri forest	-32.58396	116.21134	7/05/2024	5/06/2024	29
CAM Z6	Jarrah -Marri forest	-32.58692	116.20799	7/05/2024	5/06/2024	29
CAM GERO F	Jarrah -Marri forest	-32.58939	116.20518	7/05/2024	5/06/2024	29
CAM 5	Jarrah -Marri forest	-32.59267	116.20190	7/05/2024	5/06/2024	29
CAM C42	Minor drainage line	-32.58757	116.18952	7/05/2024	5/06/2024	29
CAM Z7	Jarrah -Marri forest	-32.58977	116.19929	7/05/2024	31/05/2024	24
CAM 21	Jarrah -Marri forest	-32.58000	116.20962	7/05/2024	31/05/2024	24
CAM 14	Jarrah -Marri forest (Burnt)	-32.57534	116.21497	7/05/2024	5/06/2024	29
CAM Z9	Jarrah -Marri forest	-32.56313	116.15313	9/05/2024	4/06/2024	27
CAM Z5	Jarrah -Marri forest	-32.59700	116.19524	9/05/2024	5/06/2024	27
CAM Z1	Jarrah -Marri forest	-32.57687	116.22766	9/05/2024	5/06/2024	27
CAM Z8	Jarrah -Marri forest	-32.57229	116.21803	9/05/2024	31/05/2024	22
CAM 12	Jarrah -Marri forest	-32.57019	116.22724	9/05/2024	31/05/2024	22

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Camera	Habitat Type	Latitude	Longitude	Date Deployed	Date Collected	Nights
CAM 15B	Edge of dampland	-32.56328	116.22761	9/05/2024	31/05/2024	22
CAM 16	Jarrah -Marri forest	-32.55893	116.24416	9/05/2024	5/06/2024	27
CAM 11	Mixed shrub dampland	-32.56518	116.23143	9/05/2024	31/05/2024	22
Total nights						1083

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2.2.2 Carter's Freshwater Mussel Assessment

The Carter's Freshwater Mussel (*Westralunio carteri*) survey approach is based on the methods used by Kluzinger et al. (2012) to study Carter's Freshwater Mussel populations in the lower Vasse River. This method is aimed at detecting species presence on foot.

However, due to the lack of any permanent water bodies (lakes, rivers or streams) identified within the Survey Area and the two ephemeral streams being completely dry (at the time of the survey), the Carter's Freshwater Mussel Assessment was not conducted. A Carter's Freshwater Mussel Assessment would need to be conducted post significant rainfall, when water is present within the streams.

2.2.3 Black Cockatoo assessment

A Black Cockatoo habitat assessment for Baudin's Black Cockatoo (*Zanda baudinii*), Carnaby's Black Cockatoo (*Z. latirostris*), Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) was undertaken across the Survey Area to assess the presence, quality, and extent of foraging, breeding and roosting habitat. The assessment involved a visual and aural assessment of the Survey Area, identifying breeding habitat (presence/absence of actual and potential breeding trees), foraging habitat, roosting areas, current species activity and other signs of use by Black Cockatoos. This assessment approach was carried out using the DAWE (2022) *Black Cockatoo referral guidelines* to define breeding, foraging and night roosting habitat.

Breeding habitat

Breeding habitat: Defined by DAWE (2022) as 'habitat that contains known, suitable, or potential nesting trees'. For most tree species such as Jarrah (*Eucalyptus marginata*), Marri (*Corymbia calophylla*), Blackbutt (*E.patens*) and Flooded Gum (*E. rudis*), suitable DBH is 500mm. For Wandoo (*E. wandoo*) suitable DBH is 300mm. On average, Carnaby Black Cockatoo are known to nest in hollows with an entrance greater than 20cm (Johnstone & Storr 1998, Groom 2011). While the Forest Red-tailed Black Cockatoo is known to nest in hollows with an entrance greater than 12 cm (Johnstone & Storr 1998). Therefore, hollow suitability was assessed in consideration of these hollow requirements.

Breeding habitat was assessed by surveying the entirety of the McCoy Haul Road Survey Area. Breeding habitat was then analysed from the data collected from the field surveys. For each potential nesting tree, details of the tree location, species, DBH, size and numbers of hollows observed, evidence of use and any other significant observations were recorded. All identified potential nesting tree were further checked visually using binoculars for suitable nest hollows. Where trees were recorded to have suitable large hollows that could be used or had signs of being used (potential or likely), trees were revisited by Principal Zoologist, Glen Gaikhorst, where the hollows were checked for Black Cockatoo use by using a drone, pole camera and/or telephoto lens.

Foraging habitat

Foraging habitat is defined by DAWE (2022) as 'Plant species known to support foraging within the range of cockatoo species'. Foraging habitat was assessed to determine if the vegetation within the Survey Area constitutes foraging habitat, and to qualify its value for Black Cockatoos. Foraging scores were calculated using the forage score tool outlined within DAWE (2022).

The flora species identified within the Survey Area from on-site habitat assessment and recent vegetation mapping by Mattiske (Mattiske 2024) were compared with known foraging species (Valentine and Stock 2008). As part of the foraging assessment, the ground below known food plants and trees was searched for any evidence of Black Cockatoo foraging residue such as Marri and Jarrah chewed seed pods, chewed Banksia cones and foliage clippings.

The DAWE (2022) foraging quality scoring tool is based on a set of site attributes:

- Foraging potential

- Connectivity
- Proximity to breeding and roosting
- Habitat health/disease presence
- Appraisal comments to explain and justify score.

As presented in the DAWE (2022) guidelines, the following criteria were applied to calculate the foraging quality score of the fauna habitat present:

- Starting score of 10 (native vegetation greater than 1 hectare)
- Foraging potential (-2 where no evidence of foraging)
- Connectivity (-2 where no other foraging habitat within 12 km)
- Proximity to breeding (-2 where site is greater than 12 km from breeding habitat)
- Proximity to roosting (-1 where site is greater than 20 km from roosting habitat)
- Impacts from plant disease (-1 where dieback is present in site)
- Total score calculated, adjusted and justified by appraisal statement.

The location and extent of plant species suitable for Black Cockatoo species foraging habitat was identified and mapped for the Survey Area, based on the vegetation assemblages and fauna habitat types, and presence/absence of known foraging species. During the field survey any Black Cockatoo foraging activity (actual or evidence) was recorded via GPS. Vegetation and foraging data were used to calculate foraging quality score for all fauna habitat types across the Survey Area as detailed in DAWE (2022).

The foraging score tool and field data collected and associated forage score calculations are summarised in Appendix B.

Roosting habitat

Night roosting habitat is defined by DAWE (2022) as 'habitat that contains one, or a group of known or potential roosting trees'. Potential night roosting habitat was assessed based on the presence of suitable tall trees within proximity to water. Roosting habitat was also assessed on evidence of roosting activity i.e. feathers, twig clips and proximity of known local or regional roosting sites available from the desktop assessment.

Opportunistic observations, both visual and aural observations of Black Cockatoos within the Survey Area were noted during the survey.

This data was used to calculate estimates of the amount of breeding habitat, amount and quality of foraging habitat, and extent of night roosting habitat within the Survey Area. This information is presented in Appendix B.

Alcoa Black Cockatoo tree definitions

Suitable Black Cockatoo trees were also identified by four tree types as outlined by Alcoa:

Nest Tree: A tree (live or dead) contains one or more hollows suitable as Black Cockatoo breeding habitat (based on hollow size, shape, and entry angle), which shows evidence of use (chewing/scratching around entrance).

Possible Nest Tree: Trees with suitable nesting hollows present, that show no evidence of use.

Habitat Tree: Trees that have the potential to provide nest hollows in the future. These are primarily Marri trees with DBH \geq 500 mm. The tree should already be starting to develop a hollow or have a form that is conducive to hollow formation.

Significant Tree: Healthy Jarrah trees with DBH \geq 2000 mm or healthy Marri trees with DBH \geq 1500 mm.

2.2.4 Masked Owl assessment

Masked Owls (*Tyto novaehollandiae novaehollandiae*) have previously been recorded in the Survey Area via bird acoustic devices (Song Meter) (GHD 2024a) and are associated with Jarrah-Marri Forest and Woodlands and nearby permanent water bodies.

Potential Masked Owl trees were targeted during the survey. Where trees with owl pellets and scats were identified, the tree was recorded as a potential masked owl tree as owl pellets are hard to identify to species level in the field.

2.2.5 Basic fauna assessment

GHD Zoologists undertook a basic fauna assessment during the survey. The Survey Area was traversed by vehicle and by foot over the entirety of the survey and opportunistic fauna species occurring within the Survey Area were recorded. A species list is provided in Appendix B. All survey methods and effort (transects) are presented in Figure 2, Appendix A.

3. Results

3.1 Fauna habitats

The main habitat type observed within the Survey Area, is Jarrah-Marri forest with smaller habitats of Bullich (*Eucalyptus megacarpa*) woodlands, Flooded Gum (*E. rudis*) woodlands and Rehabilitation Areas (aged between 12 – 16 years). These fauna habitat types have been described previously in the Terrestrial Fauna Assessment for O’Neil (GHD 2024a). The Survey Areas represents a large continuous tract of forest and woodland with good connectivity.

3.2 Fauna diversity

Through the McCoy Haul Road Pre-clearance assessment, a total number of 55 terrestrial fauna vertebrates were identified. These 55 comprised of 11 mammals, 33 birds and nine reptiles and two frogs. Of the 55 terrestrial fauna species three are introduced; Feral cat, Feral Pig and Laughing Kookaburra (for the full species list refer to Appendix B).

3.3 Significant fauna

In total nine significant fauna species were recorded during the survey period:

- Carnaby’s Black Cockatoo (*Zanda latirostris*) listed as Endangered under the WA *Biodiversity Conservation Act 2016* (BC Act) and Australian Government *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- Baudin’s Black Cockatoo (*Zanda baudinii*) listed as Endangered under the BC Act and EPBC Act
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) listed as Vulnerable under the BC Act and EPBC Act
- Chuditch (*Dasyurus geoffroyi*) listed as Vulnerable under the EPBC Act and BC Act
- Quokka (*Setonix brachyurus*) listed as Vulnerable under the EPBC Act and BC Act
- Western Brush Wallaby (*Notamacropus irma*) listed as Priority 4 by the DBCA
- Southwestern Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*) listed as Conservation Dependent by the BC Act
- Peregrine Falcon (*Falco peregrinus macropus*) listed as Other Specially protected under the BC Act
- Quenda (*Isodon fusciventer*) listed as Priority 4 by the DBCA.

3.4 Significant fauna recorded

Carnaby’s Black Cockatoo (*Zanda latirostris*)

The Carnaby’s Black Cockatoo is listed as Endangered under the EPBC Act and BC Act.

Carnaby’s Black Cockatoo is endemic to the south-west of WA from near Cape Arid on the south coast through the eastern Wheat Belt and north to about Kalbarri. Carnaby’s Black Cockatoo nest in hollows of live or dead eucalyptus, primarily smooth-barked salmon gum (*Eucalyptus salmonophloia*) and Wandoo (*E. wandoo*) (Saunders 1979, 1982) though breeding has been reported in other Wheatbelt tree species and some tree species on the Swan Coastal Plain and Jarrah forest (Saunders 1979, 1982, Stoor 1991, Johnstone & Store 1998). Success in breeding is dependent on sufficient high quality foraging habitat located in proximity of nesting and is nominally a radius of up to 12 km of nesting sites (Saunders 1979, 1982, Saunders and Ingram 1987).

Carnaby’s Black Cockatoo were recorded perched in a tree and by their calls at a handful of locations within the Survey Area. In total six individuals were recorded (Table 4) visually or aurally. A total of five Carnaby’s Black Cockatoo foraging observations were made, with one being the residue of *Banksia grandis* and four from *Allocasuarina fraseriana* (Sheoak) residue, Table 5. However foraging evidence is not an indication to population size. All foraging locations and bird sightings are located in Figure 4, Appendix A.

Table 4 Carnaby's Black Cockatoo observations

Date	Evidence	Latitude	Longitude	No. of individuals
8/03/2024	Heard calling	-32.56522	116.17083	1
8/03/2024	Heard calling	-32.56275	116.16970	2
21/05/2024	Perched in tree	-32.5543	116.2433	3
Total observations				6

Table 5 Carnaby's Black Cockatoo foraging evidence

Date	Evidence	Latitude	Longitude
6/03/2024	Foraging evidence of <i>Allocasuarina fraseriana</i>	-32.56148	116.15862
6/03/2024	Foraging evidence of <i>Allocasuarina fraseriana</i>	-32.56126	116.15997
6/03/2024	Foraging evidence of <i>Allocasuarina fraseriana</i>	-32.56288	116.15709
7/03/2024	Foraging evidence of <i>Banksia grandis</i>	-32.55873	116.16214
8/03/2024	Foraging evidence of <i>Allocasuarina fraseriana</i>	-32.56422	116.17000

** Note that foraging evidence is not an indication to population size

Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)

The Forest Red-tailed Black Cockatoo is listed as Vulnerable under the EPBC Act and BC Act.

The Forest Red-tailed Black Cockatoo is endemic to the south-west humid and sub-humid zones of WA (Mawson & Johnstone 1997). It inhabits the dense Jarrah, Karri (*E. diversicolor*) and Marri forests receiving more than 600 mm of annual average rainfall. The current distribution is north of Perth and east of Mount Helena, Christmas Tree Well, North Banister, Mt Saddleback, Rocky Gully and the Upper King River (Johnstone 1997). More recently the species has been utilising and persisting on the northern portions of the Swan Coastal Plain and is now considered a regular sighting (Johnstone et al., 2017). Habitats in which Forest Red-tailed Black Cockatoos occur are throughout the Northern Jarrah forest and within Marri, Jarrah, Wandoo, Blackbutt, Bullich and Flooded Gum present. This region has a general understory of Bull Banksia (*Banksia grandis*), Snottygobble (*Persoonia longifolia*), Sheoak (*Allocasuarina fraseriana*) and other *Banksia* species with scattered ephemeral areas of relevant species (Johnstone & Kirkby 1999). Forest Red-tailed Black Cockatoo roost in emergent Jarrah-Marri Blackbutt habitat on roadsides, paddocks or forest blocks. While the Forest Red-tailed Black Cockatoo feeds on seeds of other species, around 90% of its diet is made up of seeds from Marri and Jarrah.

Forest Red-tailed Black Cockatoos were readily recorded either by visual, aural observations, foraging residue or feathers. A total of 69 birds were observed during the survey period, either flying, calling or loafing, as shown in Table 6 and mapped on Figure 4, Appendix A.

One form of secondary evidence, a Forest Red-tailed Black Cockatoo Tail feather, was found at another location (Table 6).

A total of 38 Forest Red-tailed foraging observations were made with a total of 30 being Marri nuts (Plate 1) and eight Jarrah nuts, Table 7. However, foraging evidence is not an indication to the size of the population. All foraging locations and bird sightings are located in Figure 4, Appendix A.

Table 6 Forest Red-tailed Black Cockatoo sightings

Date	Evidence	Latitude	Longitude	No. of Individuals
5/03/2024	Heard calling	-32.59285	116.19226	2
5/03/2024	Heard calling	-32.59118	116.19107	1
6/03/2024	Observed flying	-32.54897	116.15845	3
7/03/2024	Heard calling	-32.55725	116.15626	1

Date	Evidence	Latitude	Longitude	No. of Individuals
7/03/2024	Individuals loafing	-32.56126	116.16475	3
8/03/2024	Observed flying	-32.56360	116.17042	5
8/03/2024	Individual loafing	-32.56273	116.16801	1
8/03/2024	Tail feather	-32.56317	116.16585	1
8/03/2024	Individuals loafing	-32.56377	116.16885	2
21/03/2024	Observed flying	-32.60013	116.18974	2
21/03/2024	Observed flying	-32.60106	116.18990	2
22/03/2024	Heard calling	-32.58526	116.19006	2
22/03/2024	Heard calling	-32.60122	116.19110	2
25/03/2024	Heard calling	-32.55955	116.25169	2
4/04/2024	Flying	-32.59640	116.19420	2
7/05/2024	Heard calling	-32.55178	116.24562	1
7/05/2024	Heard calling	-32.55181	116.24476	1
7/05/2024	Heard calling	-32.55667	116.24033	1
8/05/2024	Heard calling	-32.59389	116.20153	1
8/05/2024	Observed flying	-32.59200	116.19985	5
9/05/2024	Observed flying	-32.58775	116.19033	6
9/05/2024	Heard calling	-32.59475	116.19142	1
9/05/2024	Heard calling	-32.59715	116.19525	1
9/05/2024	Observed foraging	-32.59665	116.19593	4
21/05/2024	Heard calling	-32.55224	116.24489	1
21/05/2024	Heard calling	-32.55256	116.24140	1
21/05/2024	Observed flying	-32.55227	116.24093	4
21/05/2024	Observed foraging	-32.55140	116.24010	3
21/05/2024	Heard calling	-32.55715	116.24070	1
31/05/2024	Heard calling	-32.55230	116.24555	1
5/06/2024	Observed foraging	-32.58765	116.18967	1
5/06/2024	Heard calling	-32.59635	116.19612	1
5/06/2024	Observed flying	-32.59288	116.20118	4
Total observations				69

Table 7 Forest Red-tailed Black Cockatoo foraging evidence

Date	Evidence	Latitude	Longitude
5/03/2024	Foraging residue of Marri nuts	-32.60459	116.19172
5/03/2024	Foraging residue of Marri nuts	-32.60019	116.19010
6/03/2024	Foraging residue of Marri nuts	-32.56434	116.15346
6/03/2024	Foraging residue of Jarrah nuts	-32.56369	116.15375
6/03/2024	Foraging residue of Jarrah nuts	-32.56142	116.15222
6/03/2024	Foraging residue of Jarrah nuts	-32.56622	116.23038
7/03/2024	Foraging residue of Jarrah nuts	-32.55727	116.15630

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Date	Evidence	Latitude	Longitude
8/03/2024	Foraging residue of Marri nuts	-32.58667	116.20605
21/03/2024	Foraging residue of Marri nuts	-32.56184	116.17304
22/03/2024	Foraging residue of Marri nuts	-32.58392	116.18915
22/03/2024	Foraging residue of Marri nuts	-32.55684	116.24330
22/03/2024	Foraging residue of Jarrah nuts	-32.58204	116.21007
25/03/2024	Foraging residue of Marri nuts	-32.55958	116.25197
25/03/2024	Foraging residue of Marri nuts	-32.55845	116.24688
25/03/2024	Foraging residue of Marri nuts	-32.55797	116.24573
25/03/2024	Foraging residue of Marri nuts	-32.56270	116.24936
25/03/2024	Foraging residue of Marri nuts	-32.56224	116.24921
4/04/2024	Foraging residue of Marri nuts	-32.55581	116.24373
4/04/2024	Foraging residue of Marri nuts	-32.56360	116.25391
4/04/2024	Foraging residue of Marri nuts	-32.56083	116.25436
6/05/2024	Foraging residue of Marri nuts	-32.58733	116.20578
8/05/2024	Foraging residue of Marri nuts	-32.58028	116.21426
9/05/2024	Foraging residue of Marri nuts	-32.56364	116.15438
9/05/2024	Foraging residue of Marri nuts	-32.56377	116.15507
9/05/2024	Foraging residue of Marri nuts	-32.56357	116.15557
9/05/2024	Foraging residue of Marri nuts	-32.58744	116.18914
9/05/2024	Foraging residue of Marri nuts	-32.57579	116.22519
21/05/2024	Foraging residue of Marri nuts	-32.55275	116.24504
21/05/2024	Foraging residue of Marri nuts	-32.55135	116.24037
21/05/2024	Foraging residue of Jarrah nuts	-32.55657	116.24059
21/05/2024	Foraging residue of Marri nuts	-32.56000	116.24766
21/05/2024	Foraging residue of Marri nuts	-32.55977	116.24719
21/05/2024	Foraging residue of Jarrah nuts	-32.55981	116.24636
21/05/2024	Foraging residue of Marri nuts	-32.55903	116.24390
21/05/2024	Foraging residue of Jarrah nuts	-32.55965	116.24733
22/05/2024	Foraging residue of Marri nuts	-32.57379	116.21529
4/06/2024	Foraging residue of Marri nuts	-32.56378	116.15484
5/06/2024	Foraging residue of Marri nuts	-32.55761	116.24525
Total observations			38

**Note that foraging evidence is not an indication of population size



Plate 1 Forest Red-tailed Black Cockatoo foraging on Marri Nuts

Baudin's Black Cockatoo (*Zanda baudinii*)

The Baudin's Black Cockatoo is listed as Endangered under the EPBC Act and BC Act.

Baudin's Black Cockatoo is endemic to the south-west of WA. The range of Baudin's Black Cockatoo varies considerably between the breeding and non-breeding seasons. During the breeding season (from October to January), the species nests in isolated pockets of the far south-west of WA within Jarrah, Marri and Karri forests which receive an average of 750 mm of rainfall annually. In addition to the south-west there is an isolated patch of known breeding recorded at Perth Hills, east of Armadale (Johnstone & Storr 1998, Johnstone & Kirkby 2008). Breeding generally occurs in woodland or forest but may also occur in former woodland or forest now present as isolated trees withing partially cleared parkland or farmland. Nesting occurs in hollows of live or dead Karri, Marri, Wandoo and Tuart (*Eucalyptus gomphocephala*) trees (DSEWPaC 2012). During the breeding season feeding primarily occurs in native vegetation, particularly Marri (DSEWPaC 2012). The range then expands during the non-breeding season (from February) as flocks disperse to forage more widely, congregating on the central and northern parts of the Darling plateau, as far as Mundaring and Gidgegannup (DSEWPaC 2012; Saunders 1974 & 1979).

Baudin's Black Cockatoos did not have any physical observations (sightings of birds), however there were two observations of foraging residue of Marri nuts at two locations within the Survey Area, Table 8. However, foraging evidence does not give an indication to population size. Both Baudin's Black Cockatoo foraging locations are located in Figure 4, Appendix A.

Table 8 Baudin's Black Cockatoo foraging evidence

Date	Evidence	Latitude	Longitude
21/03/2024	Foraging residue of Marri nuts	-32.55508	116.24083
22/03/2024	Foraging residue of Marri nuts	-32.58615	116.20572

**Note, foraging evidence is not an indication to population size

Chuditch (*Dasyurus geoffroi*)

The Western Quoll or Chuditch is listed as Vulnerable under the BC Act and EPBC Act.

The Chuditch is WA's largest extant carnivorous marsupial and is endemic to the south-west. It has mostly brown fur with distinctive white spots (4 to 7 white spots on its body but not on its tail). The head body length is up to 40 cm and tail to 35 cm long. The Chuditch feeds mostly on large invertebrates. It also eats small lizards, birds and mammals. They are also known to consume the red pulp on *Macrozamia* seeds, small fruits and part of flowers. They utilise hollow logs or burrows for a den during the day and hunt at night. It is an excellent climber and will hunt for prey arboreally. Historically, Chuditch inhabited a wide range of habitats, but today it survives mostly in Jarrah forests and heathlands of the south-west, and woodlands of the Great Southern (DBCA 2017a).

Chuditch (Plate 2) were recorded readily across the survey area via remote cameras, with a total of 30 camera events having recorded at least 7 individuals (as identified from physical features; spots and scars), Table 9. The highest concentration of Chuditch were recorded in the patches of bush near the McCoy facility, in areas of burnt and unburnt vegetation, Table 9 and presented in Figure 3, Appendix A.

Physical assessments were conducted on the Chuditch, where camera trap images were analysed as described in section 2.2.1 to identify individuals from the spots or other identifiable characteristics. From this assessment 7 different individuals were identified in the Survey Area. There is a likelihood that more individuals reside in the Survey Area as not all images show identifying features.

Of the seven Chuditch identified, three Chuditch were recorded on multiple cameras during the survey period; Chuditch 3, Chuditch 6 and Chuditch 7. Chuditch 3 was recorded on CAM 20 and CAM Yalgoo (Table 3), which were deployed approximately 800 m apart, Chuditch 6 was recorded on CAM W11 and CAM R57 which were deployed approximately 7 km apart and Chuditch 7 was recorded on CAM Z9 and

CAM R56 deployed approximately 6km apart (Table 10). This assessment only provides an estimation of Chuditch movement patterns within the Survey Area as the Chuditch would not move in a straight line.

No Chuditch den sites were identified during the field survey. However, due to the cryptic nature, variety and number of den sites a Chuditch uses within their home range, a Chuditch den will only be identified if a Chuditch or strong signs of a Chuditch was observed at the assumed den site.

The results of the spot pattern analysis can be seen in the table in Appendix B. All locations of Chuditch observations are presented in Figure 4, Appendix A.



Plate 2 Chuditch recorded via remote camera.

Table 9 Chuditch observations

Date	Habitat Type	Observation method	Latitude	Longitude	Number of individuals
6/03/2024	Jarraah-Marri Woodland (Burnt Reveg)	Remote camera	-32.54883	116.15943	1
6/03/2024	Jarraah-Marri Woodland (Burnt Reveg)	Remote camera	-32.54883	116.15943	1
7/03/2024	Jarraah-Marri Woodland (Recently Burnt)	Remote camera	-32.56062	116.15222	1
7/03/2024	Jarraah-Marri Woodland (Recently Burnt)	Remote camera	-32.56062	116.15221	1
7/03/2024	Jarraah-Marri Woodland	Remote camera	-32.57796	116.21517	1
7/03/2024	Jarraah-Marri Woodland	Remote camera	-32.55617	116.15595	1
7/03/2024	Jarraah-Marri Woodland	Remote camera	-32.55391	116.16165	1
8/03/2024	Jarraah-Marri Woodland (Burnt)	Remote camera	-32.54883	116.15942	1
8/03/2024	Jarraah-Marri Woodland (Burnt)	Remote camera	-32.54884	116.15942	1
9/03/2024	Jarraah-Marri Woodland (Burnt Reveg)	Remote camera	-32.54884	116.15943	1
9/03/2024	Jarraah-Marri Woodland (Recently Burnt)	Remote camera	-32.55701	116.16400	1
9/03/2024	Jarraah-Marri Woodland (Recently Burnt)	Remote camera	-32.55700	116.16401	1
9/03/2024	Jarraah-Marri Woodland	Remote camera	-32.55616	116.15594	1
9/03/2024	Jarraah-Marri Woodland	Remote camera	-32.55616	116.15595	1

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Date	Habitat Type	Observation method	Latitude	Longitude	Number of individuals
9/03/2024	Jarrah-Marri Woodland	Remote camera	-32.55390	116.16165	1
10/03/2024	Jarrah-Marri Woodland (Recently Burnt)	Remote camera	-32.56289	116.16903	1
11/03/2024	Jarrah-Marri Woodland (Burnt)	Remote camera	-32.55700	116.16399	1
11/03/2024	Jarrah-Marri Woodland (Burnt Reveg)	Remote camera	-32.55389	116.16164	1
12/03/2024	Jarrah-Marri Woodland (Burnt)	Remote camera	-32.54883	116.15944	1
12/03/2024	Jarrah-Marri Woodland (Recently Burnt)	Remote camera	-32.55700	116.16400	1
13/03/2024	Jarrah-Marri Woodland (Burnt)	Remote camera	-32.54883	116.15944	1
14/03/2024	Jarrah-Marri Woodland (Recently Burnt)	Remote camera	-32.54884	116.15944	1
14/03/2024	Jarrah-Marri Woodland (Recently Burnt)	Remote camera	-32.55701	116.16398	1
17/03/2024	Jarrah-Marri Woodland	Remote camera	-32.57124	116.22308	1
19/03/2024	Jarrah-Marri Woodland (Burnt)	Remote camera	-32.55701	116.16400	1
19/03/2024	Jarrah-Marri Woodland (Burnt)	Remote camera	-32.55701	116.16401	1
22/03/2024	Jarrah-Marri Woodland (Recently Burnt)	Remote camera	-32.54882	116.15943	1
24/03/2024	Jarrah-Marri Woodland (Recently Burnt)	Remote camera	-32.54882	116.15944	1
26/05/2024	Jarrah -Marri forest	Remote camera	-32.56311	116.15305	1
6/06/2024	Jarrah -Marri forest	Remote camera	-32.58096	116.21474	1
Total observations					30

** Please note that this is the number of camera events and not number of individuals.

Table 10 Chuditch movements estimations via remote camera placements

Chuditch ID	Remote cameras that recorded known Chuditch		Distance (km)
Chuditch 3	CAM 20	CAM Yalgoo	0.8
Chuditch 6	CAM W11	CAM R57	7
Chuditch 7	CAM Z9	CAM R56	6

Quokka (*Setonix brachyurus*)

The Quokka is listed as Vulnerable under the EPBC Act and BC Act

The current distribution of the mainland Quokka includes areas through the south-west forests from Jarrahdale to Walpole. The mainland Quokka lives in the Darling Range and south-west regions of WA, mostly inhabiting densely vegetated swamps and sometimes tea-tree thickets on sandy soils along creek systems and dense heath on slopes. Mainland Quokkas tend to hide in runs among vegetation during the day and forage along the swamp margins at night (Kitchener 1995).

In the southern forest Quokkas occupy a range of forest, woodland and wetland ecotypes. The most commonly occupied sites comprise of Jarrah, Marri, Red Tingle (*Eucalyptus jacksonii*) or Yellow Tingle (*E. guilfoylei*) forest and riparian habitats with a sedge dominated understory (DEC 2013). Habitat supporting a low density of near-surface fuel, a complex vegetation structure and burn patchiness are the factors favouring Quokka occupancy in the southern forest (DEC 2013). The habitat critical to survival for the south coast subpopulations includes a wider range of vegetation types (floristically and structurally) than in the northern Jarrah forest, including swamps, riparian areas, incised gullies and dense coastal heath (de Tores et al 2007).

A single observation of the Quokka (Plate 3) via remote camera in the mixed Shrub damp land was made, and two observations of scats (Table 11). All Quokka observations are presented in Figure 4, Appendix A.

Table 11 Quokka observations

Date	Habitat	Observation type	Latitude	Longitude	No. of Observations
6/03/2024	Mixed Shrub dampland	Scats	-32.56473	116.23110	1
22/03/2024	Minor drainage line	Scats	-32.58393	116.19013	1
21/05/2024	Mixed Shrub dampland	Remote camera	-32.56517	116.23142	1
Total Observations					3



Plate 3 Quokka recorded via remote camera



Plate 4 Quokka Scats found in drainage line

Peregrine Falcon (*Falco peregrinus*)

The Peregrine Falcon is listed as Specially Protected under the BC Act.

The Peregrine Falcon is found on and near cliffs, gorges, timbered watercourses, riverine environments, wetlands, plains, open woodlands and pylons and spires of buildings, though less frequently in desert regions (Morcombe 2004, Pizzey & Knight 2012). They are not common but can be found almost anywhere throughout WA and in the southwest including particular at Fitzgerald River, Stirling Range, Porongurup National Parks, Kondinin and Peak Charles, with many more locations north of Perth (Nevil 2013).

A single observation of a Peregrine Falcon was observed soaring over Jarrah-Marri woodland within the Survey Area. The sighting is presented in Table 12 and presented in Figure 4, Appendix A.

Table 12 *Peregrine Falcon observations*

Date	Habitat	Observation type	Latitude	Longitude	No. of Individuals
7/03/2024	Jarrah-Marri Woodland	Opportunistic observation	-32.57040	116.22437	1

Southwestern Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*)

The South-west Brush-tailed Phascogale is listed as Conservation Dependent (CD) under the BC Act.

It occurs at low densities in the Northern Jarrah forest with highest densities occurring in the Perup/Kingston area, Collie River valley and near Margaret River and Busselton. This species has been

observed in dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover. Records are less common from wetter forests. They are most active between dusk and dawn (though emerging later in mid-winter) and forage almost exclusively among the tree canopies. Nest sites include hollow tree limbs, rotten stumps and even bird's nests. Lactating females show a preference for large tree cavities with small entrances. They are opportunistic feeders including invertebrates, nectar, small birds and small mammals (DBCA 2017b).

A single Southwestern Brush-tailed Phascogale (Plate 5) was recorded via remote camera in the Jarrah-Marri woodland along the North East road portion of the Survey Area, Table 13 and Figure 4, Appendix A.

Table 13 Southwestern Brush-tailed Phascogale observations

Date	Habitat	Observation type	Latitude	Longitude	No. of Individuals
10/03/2024	Jarrah-Marri Woodland	Remote Camera	-32.5572	116.2423	1



Plate 5 Southwestern Brush-tailed Phascogale recorded via Remote Camera

Western Brush Wallaby (*Notamacropus irma*)

The Western Brush Wallaby is listed as Priority 4 by the DBCA.

The Western Brush Wallaby occurs widely through the South-west of WA although its former distribution was more extensive, having contracted due habitat loss from historical and ongoing land clearing. It is a medium size macropod with a head body of 900 mm and has distinctive pale stripes on its face with black and white ears and black feet and hands (Van Dyck et al. 2013). Western Brush Wallaby is locally common in dry sclerophyll forest and woodlands in the southwest of WA (Menkhorst & Knight 2011). They are predominantly diurnal, grazing on grasses and forbs.

The Western Brush Wallaby (Plate 6) was recorded via remote camera with a total of 43 camera events showing at least one individual across the Survey Area. Four individuals were opportunistically observed in the field and four observations of fresh scat were recorded. Western Brush Wallaby observations are presented in Table 14 and presented in Figure 4, Appendix A.



Plate 6 Western Brush Wallaby recorded via remote camera.

Table 14 Western Brush Wallaby observations

Date	Habitat	Observation type	Latitude	Longitude	No. of Individuals
5/03/2024	Jarrah -Marri forest	Remote camera	-32.56313	116.23424	1
7/03/2024	Jarrah -Marri forest	Opportunistic observation	-32.55706	116.16415	1
8/03/2024	Jarrah -Marri forest	Remote camera	-32.56313	116.23425	1
8/03/2024	Jarrah -Marri forest	Remote camera	-32.57351	116.21985	1
8/03/2024	Jarrah -Marri forest	Remote camera	-32.56929	116.22607	1
8/03/2024	Jarrah -Marri forest	Remote camera	-32.56060	116.15220	1
12/03/2024	Jarrah -Marri forest	Remote camera	-32.56313	116.23425	1
12/03/2024	Jarrah -Marri forest	Remote camera	-32.56927	116.22605	1
14/03/2024	Jarrah -Marri forest	Remote camera	-32.55920	116.24657	1
14/03/2024	Jarrah -Marri forest	Remote camera	-32.56313	116.23425	1
15/03/2024	Jarrah -Marri forest	Remote camera	-32.55989	116.25250	1
15/03/2024	Jarrah -Marri forest	Remote camera	-32.56059	116.15221	1
16/03/2024	Jarrah -Marri forest	Remote camera	-32.56807	116.22869	1
16/03/2024	Jarrah -Marri forest	Remote camera	-32.57125	116.22310	1
17/03/2024	Jarrah -Marri forest	Remote camera	-32.56313	116.23424	1
17/03/2024	Jarrah -Marri forest	Remote camera	-32.56059	116.15219	1
18/03/2024	Jarrah -Marri forest	Remote camera	-32.55990	116.25247	1
19/03/2024	Jarrah -Marri forest	Remote camera	-32.55992	116.25245	1
19/03/2024	Jarrah -Marri forest	Remote camera	-32.57350	116.21985	1
19/03/2024	Jarrah -Marri forest	Remote camera	-32.56926	116.22606	1
21/03/2024	Jarrah -Marri forest	Remote camera	-32.55920	116.24658	2

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Date	Habitat	Observation type	Latitude	Longitude	No. of Individuals
21/03/2024	Jarrah -Marri forest	Remote camera	-32.56926	116.22604	1
22/03/2024	Jarrah -Marri forest	Remote camera	-32.55319	116.24635	1
22/03/2024	Jarrah -Marri forest	Opportunistic observation	-32.58608	116.20518	1
22/03/2024	Jarrah -Marri forest	Scats	-32.58663	116.20486	1
22/03/2024	Jarrah -Marri forest	Opportunistic observation	-32.58657	116.20491	1
22/03/2024	Jarrah -Marri forest	Remote camera	-32.54882	116.15944	1
23/03/2024	Jarrah -Marri forest	Remote camera	-32.55992	116.25243	1
25/03/2024	Jarrah -Marri forest	Remote camera	-32.55982	116.16628	1
25/03/2024	Jarrah -Marri forest	Remote camera	-32.57349	116.21986	1
26/03/2024	Jarrah -Marri forest	Opportunistic observation	-32.55480	116.24945	1
4/04/2024	Jarrah -Marri forest	Scats	-32.58287	116.20949	1
6/05/2024	Jarrah -Marri forest	Scats	-32.57154	116.22622	1
8/05/2024	Jarrah -Marri forest	Remote camera	-32.55897	116.24421	1
11/05/2024	Jarrah -Marri forest	Remote camera	-32.55892	116.24420	1
12/05/2024	Jarrah -Marri forest	Remote camera	-32.55965	116.23627	1
12/05/2024	Jarrah -Marri forest	Remote camera	-32.56313	116.15315	1
13/05/2024	Jarrah -Marri forest	Remote camera	-32.56315	116.15315	1
14/05/2024	Jarrah -Marri forest	Remote camera	-32.58937	116.20513	1
14/05/2024	Jarrah -Marri forest	Remote camera	-32.55887	116.24416	1
15/05/2024	Jarrah -Marri forest	Remote camera	-32.58101	116.21471	1
17/05/2024	Jarrah -Marri forest	Remote camera	-32.57687	116.22767	1
21/05/2024	Jarrah -Marri forest	Scats	-32.55393	116.24435	1
21/05/2024	Jarrah -Marri forest	Remote camera	-32.55891	116.24405	1
21/05/2024	Jarrah -Marri forest	Remote camera	-32.57687	116.22767	1
21/05/2024	Jarrah -Marri forest	Remote camera	-32.56315	116.15309	1
22/05/2024	Jarrah -Marri forest	Remote camera	-32.58690	116.20799	1
25/05/2024	Jarrah -Marri forest	Remote camera	-32.57685	116.22766	1
26/05/2024	Jarrah -Marri forest	Remote camera	-32.58977	116.19931	1
26/05/2024	Jarrah -Marri forest	Remote camera	-32.58393	116.21134	1
26/05/2024	Jarrah -Marri forest	Remote camera	-32.58395	116.21137	1
31/05/2024	Jarrah -Marri forest	Remote camera	-32.56307	116.15308	1
2/06/2024	Jarrah -Marri forest	Remote camera	-32.58933	116.20521	1
Total observations					54

Quenda (*Isoodon fusciventer*)

The Quenda is listed as Priority 4 under the BC Act.

The Quenda has patchy distribution through a range of forest, woodland, shrubland and heathland habitats from east of Two People Bay through the Jarrah/Karri forests of lower south-west, and north to Perth region where several local re-introduction programs has successfully re-instated this species to some of its former northern range on the Swan Coastal Plain. Its habitat is generally dense scrubby, often swampy, vegetation with dense cover up to one metre high, often feeds in adjacent forest and woodland that is burnt on a

regular basis and in areas of pasture and cropland lying close to dense cover. Populations inhabiting Jarrah and Wandoo forests are usually associated with watercourses (Braithwaite, 1995). Unlike most other marsupials of similar size, this species appears to be quite resilient and able to survive in degraded and semi-developed lands, however it relies on suitable refugia to avoid predators.

The Quenda (Plate 7) was recorded at two locations within the Survey Area via remote camera, with a total of five camera events within the Jarrah-Marri forest. Quenda remote camera observation are presented in Table 15 and Figure 4, Appendix A.



Plate 7 Quenda observed via remote camera

Table 15 Quenda observations

Date	Habitat Type	Observation method	Latitude	Longitude	Number of individuals
8/03/2024	Jarrah -Marri forest	Remote camera	-32.5562	116.156	1
11/05/2024	Jarrah -Marri forest	Remote camera	-32.5631	116.1531	1
12/05/2024	Jarrah -Marri forest	Remote camera	-32.5631	116.1531	1
14/05/2024	Jarrah -Marri forest	Remote camera	-32.5631	116.1531	1
21/05/2024	Jarrah -Marri forest	Remote camera	-32.5631	116.1531	1
Total Observations					5

3.5 Black Cockatoo assessment summary

A summary of the Black Cockatoo breeding, foraging and roosting assessment as defined by Alcoa definitions is presented in Table 16 and Table 17.

3.5.1 Breeding habitat

From this survey a total of nine trees were identified as potentially suitable nest hollow trees and were assessed by Principal Zoologist, Glen Gaikhorst during a follow up hollow assessment. From Glen's assessment, three trees were identified as Nest Trees and six were identified as Possible Nest Trees, Possible nest trees were classed on the basis of minimal chew marks (potential Black Cockatoo exploratory chews) and if they could not be accessed by drone or pole camera. Several other trees were assessed but were deemed Habitat Trees post assessment.

The Black Cockatoo Assessment is presented in Table 17 and all breeding trees are presented in Figure 4, Appendix A.

3.5.2 Foraging habitat

The Jarrah – Marri forest provides extensive foraging habitat for two Black Cockatoo species (Forest Red-tailed Black Cockatoo and Baudin's Black Cockatoo). With confirmed observations of foraging evidence from all three Black Cockatoo species across the Survey Area. Forest Red-tailed Black Cockatoos were the most extensive across the Survey Area with a total of 38 observations of Marri or Jarrah foraging residue (Table 7). Carnaby's Black Cockatoos and Baudin's Black Cockatoos had significantly less observations with only five observations of foraging residue by Carnaby's Black Cockatoos (Table 5) and two observations by Baudin's Black Cockatoos (Table 8).

3.5.3 Roosting habitat

Confirmed roosting habitat for Forest Red-tailed Black Cockatoo was recorded within the Survey Area, via observations of Forest Red-tailed Black Cockatoo tail feathers at roosting trees. Roosting trees were observed in close proximity to the McCoy mine centre, where some Jarrahs were observed to have large amounts of scats, trimmings and feathers, whilst other trees had minimal trimmings and scats. The Black Cockatoo species at other roost sites was unable to be confirmed, as no identifiable tail feathers were found.

Table 16 Black Cockatoo habitat usage

Habitat usage (DAWE 2022)	Tree type (Alcoa/additional category)	Presence within the Survey Area	Evidence
Foraging habitat	-	Present Marri, Jarrah, Bull Banksia and Sheoak	Present with the Survey Area from Primarily Jarrah nuts and Marri nuts, small amounts of <i>Banksia grandis</i> and <i>Allocasurina fraseriana</i>
Known roosting Tree	-	Present Marri, Jarrah	21 Roosting trees were identified within the Survey Area via branch trimmings, scats and feathers at the base of large trees.
	Possible nest tree	Present	Six trees were identified within the Survey Area (refer Table 17)
	Nest tree	Present Marri and a Stag	Three known nesting trees were recorded within the Survey Area (refer Table 17)
	Habitat Tree	Present	2826 Habitat Trees were identified. 663 Marri trees, 2049 Jarrah Trees, 44 Blackbutt trees, 24 Bullich trees, 4 flooded gum and 42 Stags
-	Significant Trees	Present Jarrah and Marri	Nine significant trees were recorded. Five Marri and four Jarrah trees, An extra Jarrah tree which just falls out of the significant tree criteria was also recorded (refer Table 18)

Legend (DAWE 2022)

Foraging habitat: Plant species known to support foraging within the species' range.

Known roosting tree: A tree (usually tallest) or any species usually in close proximity to freshwater that is confirmed to be used for night roosting either via cockatoo presence or strong evidence of roosting.

Potential roost tree: Tall tree of any species, usually in close proximity to a freshwater water source.

Alcoa Black Cockatoo Tree usage terminology



Nest Tree: A tree (live or dead) containing one or more hollows suitable as Black Cockatoo breeding habitat (based on hollow size, shape, and entry angle), which shows evidence of use (chewing/scratching around entrance).

Possible Nest Tree: Trees with suitable nesting hollows present, that show no evidence.

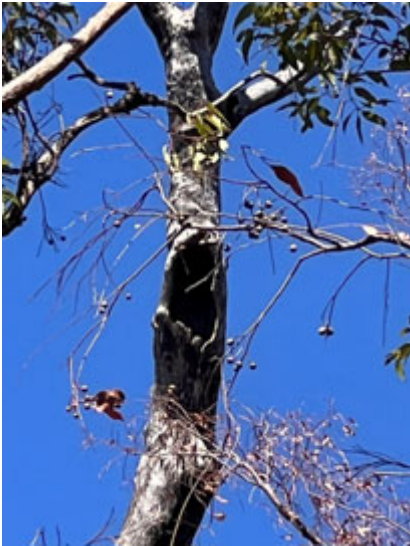

Habitat Tree: Trees on a haul road alignment that have the potential to provide nest hollows in the future. These are primarily Marri trees with DBH ≥ 500 mm. The tree should already be starting to develop a hollow or have a form that is conducive to hollow formation.

Significant Tree: Healthy Jarrah trees with DBH ≥ 2000 mm or healthy Marri trees with DBH ≥ 1500 mm


Table 17 Black Cockatoo hollow assessment

Tree Species	Latitude	Longitude	Tree DBH (mm)	Alcoa Tree Definition	Glen Gaikhorst comments	Photo
Marri (<i>Corymbia calophylla</i>)	-32.5863	116.2043	700	Nest Tree	Well, used hollow, extensive chews on the hollow entrance with well defined nest chamber.	
Marri (<i>Corymbia calophylla</i>)	-32.587	116.2075	930	Nest Tree	Extensive chews on outer hollow. Hollow too tall for pole camera.	



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Tree Species	Latitude	Longitude	Tree DBH (mm)	Alcoa Tree Definition	Glen Gaikhorst comments	Photo
Stag	-32.5852	116.2075	1600	Nest Tree	Extensive chews on outer hollow. Hollow too tall for pole camera.	
Jarrah (<i>Eucalyptus marginata</i>)	-32.592015	116.199922	910	Possible Nest Tree	Hollow too high for pole camera and branches in front for drone. Ground assessment via zoom lens. Appears to have minimal chews on the upper left and lower right rim. Assessment is a likely BC hollow.	


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Tree Species	Latitude	Longitude	Tree DBH (mm)	Alcoa Tree Definition	Glen Gaikhorst comments	Photo
Marri (<i>Corymbia calophylla</i>)	-32.5661	116.2295	1350	Possible nest tree	<p>Small number of chews, on lower right edge.</p> <p>Hollow too tall for pole camera</p>	


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Tree Species	Latitude	Longitude	Tree DBH (mm)	Alcoa Tree Definition	Glen Gaikhorst comments	Photo
Marri (<i>Corymbia calophylla</i>)	-32.5839	116.208	1240	Possible nest tree	Minimal older chews present. Hollow too tall for pole camera	
Marri (<i>Corymbia calophylla</i>)	-32.5853	116.1906	1000	Possible nest tree	Fresh chews on top left of hollow entrance. Small number of chews Hollow too tall for pole camera.	

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Tree Species	Latitude	Longitude	Tree DBH (mm)	Alcoa Tree Definition	Glen Gaikhorst comments	Photo
Marri (<i>Corymbia calophylla</i>)	-32.583677	116.211043	1410	Possible nest tree	<p>2x Hollows too high for pole camera and branches in front of both hollows for drone. Ground assessment via zoom lens. Appears to have chews on the upper hollow particularly on the bottom rim which has fresh scarring. However this hollow has bees exiting and maybe taken over. Lower hollow is in a side limb top/side entry and also looks to have older chews present. But likely used by BC. Assessment is a likely BC hollow</p>	

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Tree Species	Latitude	Longitude	Tree DBH (mm)	Alcoa Tree Definition	Glen Gaikhorst comments	Photo
Marri (<i>Corymbia calophylla</i>)	-32.573211	116.217328	1500	Possible nest tree	Possible Hollow. Ground Assessment only. Hollow too tall for Pole Camera and too windy and branch in front of hollow for drone. Also, Significant tree	

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3.5.4 Significant trees

Nine trees were identified as significant by the Alcoa guidelines stated in Section 2.2.3. These trees comprised of four Jarrah trees with a DBH of 2000mm or greater and five Marri trees with a DBH of 1500 mm or greater (Table 18 and presented in Figure 3, Appendix A).

An extra Jarrah tree was also recorded as it just falls under the 2000 mm DBH criteria to be considered a significant tree and is presented in Table 18.

Table 18 Significant trees

Tree species	DBH (mm)	Notes	Latitude	Longitude
Jarrah (<i>Eucalyptus marginata</i>)	2005	Huge tree but burnt out	-32.58011	116.21240
Jarrah (<i>Eucalyptus marginata</i>)	2060	Huge jarrah	-32.58261	116.20928
Marri (<i>Corymbia calophylla</i>)	1560		-32.59213	116.20174
Marri (<i>Corymbia calophylla</i>)	1900	Possible hollow. 2 hollows present, too shallow for BC, potential for future use. Forest Red-tailed Black Cockatoo foraging.	-32.58036	116.21419
Jarrah (<i>Eucalyptus marginata</i>)	2000		-32.56328	116.15597
Jarrah (<i>Eucalyptus marginata</i>)	2100	Very healthy jarrah, bit burnt.	-32.57220	116.21692
Marri (<i>Corymbia calophylla</i>)	1500	Significant tree, possible hollow. too windy and branch in front for drone. Too high for pole camera. (Refer Table 17)	-32.57321	116.21733
Jarrah (<i>Eucalyptus marginata</i>)	2600	Tree has 'H' spray painted on tree. Healthy but burnt	-32.57278	116.21809
Marri (<i>Corymbia calophylla</i>)	1600	Significant tree. Good tree for bird of prey	-32.55311	116.24168
Jarrah (<i>Eucalyptus marginata</i>)	1950	Falls just under significant tree criteria	-32.55996	116.24852

4. Conclusion

The Survey Area consists of Jarrah-Marri forest as the dominant habitat type, with smaller areas of habitat types including Bullich woodlands, Flooded Gum woodlands and Rehabilitation Areas. The conservation value of the Jarrah-Marri forest is specific to the locally occurring significant fauna species and the type of usage by those species. For example, Jarrah-Marri forest provides extensive foraging habitat for Chuditch and all three Black Cockatoo species as well as roosting and breeding habitat for the three Black Cockatoo species.

All three Black Cockatoo species have been observed utilising the Survey Area. The Forest Red-tailed Black Cockatoo was recorded the most within the Survey Area with the highest number of individuals recorded (sightings) and the most foraging evidence located compared to Carnaby's Cockatoo and Baudin's Cockatoo. Both Baudin's Black Cockatoo and Carnaby's Black Cockatoo had minimal amounts of usage and observation within the Survey Area.

The Survey area contains habitat to support breeding, foraging and roosting for Black Cockatoos. From this survey three trees were identified as known nesting trees, three were identified as priority suitable nesting hollows (nest trees) and three were identified as suitable nesting trees (potential nesting trees). These were recorded and verified by Principal Zoologist, Glen Gaikhorst. Several other trees were identified as potential nesting trees/habitat trees. Nine Significant trees (Jarrah DBH ≥ 2000 mm, and Marri DBH ≥ 1500 mm) were recorded within the Survey Area.

In total, nine significant fauna species were recorded including the Carnaby's Black Cockatoo, Baudin's Black Cockatoo, Forest Red-tailed Black Cockatoo, Chuditch, Quokka, South-western Brush-tailed Phascogale, Peregrine Falcon, Western Brush Wallaby and Quenda. Building upon the 14 significant species recorded within the O'Neil and O'Neil East Survey Areas (occurring in the region) with the addition of the Peregrine Falcon, there has been a total of 15 significant fauna species recorded within the region during the surveys.

Chuditch were recorded readily by remote camera with 30 remote camera events with at least 7 individuals identified from physical features (spots and scars). Chuditch were observed in highly disturbed areas from around the mine area and recently burnt areas. These figures represent a variation from the Alcoa O'Neil site, which identified 61 remote camera events, with at least 15 individuals identified based on physical features. No Chuditch dens were identified within the Survey Area, however, a female Chuditch may have an estimated den usage of 110 burrows and 66 logs within her home range of up to 4 km² (DBCA, 2012). Therefore, a den could have been observed but not identified as it was not currently in use.

Quokkas had a single observation via Remote camera in the mixed Shrub dampland and two observations were scats. These observations are consistent with the Alcoa O'Neil sites as Quokkas were previously recorded in the same mixed shrubland and minor drainage line.

A single observation of the Peregrine Falcon within the McCoy Haul Road alignment was made. This species is rarely observed with the Jarrah Forest of Western Australia as they are in low densities.

A single observation of the Southwestern Brush-tail Phascogale was recorded via a remote camera. Low numbers of Southwestern Brush-tailed Phascogale is consistent within the region with only one other individual recorded recently within O'Neil East by GHD (2024).

Western Brush Wallaby were common within the Survey Area with individuals recorded within most of the habitat types. The high numbers of animals are likely attributed to the fox and cat control that is undertaken within the Northern Jarrah forest. Therefore, the population is dependent on management actions undertaken.

Quenda were only recorded at two locations, with a total of five camera events in the Survey Area despite extensive camera trapping effort within the Survey Area. From other projects, GHD has found Quenda

numbers to be low within the region (GHD 2021a, GHD 2021b, GHD 2024a, GHD 2024b and GHD 2024c). Low number of the Quenda is likely due to extensive prescribed burning to key habitats within the region.

A Carter's Freshwater Mussel assessment was not conducted during this Survey as the two ephemeral streams within the Survey Area did not contain any water and were unable to support Carter's Freshwater Mussel. A Carter's Freshwater Mussel Assessment would need to be conducted post-significant rain and the streams need to contain sufficient water.

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Appendices

Appendix A

Figures

Figure 1 Survey Area

Figure 2 Survey Effort

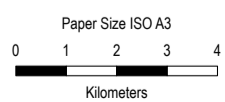
Figure 3 Significant Fauna

Figure 4 Significant Trees and Black Cockatoo Nesting Trees

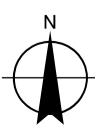


Legend

○ Populated Places	▭ Survey area (original)
— Major Road	▭ Survey area (variation 1)
— Minor Road	▭ Survey area (variation 2)
- - - Miscellaneous Road	



Map Projection: Transverse Mercator
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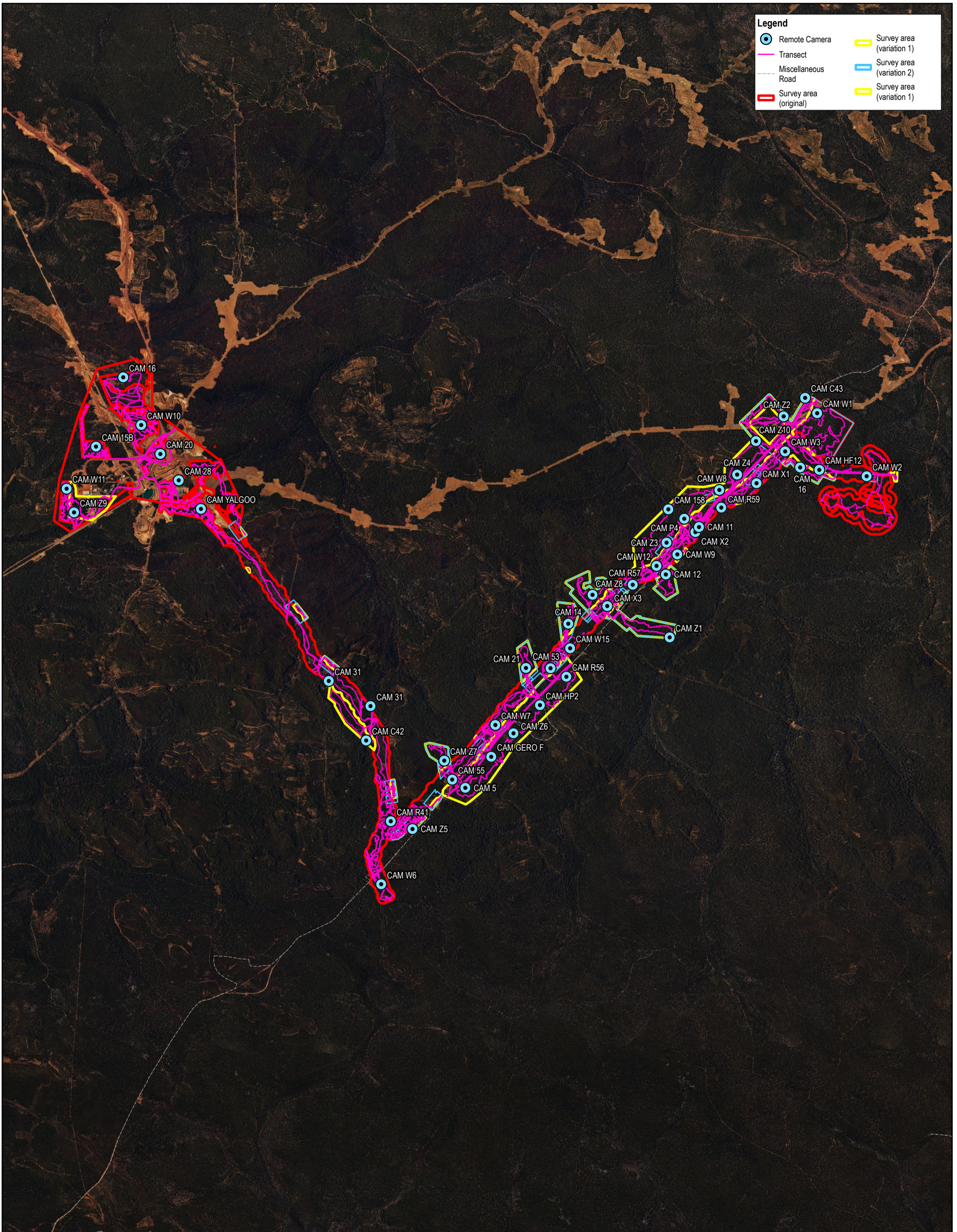


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 Revision No. D
 Date 02/07/2024

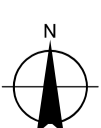
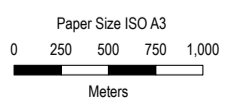
Project location

FIGURE 1



Legend

- Remote Camera
- Transect
- Miscellaneous Road
- Survey area (original)
- Survey area (variation 1)
- Survey area (variation 2)
- Survey area (variation 1)



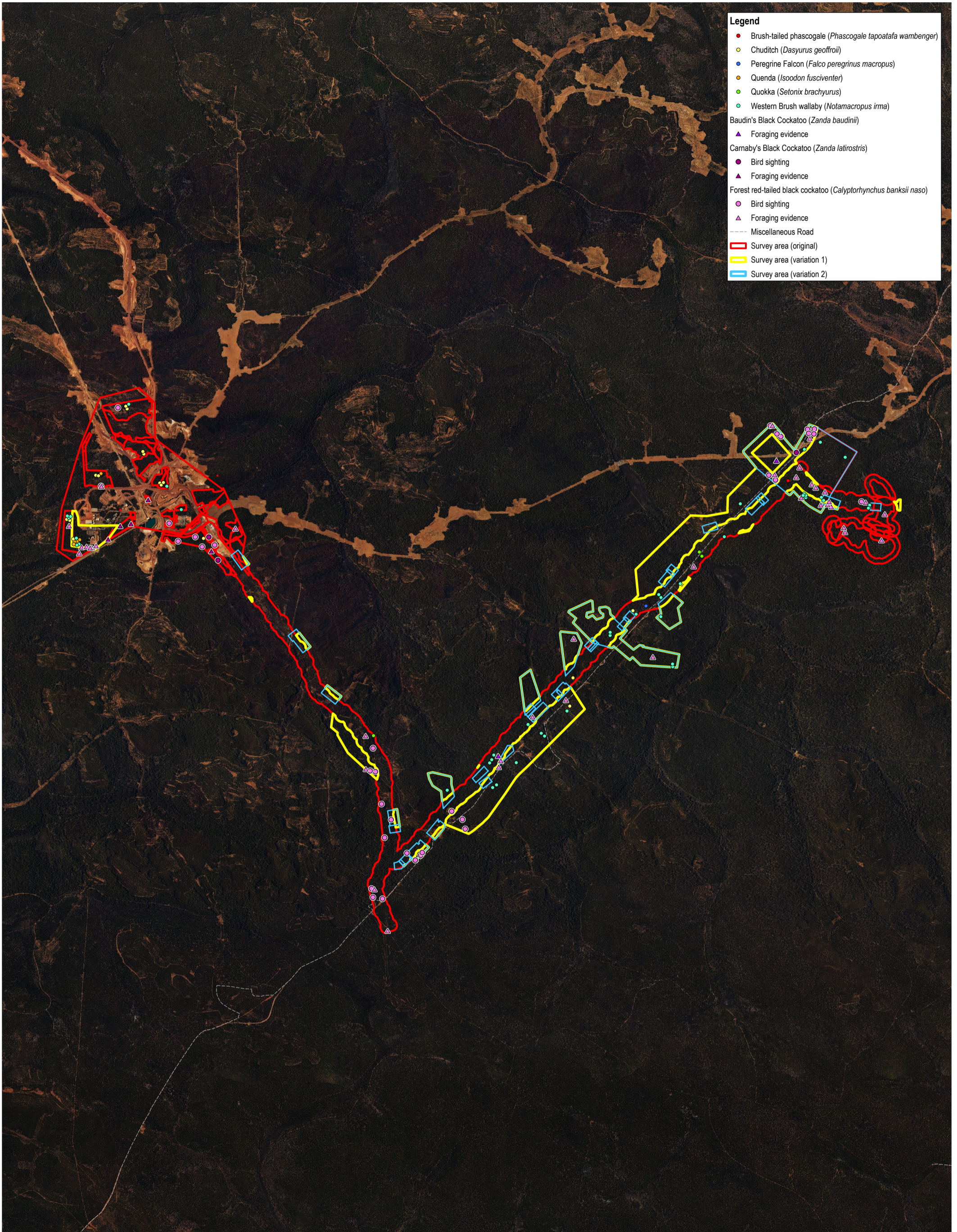
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 Date 04/07/2024

Survey effort

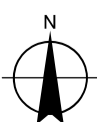
FIGURE 2



- Legend**
- Brush-tailed phascogale (*Phascogale tapoatafa wambenger*)
 - Chuditch (*Dasyurus geoffroi*)
 - Peregrine Falcon (*Falco peregrinus macropus*)
 - Quenda (*Isoodon fusciventer*)
 - Quokka (*Setonix brachyurus*)
 - Western Brush wallaby (*Notamacropus irma*)
 - Baudin's Black Cockatoo (*Zanda baudinii*)
 - ▲ Foraging evidence
 - Carnaby's Black Cockatoo (*Zanda latirostris*)
 - Bird sighting
 - ▲ Foraging evidence
 - Forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*)
 - Bird sighting
 - ▲ Foraging evidence
 - Miscellaneous Road
 - ▭ Survey area (original)
 - ▭ Survey area (variation 1)
 - ▭ Survey area (variation 2)

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Map Projection: Transverse Mercator
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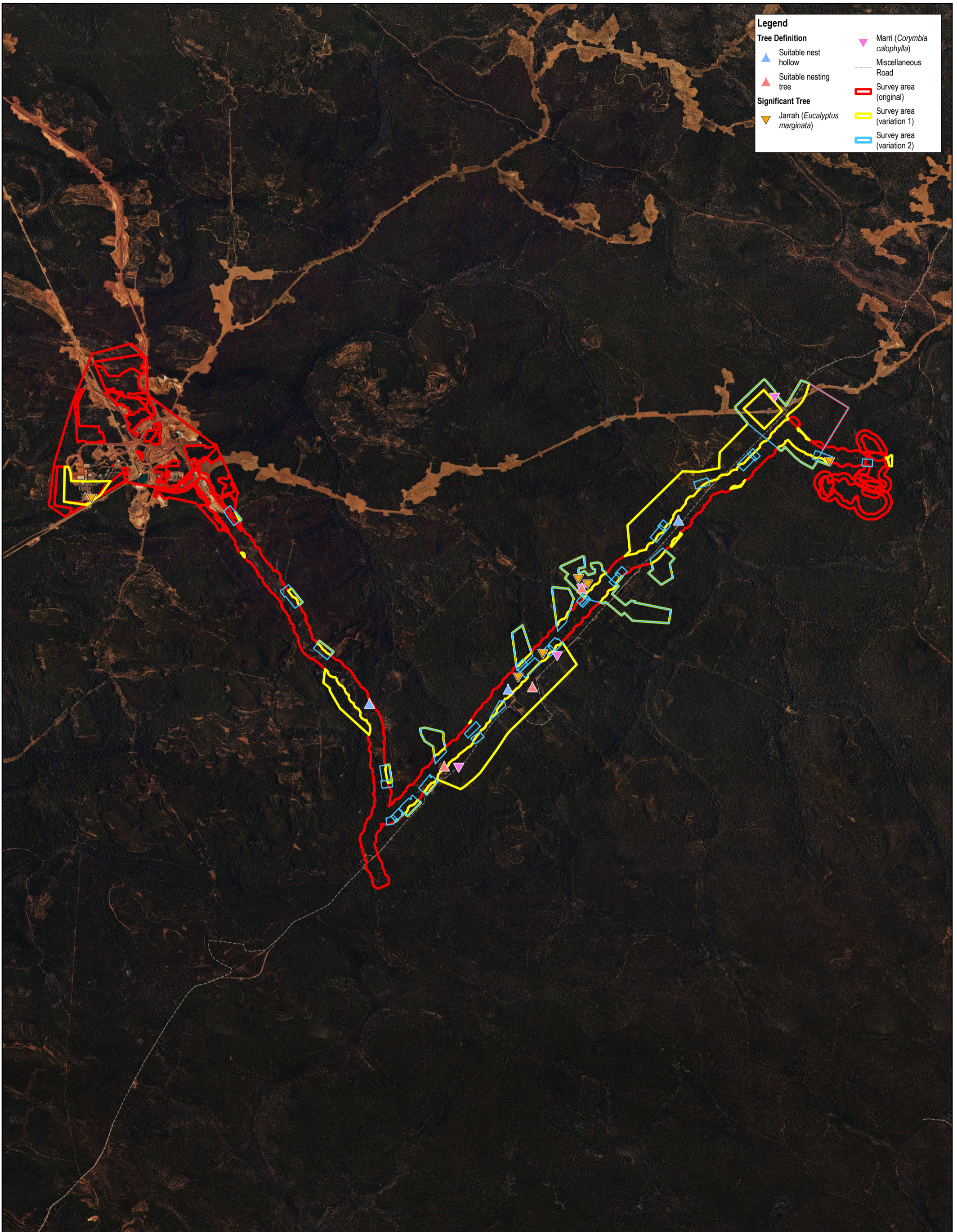


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 Revision No. E
 Date 04/07/2024

Threatened fauna

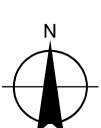
FIGURE 3



Legend

Tree Definition		
▲ Suitable nest hollow	▼ Marri (<i>Corymbia calophylla</i>)	--- Miscellaneous Road
▲ Suitable nesting tree		▭ Survey area (original)
Significant Tree		▭ Survey area (variation 1)
▼ Jarrah (<i>Eucalyptus marginata</i>)		▭ Survey area (variation 2)

Paper Size ISO A3
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Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 50

Alcoa
 Holyoake Environmental Assessments

Project No. 12565572
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Nesting trees and significant trees

FIGURE 4

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Appendix B

Field Data

Species List

Family	Scientific Name	Species	EPBC listing	BC Act/DBCA listing	Phase 1	Phase 2
Mammals						
Dasyuridae	<i>Antechinus flavipes</i>	Mardo			X	X
Dasyuridae	<i>Dasyurus geoffroii</i>	Chuditch	Vu	Vu	X	X
Dasyuridae	<i>Phascogale tapoatafa wambenger</i>	South Western Brush-tailed Phascogale		CD	X	
Felidae	<i>Felis catus</i>	Feral Cat	Int	Int		X
Macropodidae	<i>Macropus fuliginosus</i>	Western Grey Kangaroo			X	X
Macropodidae	<i>Notamacropus irma</i>	Western Brush Wallaby		P4	X	X
Macropodidae	<i>Setonix brachyurus</i>	Quokka	Vu	Vu	X	X
Muridae	<i>Rattus fuscipes</i>	Bush rat				X
Peramelidae	<i>Isoodon fusciventer</i>	Quenda		P4	X	X
Suidae	<i>Sus scrofa</i>	Feral Pig	Int	Int	X	X
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna			X	X
Birds						
Acanthizidae	<i>Acanthiza apicalis</i>	Inland Thornbill				X
Acanthizidae	<i>Gergoyne fusca</i>	Western Gerygone				X
Acanthizidae	<i>Sericornis frontalis</i>	White-browed Scrubwren			X	X
Acanthizidae	<i>Smicromis brevirostris</i>	Weebill			X	X
Accipitridae	<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk				X
Accipitridae	<i>Lophoictinia isura</i>	Square-tailed Kite			X	
Aegothelidae	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar			X	
Alcedinidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra		Int	X	X
Artamidae	<i>Strepera versicolor</i>	Grey Currawong			X	X
Cacatuidae	<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black Cockatoo	Vu	Vu	X	X
Cacatuidae	<i>Eolophus roseicapillus</i>	Galah			X	
Cacatuidae	<i>Zanda baudinii</i>	Baudin's Cockatoo	En	En	X	
Cacatuidae	<i>Zanda latirostris</i>	Carnaby's Black Cockatoo			X	X
Casuariidae	<i>Dromaius novaehollandiae</i>	Emu			X	
Climacteridae	<i>Climacteris rufus</i>	Rufous Tree Creeper				X
Columbidae	<i>Phaps chalcoptera</i>	Common Bronzewing			X	X
Corvidae	<i>Corvus coronoides</i>	Australian Raven				X
Cuculidae	<i>Chrysococcyx basalis</i>	Pallid Cuckoo				X
Falconidae	<i>Falco peregrinus macropus</i>	Peregrine Falcon		OS	X	
Maluridae	<i>Malurus elegans</i>	Red-winged Fairywren				X
Maluridae	<i>Malurus splendens</i>	Splendid Fairywren			X	X

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Family	Scientific Name	Species	EPBC listing	BC Act/DBCA listing	Phase 1	Phase 2
Meliphagidae	<i>Acanthorhynchus superciliosus</i>	Western Spinebill			X	
Pachycephalidae	<i>Pachycephala pectoralis</i>	Golden Whistler			X	X
Pardalotidae	<i>Pardalotus punctatus</i>	Spotted Pardalote			X	X
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote			X	X
Petroicidae	<i>Eopsaltria griseogularis</i>	Western Yellow Robin			X	X
Psittaculidae	<i>Barnardius zonarius</i>	Australian Ringneck Parrot			X	X
Psittaculidae	<i>Platycercus icterotis</i>	Western Rosella				X
Psittaculidae	<i>Purpureicephalus spurius</i>	Red-capped Parrot				X
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail			X	X
Strigidae	<i>Ninox boobook</i>	Southern Boobook			X	
Turnicidae	<i>Turnix varius</i>	Painted Button Quail			X	
Zosteropidae	<i>Zosterops lateralis</i>	Silverye				X
Reptiles						
Agamidae	<i>Pogona minor minor</i>	Western Bearded Dragon			X	
Elapidae	<i>Pseudonaja affinis</i>	Dugite			X	X
Scincidae	<i>Ctenotus labillardieri</i>	Red-legged Ctenotus				X
Scincidae	<i>Cryptoblepharus buchananii</i>	Buchanan's Snake-eyed Skink				X
Scincidae	<i>Egernia napoleonis</i>	Napoleon Skink			X	
Scincidae	<i>Lerista distinguenda</i>	South-western Orange-tailed Slider			X	
Scincidae	<i>Menetia greyii</i>	Common Dwarf Skink				X
Scincidae	<i>Morethia obscura</i>	Shrubland Skink				X
Varanidae	<i>Varanus rosenbergi</i>	Rosenburg's Monitor			X	X
Frogs						
Limnodynastidae	<i>Heleioporus eyrei</i>	Moaning Frog				X
Myobatrachidae	<i>Crinia pseudinsignifera</i>	Bleating Froglet				X

Camera data Phase 1

Family	Scientific Name	Species	EPBC listing	DBCA listing/ BC Act	CAM 16	CAM W3	CAM HF12	CAM 55	CAM R59	CAM 31	CAM W1	CAM W9	CAM 53	CAM W6	CAM 20	CAM 28	CAM R41	CAM X2	CAM Yalgoo
Dasyuridae	<i>Antechinus flavipes</i>	Mardo				7	8	3	4	3	7	3	11	1	1	9			7
Dasyuridae	<i>Dasyurus geoffroi</i>	Chuditch	Vu	Vu	8										6				1
Dasyuridae	<i>phascogale tapoatafa wambenger</i>	South western Brush-tailed Phascogale		CD		1													
Macropodidae	<i>Macropus fuliginosus</i>	Western Grey Kangaroo			1		1	2											
Macropodidae	<i>Notamacropus irma</i>	Western Brush Wallaby		P4	1		2		5		1	1				1			
Peramelidae	<i>Isoodon fusciventer</i>	Quenda		P4															
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna					2		1										
Acanthizidae	<i>Sericornis frontalis</i>	White-browed Scrubwren			1	1			1					1	1	4		1	
Acanthizidae	<i>Smicromnis brevirostris</i>	Weebill				1													
Aegothelidae	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar																	
Artamidae	<i>Strepera versicolor</i>	Grey Currawong																	
Casuariidae	<i>Dromaius novaehollandiae</i>	Emu				1													

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Family	Scientific Name	Species	EPBC listing	DBCA listing/ BC Act	CAM 16	CAM W3	CAM HF12	CAM 55	CAM R59	CAM 31	CAM W1	CAM W9	CAM 53	CAM W6	CAM 20	CAM 28	CAM R41	CAM X2	CAM Yalgoo
Climacteridae	<i>Climacteris rufus</i>	Rufous Tree Creeper																	
Maluridae	<i>Malurus elegans</i>	Red-winged Fairywren											1	1					
Maluridae	<i>Malurus splendens</i>	Splendid Fairywren			6					4								1	
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote							1										
Petroicidae	<i>Eopsaltria griseogularis</i>	Western Yellow Robin				1													
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail											2						
Strigidae	<i>Ninox boobook</i>	Southern Boobook																	
Turnicidae	<i>Turnix varius</i>	Painted Button Quail																	
Agamidae	<i>Pogona minor minor</i>	Western Bearded Dragon												1					
Elapidae	<i>Pseudonaja affinis</i>	Dugite							1										
Scincidae	<i>Egernia napoleonis</i>	Napoleon Skink				1	3						4				1	1	
Scincidae	<i>Morethia obscura</i>	Shrubland Skink																	
Varanidae	<i>Varanus rosenbergi</i>	Rosenburg's Monitor					1		1		1								

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Family	Scientific Name	Species	EPBC listing	DBCA listing/ BC Act	CAM X3	CAM W7	CAM 15B	CAM X1	CAM 31	CAM W12	CAM W11	CAM R57	CAM W10	CAM W2	CAM 15
Dasyuridae	<i>Antechinus flavipes</i>	Mardo			5	1	1	7		7	4				
Dasyuridae	<i>Dasyurus geoffroii</i>	Chuditch	Vu	Vu			2				1	1	3		
Dasyuridae	<i>phascogale tapoatafa wambenger</i>	South western Brush-tailed Phascogale		CD											
Macropodidae	<i>Macropus fuliginosus</i>	Western Grey Kangaroo					2		1		1			1	
Macropodidae	<i>Notamacropus irma</i>	Western Brush Wallaby		P4	3					3	3	1			
Peramelidae	<i>Isoodon fusciventer</i>	Quenda		P4			1								
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna				1				3		1			
Acanthizidae	<i>Sericornis frontalis</i>	White-browed Scrubwren					1							14	2
Acanthizidae	<i>Smicrornis brevirostris</i>	Weebill													1
Aegothelidae	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar								1				5	
Artamidae	<i>Strepera versicolor</i>	Grey Currawong				1	4					1		4	
Casuariidae	<i>Dromaius novaehollandiae</i>	Emu													
Climacteridae	<i>Climacteris rufus</i>	Rufous Tree Creeper					1	1							
Maluridae	<i>Malurus elegans</i>	Red-winged Fairywren					1								
Maluridae	<i>Malurus splendens</i>	Splendid Fairywren							1	3					
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote													3
Petroicidae	<i>Eopsaltria griseogularis</i>	Western Yellow Robin												4	
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail				1					1				
Strigidae	<i>Ninox boobook</i>	Southern Boobook								1					
Turnicidae	<i>Turnix varius</i>	Painted Button Quail							2						
Agamidae	<i>Pogona minor minor</i>	Western Bearded Dragon												5	
Elapidae	<i>Pseudonaja affinis</i>	Dugite													1

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Family	Scientific Name	Species	EPBC listing	DBCAs listing/ BC Act	CAM X3	CAM W7	CAM 15B	CAM X1	CAM 31	CAM W12	CAM W11	CAM R57	CAM W10	CAM W2	CAM 15
Scincidae	<i>Egernia napoleonis</i>	Napoleon Skink			1			4		2					
Scincidae	<i>Morethia obscura</i>	Shrubland Skink												2	
Varanidae	<i>Varanus rosenbergi</i>	Rosenburg's Monitor							1	1		5			

Camera data Phase 2

Family	Scientific Name	Species	EPBC listing	DBCAs listing/ BC Act	CAM Z1	CAM Z10	CAM Z4	CAM Z8	CAM Z3	CAM 19	CAM 11	CAM W8	CAM P4	CAM Z2	CAM Z7	CAM 15b	CAM 12	CAM 21	CAM 17/Gero F
Dasyuridae	<i>Antechinus flavipes</i>	Mardo				10	4	1	3	6	1	7	7	2	1	1			3
Dasyuridae	<i>Dasyurus geoffroii</i>	Chuditch	Vu	Vu															
Felidae	<i>Felis catus</i>	Feral Cat	Int	Int			1							1					
Macropodidae	<i>Macropus fuliginosus</i>	Western Grey Kangaroo						1	1	1				2	1				
Macropodidae	<i>Notamacropus irma</i>	Western Brush Wallaby		P4	3		1								1				2
Macropodidae	<i>Setonix brachyurus</i>	Quokka	Vu	Vu							1								
Muridae	<i>Rattus fuscipes</i>	Bush rat																	
Peramelidae	<i>Isodon fusciventer</i>	Quenda		P4															
Suidae	<i>Sus scrofa</i>	Feral Pig	Int	Int							1								
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna			1			1	1	1		1	2			1			
Acanthizidae	<i>Acanthiza apicalis</i>	Inland Thornbill																	

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Family	Scientific Name	Species	EPBC listing	DBCA listing/ BC Act	CAM Z1	CAM Z10	CAM Z4	CAM Z8	CAM Z3	CAM 19	CAM 11	CAM W8	CAM P4	CAM Z2	CAM Z7	CAM 15b	CAM 12	CAM 21	CAM 17/Gero F
Acanthizidae	<i>Gergoyne fusca</i>	Western Gerygone				1													
Acanthizidae	<i>Sericornis frontalis</i>	White-browed Scrubwren							1										
Artamidae	<i>Strepera versicolor</i>	Grey Currawong			1					1									
Climacteridae	<i>Climacteris rufus</i>	Rufous Tree Creeper																	
Columbidae	<i>Phaps chalcoptera</i>	Common Bronzewing						1					1						
Cuculidae	<i>Chrysococcyx basalis</i>	Pallid Cuckoo														1			
Maluridae	<i>Malurus elegans</i>	Red-winged Fairywren														1			
Maluridae	<i>Malurus splendens</i>	Splendid Fairywren									1		6			1			
Neosittidae	<i>Pachycephala pectoralis</i>	Golden Whistler				1			1										
Petroicidae	<i>Eopsaltria griseogularis</i>	Western Yellow Robin						1											
Psittaculidae	<i>Platycercus icterotis</i>	Western Rosella											2						
Psittaculidae	<i>Purpureicephalus spurius</i>	Red-capped Parrot																	
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail																	
Scincidae	<i>Cryptoblepharus buchananii</i>	Buchanan's Snake-eyed Skink																	

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Family	Scientific Name	Species	EPBC listing	DBCA listing/ BC Act	CAM 16	CAM 5	CAM Z6	CAM14	CAM Z9	CAM C42	CAM Z5	CAM HP2	CAM R56
Dasyuridae	<i>Antechinus flavipes</i>	Mardo			4			1	2		12		4
Dasyuridae	<i>Dasyurus geoffroi</i>	Chuditch	Vu	Vu					1				1
Felidae	<i>Felis catus</i>	Feral Cat	Int	Int									
Macropodidae	<i>Macropus fuliginosus</i>	Western Grey Kangaroo			1				1				
Macropodidae	<i>Notamacropus irma</i>	Western Brush Wallaby		P4	4		1		4			2	1
Macropodidae	<i>Setonix brachyurus</i>	Quokka	Vu	Vu									
Muridae	<i>Rattus fuscipes</i>	Bush rat											1
Peramelidae	<i>Isoodon fusciventer</i>	Quenda		P4					4				
Suidae	<i>Sus scrofa</i>	Feral Pig	Int	Int									
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna									1		1
Acanthizidae	<i>Acanthiza apicalis</i>	Inland Thornbill									1		
Acanthizidae	<i>Gergoyne fusca</i>	Western Gerygone											
Acanthizidae	<i>Sericornis frontalis</i>	White-browed Scrubwren											
Artamidae	<i>Strepera versicolor</i>	Grey Currawong											1
Climacteridae	<i>Climacteris rufus</i>	Rufous Tree Creeper					1				6		1

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Family	Scientific Name	Species	EPBC listing	DBCA listing/ BC Act	CAM 16	CAM 5	CAM Z6	CAM14	CAM Z9	CAM C42	CAM Z5	CAM HP2	CAM R56
Columbidae	<i>Phaps chalcoptera</i>	Common Bronzewing								1			
Cuculidae	<i>Chrysococcyx basalis</i>	Pallid Cuckoo											
Maluridae	<i>Malurus elegans</i>	Red-winged Fairywren											
Maluridae	<i>Malurus splendens</i>	Splendid Fairywren											1
Neosittidae	<i>Pachycephala pectoralis</i>	Golden Whistler											
Petroicidae	<i>Eopsaltria griseogularis</i>	Western Yellow Robin					1						1
Psittaculidae	<i>Platycercus icterotis</i>	Western Rosella											
Psittaculidae	<i>Purpureicephalus spurius</i>	Red-capped Parrot									1		
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail											1
Scincidae	<i>Cryptoblepharus buchananii</i>	Buchanan's Snake-eyed Skink									1		

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Black Cockatoo foraging assessment- Forest Red Tailed Black Cockatoos

Date	Evidence	Latitude	Longitude
5/03/2024	Foraging residue of Marri nuts	-32.60459	116.19172
5/03/2024	Foraging residue of Marri nuts	-32.60019	116.19010
6/03/2024	Foraging residue of Marri nuts	-32.56434	116.15346
8/03/2024	Foraging residue of Marri nuts	-32.58667	116.20605
21/03/2024	Foraging residue of Marri nuts	-32.56184	116.17304
22/03/2024	Foraging residue of Marri nuts	-32.58392	116.18915
22/03/2024	Foraging residue of Marri nuts	-32.55684	116.24330
25/03/2024	Foraging residue of Marri nuts	-32.55958	116.25197
25/03/2024	Foraging residue of Marri nuts	-32.55845	116.24688
25/03/2024	Foraging residue of Marri nuts	-32.55797	116.24573
25/03/2024	Foraging residue of Marri nuts	-32.56270	116.24936
25/03/2024	Foraging residue of Marri nuts	-32.56224	116.24921
4/04/2024	Foraging residue of Marri nuts	-32.55581	116.24373
4/04/2024	Foraging residue of Marri nuts	-32.56360	116.25391
4/04/2024	Foraging residue of Marri nuts	-32.56083	116.25436
6/05/2024	Foraging residue of Marri nuts	-32.58733	116.20578
8/05/2024	Foraging residue of Marri nuts	-32.58028	116.21426
9/05/2024	Foraging residue of Marri nuts	-32.56364	116.15438
9/05/2024	Foraging residue of Marri nuts	-32.56377	116.15507
9/05/2024	Foraging residue of Marri nuts	-32.56357	116.15557
9/05/2024	Foraging residue of Marri nuts	-32.58744	116.18914
9/05/2024	Foraging residue of Marri nuts	-32.57579	116.22519
21/05/2024	Foraging residue of Marri nuts	-32.55275	116.24504
21/05/2024	Foraging residue of Marri nuts	-32.55135	116.24037
21/05/2024	Foraging residue of Marri nuts	-32.56000	116.24766
21/05/2024	Foraging residue of Marri nuts	-32.55977	116.24719
21/05/2024	Foraging residue of Marri nuts	-32.55903	116.24390
22/05/2024	Foraging residue of Marri nuts	-32.57379	116.21529
4/06/2024	Foraging residue of Marri nuts	-32.56378	116.15484
5/06/2024	Foraging residue of Marri nuts	-32.55761	116.24525

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Black Cockatoo Direct Observation assessment- Forest Red Tailed Black Cockatoos

Date	Evidence	Latitude	Longitude	No. of Individuals
5/03/2024	Heard calling	-32.59285	116.19226	2

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Date	Evidence	Latitude	Longitude	No. of Individuals
5/03/2024	Heard calling	-32.59118	116.19107	1
6/03/2024	Observed flying	-32.54897	116.15845	3
8/03/2024	Tail feather	-32.56317	116.16585	1
8/03/2024	Individual loafing	-32.56377	116.16885	2
21/03/2024	Observed flying	-32.60013	116.18974	2
21/03/2024	Observed flying	-32.60106	116.18990	2
22/03/2024	Heard calling	-32.60122	116.19110	2
25/03/2024	Heard calling	-32.55955	116.25169	2
4/04/2024	Flying	-32.59640	116.19420	2
7/05/2024	Heard calling	-32.55178	116.24562	1
7/05/2024	Heard calling	-32.55181	116.24476	1
7/05/2024	Heard calling	-32.55667	116.24033	1
8/05/2024	Heard calling	-32.59389	116.20153	1
8/05/2024	Observed flying	-32.59200	116.19985	5
9/05/2024	Observed flying	-32.58775	116.19033	6
9/05/2024	Heard calling	-32.59475	116.19142	1
9/05/2024	Heard calling	-32.59715	116.19525	1
9/05/2024	Observed foraging	-32.59665	116.19593	4
21/05/2024	Heard calling	-32.55224	116.24489	1
21/05/2024	Heard calling	-32.55256	116.24140	1
21/05/2024	Observed flying	-32.55227	116.24093	4
21/05/2024	Observed foraging	-32.55140	116.24010	3
21/05/2024	Heard calling	-32.55715	116.24070	1
5/06/2024	Observed foraging	-32.58765	116.18967	1
5/06/2024	Heard calling	-32.59635	116.19612	1

Black Cockatoo Direct Observation Assessment- Forest Red Tailed Black Cockatoos

Date	Evidence	Latitude	Longitude	No. of Individuals
5/03/2024	Heard calling	-32.59285	116.19226	2
5/03/2024	Heard calling	-32.59118	116.19107	1
6/03/2024	Observed flying	-32.54897	116.15845	3
8/03/2024	Tail feather	-32.56317	116.16585	1
8/03/2024	Individual loafing	-32.56377	116.16885	2
21/03/2024	Observed flying	-32.60013	116.18974	2
21/03/2024	Observed flying	-32.60106	116.18990	2
22/03/2024	Heard calling	-32.60122	116.19110	2
25/03/2024	Heard calling	-32.55955	116.25169	2
4/04/2024	Flying	-32.59640	116.19420	2

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Date	Evidence	Latitude	Longitude	No. of Individuals
7/05/2024	Heard calling	-32.55178	116.24562	1
7/05/2024	Heard calling	-32.55181	116.24476	1
7/05/2024	Heard calling	-32.55667	116.24033	1
8/05/2024	Heard calling	-32.59389	116.20153	1
8/05/2024	Observed flying	-32.59200	116.19985	5
9/05/2024	Observed flying	-32.58775	116.19033	6
9/05/2024	Heard calling	-32.59475	116.19142	1
9/05/2024	Heard calling	-32.59715	116.19525	1
9/05/2024	Observed foraging	-32.59665	116.19593	4
21/05/2024	Heard calling	-32.55224	116.24489	1
21/05/2024	Heard calling	-32.55256	116.24140	1
21/05/2024	Observed flying	-32.55227	116.24093	4
21/05/2024	Observed foraging	-32.55140	116.24010	3
21/05/2024	Heard calling	-32.55715	116.24070	1
5/06/2024	Observed foraging	-32.58765	116.18967	1
5/06/2024	Heard calling	-32.59635	116.19612	1

Black Cockatoo Foraging Assessment- Baudin's Black Cockatoos

Date	Evidence	Latitude	Longitude
21/03/2024	Foraging residue of Marri nuts	-32.55508	116.24083
22/03/2024	Foraging residue of Marri nuts	-32.58615	116.20572

Black Cockatoo Foraging assessment- Carnaby's Black Cockatoos

Date	Evidence	Latitude	Longitude
6/03/2024	Foraging evidence of Sheoak	-32.56148	116.15862
6/03/2024	Foraging evidence of Sheoak	-32.56126	116.15997
6/03/2024	Foraging evidence of Sheoak	-32.56288	116.15709

Black Cockatoo Direct Observation assessment- Carnaby's Black Cockatoos

Date	Evidence	Latitude	Longitude	No. of Individuals
8/03/2024	Heard calling	-32.56522	116.17083	1
8/03/2024	Heard calling	-32.56275	116.16970	2
21/05/2024	Perched in tree	-32.5543	116.2433	3

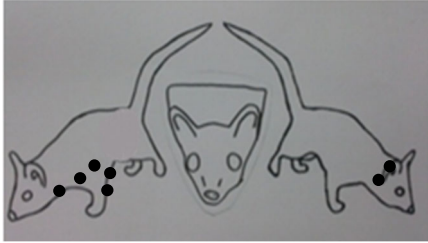


Black Cockatoo foraging assessment (DAWE 2022)

Starting score	Carnaby's Cockatoo	Baudin's Cockatoo	Forest Red-tailed Black Cockatoo
10	Start at a score of 10 if your site is native shrubland, Kwongan heathland or woodland, dominated by proteaceous plant species such as Banksia spp. (including Dryandra spp.), Hakea spp. and Grevillea spp., as well as native eucalypt woodland and forest that contains foraging species, within the range of the species, including along roadsides and parkland cleared areas. Also includes planted native vegetation. This tool only applies to sites equal to or larger than 1 hectare in size.	Start at a score of 10 if your site is native eucalypt woodlands and forest, and proteaceous woodland and heath, particularly Marri, within the range of the species, including along roadsides and parkland cleared areas. Can include planted vegetation. This tool only applies to sites equal to or larger than 1 hectare in size.	Start at a score of 10 if your site is Jarrah or Marri woodland and/or forest, or if it is on the edge of Karri forest, or if Wandoo and Blackbutt occur on the site, within the range of the subspecies, including along roadsides and parkland cleared areas. This tool only applies to sites equal to or larger than 1 hectare in size.
Attribute/score subtraction	Context adjustor (attributes reducing functionality of foraging habitat)		
Foraging potential (-2)	Subtract 2 from your score if there is no evidence of feeding debris on your site.	Subtract 2 from your score if there is no evidence of feeding debris on your site.	Subtract 2 from your score if there is no evidence of feeding debris on your site.
Connectivity (-2)	Subtract 2 from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	Subtract 2 from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	Subtract 2 from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.
Proximity to breeding (-2)	Subtract 2 if you have evidence to conclude that your site is more than 12 km from breeding habitat.	Subtract 2 if you have evidence to conclude that your site is more than 12 km from breeding habitat.	Subtract 2 if you have evidence to conclude that your site is more than 12 km from breeding habitat.
Proximity to roosting (-1)	Subtract 1 if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	Subtract 1 if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	Subtract 1 if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.
Impact from significant plant disease (-1)	Subtract 1 if your site has disease present (e.g. Phytophthora spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	Subtract 1 if your site has disease present (e.g. Phytophthora spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	Subtract 1 if your site has disease present (e.g. Phytophthora spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.
Attribute/score subtraction	Carnaby's Black Cockatoo	Baudin's Black Cockatoo	Forest Red-tailed Black Cockatoo
Starting score	10	10	10
Foraging potential (-2)	0	0	0
Connectivity (-2)	0	0	0
Proximity to breeding (-2)	0	0	0




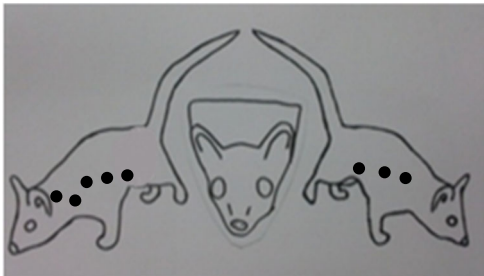
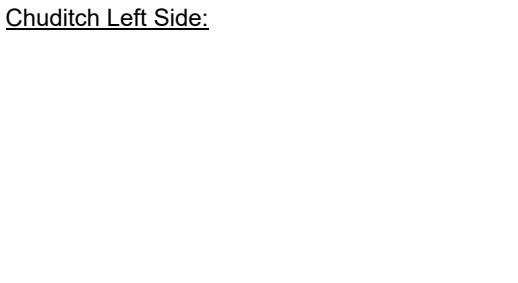
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Starting score	Carnaby's Cockatoo	Baudin's Cockatoo	Forest Red-tailed Black Cockatoo
Proximity to roosting (-1)	0	0	0
Impact from significant plant disease (-1)	0	0	0
Total score	10	10	10
Appraisal	<p>The Jarrah-marri forest contains suitable foraging habitat for Carnaby's Black Cockatoo however, only limited signs of foraging evidence from Carnaby's Black Cockatoo were recorded within the Survey Area. The habitat has good connectivity with foraging habitat within 12kms of the Survey Area. Previously recorded breeding trees are recorded within the region and three known breeding trees, three suitable nesting hollows and three suitable nesting trees were recorded within the Survey Area. 21 Roosting sites were recorded with the Survey Area with more roosting being recorded within the region. No signs of Phytophthora or Marri canker was observed. Frequent fires have the potential to affect Carnaby's Black Cockatoo.</p>	<p>The Jarrah-marri forest contains suitable foraging habitat for Baudin's Black Cockatoo however, only limited signs of foraging evidence from Baudin's Black Cockatoo were recorded within the Survey Area. The habitat has good connectivity with foraging habitat within 12kms of the Survey Area. Previously recorded breeding trees are recorded within the region and three known breeding trees, three suitable nesting hollows and three suitable nesting trees were recorded within the Survey Area. 21 Roosting sites were recorded with the Survey Area with more roosting being recorded within the region. No signs of Phytophthora or Marri canker was observed. Frequent fires have the potential to affect Baudin's Black Cockatoo.</p>	<p>The Jarrah-marri forest contains suitable foraging habitat with numerous signs of Forest Red-tailed Black Cockatoo foraging evidence on Marri and Jarrah nuts were recorded within the Survey Area. The Survey Area has good connectivity with foraging habitat within 12kms and the greater Jarrah forest. Previously recorded breeding trees are recorded within the region and three known breeding trees, three suitable nesting hollows and three suitable nesting trees were recorded within the Survey Area. 21 Roosting sites were recorded within the Survey Area, however, from the number of Forest Red-tailed Black Cockatoos sighted it is likely there are roosting trees elsewhere in the region. No signs of Phytophthora or Marri canker was observed. Frequent fires have the potential to affect Forest Red-tail Black Cockatoo.</p>

Chuditch Camera Capture (*Dasyurus geoffroii*) Physical Assessment data

Chuditch ID	Camera ID	Date	ID marks	Spot pattern diagram	Remote camera Image
Chuditch 1	CAM16	Phase 1: 07/03/2024	Three distinct horizontal white spots along left hand front flank, with three distinct vertical white spots at front left leg.		<u>Chuditch Left Side:</u> 
		09/03/2024			<u>Chuditch Right Side:</u> 
		10/03/2024	Distinct belt of three vertical white spots in the middle of right hand side flank		
		15/03/2024			

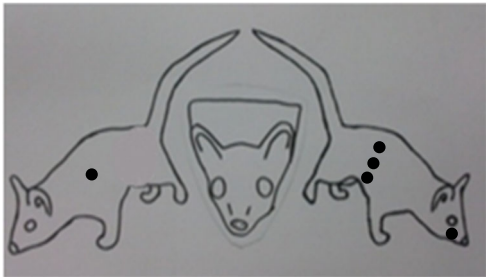


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Chuditch ID	Camera ID	Date	ID marks	Spot pattern diagram	Remote camera Image
Chuditch 2	CAM16	Phase 1: 13/03/2024 14/03/2024 25/03/2024	Definitive white “slash” type marking along front right flank with grouping of four white spots in “square” formation along back right hand side flank.		<p><u>Chuditch Left Side:</u></p>  <p><u>Chuditch Right Side:</u></p> 
Chuditch 3	CAM20 CAM Yalgoo	Phase 1: 09/03/2024 10/03/2024	<p>Distinctive white scarring on underside of left ear with row of three horizontal spots along left flank.</p> <p>Large bare patch without spots along back right hand side with small row of three horizontal spots along middle of right hand side.</p>		<p><u>Chuditch Left Side:</u></p> 

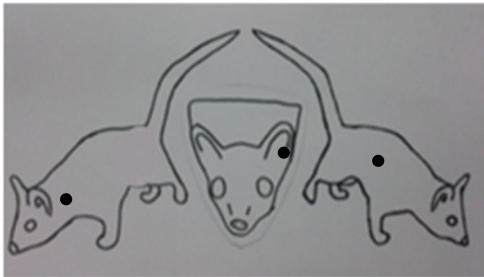


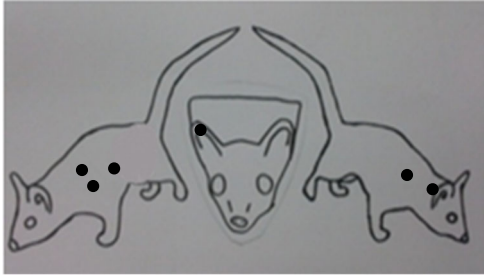
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Chuditch ID	Camera ID	Date	ID marks	Spot pattern diagram	Remote camera Image
					<div data-bbox="1659 233 2175 523"> </div> <p data-bbox="1659 676 1883 703"><u>Chuditch Right Side:</u></p> <div data-bbox="1659 708 2175 999"> </div>


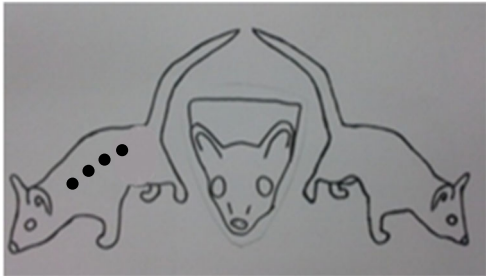

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Chuditch ID	Camera ID	Date	ID marks	Spot pattern diagram	Remote camera Image
Chuditch 4	CAM20	Phase 1: 09/03/2024	<p>Distinct scarring along snout on right hand side. Blackened tail. Line of three vertical white spots in the middle of right hand side flank.</p> <p>Prominent, large white spot in the middle of left hand side flank.</p>		<p><u>Chuditch Left Side:</u></p>  <p><u>Chuditch Right Side:</u></p> 

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Chuditch ID	Camera ID	Date	ID marks	Spot pattern diagram	Remote camera Image
Chuditch 5	CAM15B	Phase 1: 09/03/2024	White spot marking on front left ear and distinctive single, large white spot on front left shoulder. Two distinct, large white spots located across right shoulder.		<p><u>Chuditch Left Side:</u></p>  <p><u>Chuditch Right Side:</u></p> 
Chuditch 6	CAM W11 Cam R57	Phase 1: 08/03/2024 18/03/2024	Distinct scarring behind right ear and distinct, large, single white spot directly behind right ear. Small distinct notch on left ear.		<p><u>Chuditch Left Side:</u></p> <p><u>Chuditch Right Side:</u></p>

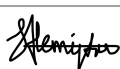

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Chuditch ID	Camera ID	Date	ID marks	Spot pattern diagram	Remote camera Image
					 <p>2024-03-08 12:01:10 AM M 3/3 10 21°C HYPERF IRE 2 COVERT</p>
Chuditch 7	CAM Z9 CAM R56	Phase 2: 27/05/2024	Distinct horizontal row of four spots along left flank		<p><u>Chuditch Left Side:</u></p>  <p>2024-05-27 01:10:43 M 2/3 10 11°C HYPERF IRE 2 COVERT</p> <p><u>Chuditch Right Side:</u></p>

Reference

Hohnen, R, Ashby, J, Tuft, K, & McGregor, H 2012, 'Individual identification of northern quolls (*Dasyurus hallucatus*) using remote cameras', Australian Mammalogy, CSIRO Publishing. <http://dx.doi.org/10.1071/AM12015>.

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Document title		McCoy Haul Road Fauna Pre-clearance Survey					
Project number		12565572					
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Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S0	Rev A	D. Goldspink	J Collins, G Gaikhorst	On file	J Collins		14/06/24
S3	Rev B	D. Goldspink S. Flemington	S. Flemington	On file			3/07/24
S4	Rev C	D. Goldspink	S. Flemington	On file			4/07/24
S4	Rev 1 FINAL	D. Goldspink	S. Flemington		M Brook		5/07/24
[Status code]							

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