

## **Appendix 30 Targeted Chuditch, Quokka, and Woylie Survey – Larego Region**

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# Targeted Chuditch, Quokka, and Woylie Survey

## Willowdale Mine – Larego Region

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2.0	17 June 2024	K. Griffith	E. Webb	E. Webb

## Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Alcoa of Australia Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.



## Executive Summary

Alcoa of Australia Ltd commissioned SLR Consulting Australia Pty Ltd to undertake a fauna desktop assessment and targeted Chuditch (*Dasyurus geoffroii*), Quokka (*Setonix brachyurus*), and Woylie (*Bettongia penicillata*) survey for the Willowdale Mine Larego region as part of its Mining and Management Plan assessment by the Mining and Management Program Liaison Group. The survey was undertaken within a defined area that consists of approximately 35 individual polygons (the Survey Area) that cover 451.8 hectares and is located approximately 15 km southeast of the Waroona townsite, in the Jarrah Forest bioregion of Western Australia.

The objective of the survey was to identify key fauna values targeting Chuditch, Quokka, and Woylie within the Survey Area as part of the MMP assessment process.

The targeted fauna survey used a variety of detection methods including camera trapping, spotlighting, active searches, and opportunistic observations. Fauna habitat mapping was based on a combination of field observations, vegetation mapping, fauna habitat assessment data, and aerial imagery.

Two fauna habitats were mapped within the Survey Area, Jarrah-Marri Forest, and Drainage Line habitats. The Drainage Line habitat provides the most value for the targeted taxa as it is core habitat for the Chuditch, Quokka, and Woylie. The Jarrah-Marri Forest also provides value for targeted taxa as core habitat for the Chuditch and Woylie and supporting habitat for the Quokka.

One targeted taxon was recorded during the survey; secondary evidence of Chuditch was recorded in the form of scat within the Jarrah-Marri Forest. The Quokka and Woylie were not recorded during the current survey; however, they have previously been recorded within 200 m and 40 m of the Survey Area respectively.

In addition to the targeted fauna taxa, four significant taxa were recorded during the fauna survey:

- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*).
- Baudin's Cockatoo (*Zanda baudinii*).
- Western Brush Wallaby (*Notamacropus irma*).
- Rakali (*Hydromys chrysogaster*).

A further seven significant fauna taxa were assessed as having a high likelihood and six significant fauna taxa were assessed as having a medium likelihood, and 15 significant fauna taxa were assessed as having have a low likelihood of occurring within the Survey Area.

Three introduced taxa were recorded during the survey: Pig (*Sus scrofa*), Cat (*Felinus catus*) and Black Rat (*Rattus rattus*).



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## Acronyms and Abbreviations

°C	Degree Celsius
BC Act	<i>Biodiversity Conservation Act 2016</i>
BoM	Bureau of Meteorology
CR	Critically Endangered
DAWE	Department of Agriculture Water and Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEE	Department of the Environment and Energy
Desktop Study Area	The area that was studied during the desktop assessment encompassing the Survey Area and surrounds
DMIRS	Department of Mines, Industry Regulation and Safety
DoE	Department of the Environment
DPIRD	Department of Primary Industries and Regional Development
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
DWER	Department of Water and Environmental Regulation
EIA	Environmental Impact Assessment
EN	Endangered
EP Act	<i>Environmental Protection Act 1986</i>
EPA	Environmental Protection Authority
EPBC Act	<i>Environment Protection Biodiversity and Conservation Act 1999</i>
ESA	Environmentally Sensitive Area
GIS	Geographic Information System
GPS	Global Positioning System
ha	Hectare
IBRA	Interim Biogeographic Regionalisation for Australia
IBSA	Index of Biodiversity Surveys for Assessments
km	Kilometres
Lat	Latitude
Long	Longitude
m	Metres
MA	Marine
MI	Migratory
mm	Millimetres
MMP	Mining and Management Program
MMPLG	Mining and Management Planning Liaison Group
MNES	Matters of National Environmental Significance



OS	Other Specially Protected Fauna
P	Priority
PMST	Protected Matters Search Tool
Alcoa	Alcoa of Australia Ltd
SLR	SLR Consulting Australia
Survey Area	The area that was surveyed
T	Threatened
TEC	Threatened Ecological Community
VU	Vulnerable
WA	Western Australia
WAM	Western Australian Museum



## 1.0 Introduction

### 1.1 The Project

Alcoa of Australia Ltd (Alcoa) commissioned SLR Consulting Australia Pty Ltd (SLR) to undertake a fauna desktop assessment and targeted Chuditch (*Dasyurus geoffroii*), Quokka (*Setonix brachyurus*), and Woylie (*Bettongia penicillata*) survey for the Willowdale Mine Larego region (the Project) as part of its Mining and Management Program (MMP) assessment by the Mining and Management Planning Liaison Group (MMPLG). The survey was undertaken within a defined area that consists of approximately 35 individual polygons (the Survey Area) that cover 451.8 hectares and is located approximately 15 km southeast of the Waroona townsite, in the Jarrah Forest bioregion of Western Australia (**Map 1**). All maps are provided in **Appendix A**.

### 1.2 Objective and Scope

The objective of the survey was to identify key fauna values targeting Chuditch, Quokka, and Woylie within the Survey Area as part of the MMP assessment process for the Project. The following scope of work was completed:

- A desktop assessment of the Willowdale Mine Larego region including an overview of fauna habitat, inventory of likely species present and background environmental information.
- A targeted survey for Chuditch, Quokka, and Woylie.
- A technical biological report.



## 2.0 Background

### 2.1 Statutory and Regulatory Framework

Western Australian fauna is governed by the following legislative measures:

- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act). (Commonwealth of Australia, 1999).
- *Biodiversity Conservation Act 2016* (WA) (BC Act) (Government of Western Australia, 2016).
- *Environmental Protection Act 1986* (WA) (EP Act) (Government of Western Australia, 1986).

In addition to these legislative measures, the following non-legislative lists are considered on a case-by-case basis:

- WA Department of Biodiversity Conservation and Attractions (DBCA) Priority lists for fauna, flora, and ecological communities.
- Recognition of locally significant populations by DBCA.

The EIA process is supported by guidance documents published by the Environmental Protection Authority (EPA), DBCA and the Department of Climate Change, Energy, the Environment and Water (DCCEE).

#### Western Australia

- *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA, 2020).
- *Environmental Factor Guideline – Terrestrial Fauna* (EPA, 2016).

#### Commonwealth

- *Matters of National Environmental Significance – Significant Impact Guidelines 1.1* (DoE, 2013).
- *Survey guidelines for Australia’s threatened mammals* (DSEWPoC, 2011).

## 2.2 Existing Environment

### 2.2.1 Climate

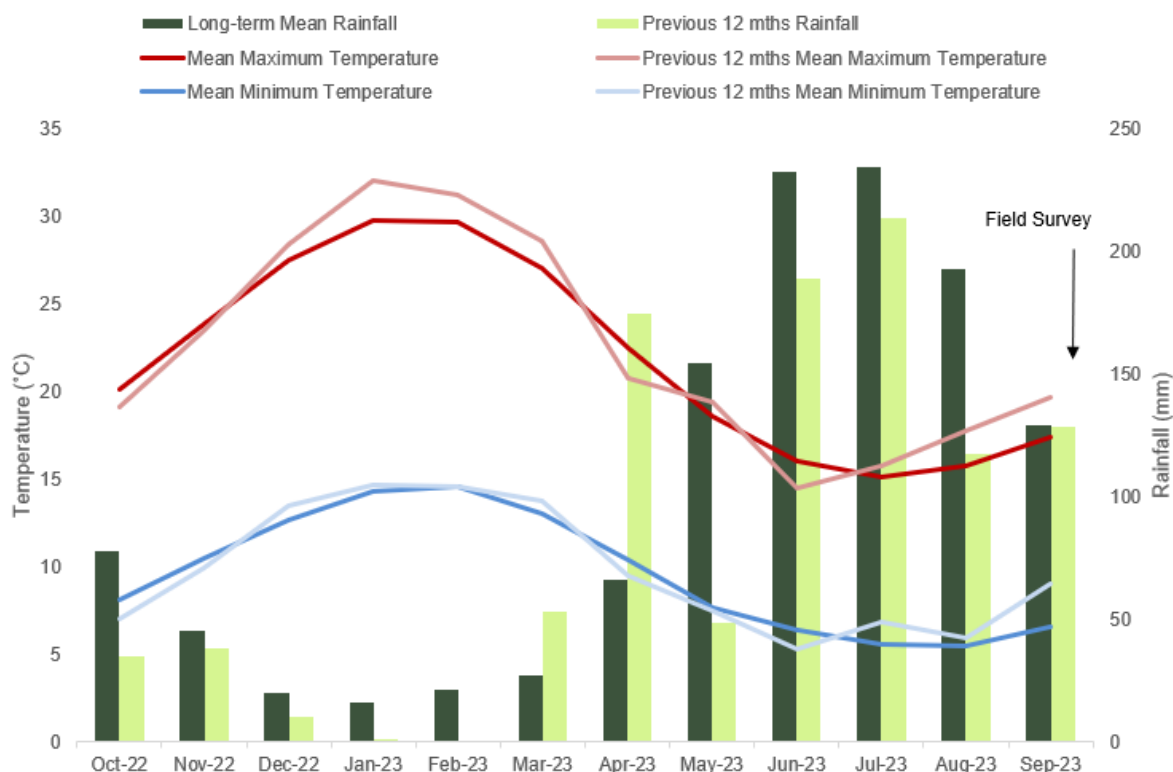
The closest long-term Bureau of Meteorology (BoM) weather station with a complete dataset is Dwellingup Weather Station (Station 9538), located approximately 17.1 km southwest of the Survey Area.

Climate statistics were calculated using data from the most current climate normal, which is defined as a 30-year interval where possible. A climate normal is a period long enough to include year-to-year variations while avoiding the influence of longer-term changes in climate (BoM, 2007).

The long-term (1957 to 2024) mean minimum temperature for Dwellingup Weather Station ranges from 5.5°C (August) to 14.6°C (February) and the long-term mean maximum temperature ranges from 15.1°C (July) to 39.8°C (January) (BoM, 2024) (**Graph 1**).



The Dwellingup Weather Station recorded 1009 mm of rainfall in the 12 months prior to the survey (October 2022 to September 2023), which is 209.3 mm below the long-term (1934 to 2023) average of 1218.3 mm (BoM, 2024). In the three months prior to the survey (July 2023 to September 2023), 459.4 mm of rainfall was recorded, which is 97.5 mm below the long-term average of 556.9 mm for the same period (BoM, 2024).



**Graph 1: Climate summary of Dwellingup Weather Station**

### 2.2.2 Interim Biogeographic Regionalisation of Australia

The Interim Biogeographic Regionalisation of Australia (IBRA) divides Australia into 89 bioregions based on major biological, geographical, and geological attributes. These bioregions are subdivided into 419 subregions as part of a refinement of the IBRA framework (DEE, 2016). The Survey Area occurs within the Jarrah Forest bioregion and the Northern Jarrah Forest (JAF01) subregion.

The Northern Jarrah Forest subregion overlays Archaean granite and metamorphic rocks with an average elevation of 300 m, capped by extensive lateritic duricrust and interrupted by later drainage and dissected by occasional granite hills. In the east the laterite becomes greatly separated until it compresses isolated remnants. Vegetation comprises of Jarrah-Marri Forest in the west with Bullich and Blackbutt in the valleys grading to Wandoo and Marri woodlands in the east with Powder bark on breakaways. A common understorey of heath is found on granite rocks in the north and east forests and woodlands. The lower slopes, where rapid changes in the site conditions occur, support most of the diversity in the communities. The subregional area is 2,255,904 ha (Williams and Mitchell, 2001).

### 2.2.3 Soil Landscape Mapping

Soil landscape mapping of Western Australia consists of a compilation of various surveys at different scales varying between 1:20,000 and 1:3,000,000 (DPIRD, 2022). The mapping comprises a nested hierarchy of levels, with each level a subdivision of the preceding level. Soil landscape mapping provides an indication of potential vegetation types and fauna



habitats within the Survey Area and has been described below to the highest level of detail available for the Survey Area.

The Survey Area occurs within one soil landscape system, the Darling Plateau System (255Dp) comprising of lateritic plateau, duplex sandy gravels, loamy gravels, wet soils, Jarrah-Marri-Wandoo forest and woodland.

The Survey Area occurs across four soil landscape subsystems and two soil landscape phases (**Table 1; Map 2**).

**Table 1: Soil landscape subsystems and phases within the Survey Area**

Subsystem or phase		Description	Area (ha) and percentage within Survey Area
Name	Code		
Dwellingup Subsystem	255DpDW	Divides, lower to upper slopes and hillcrests. Duplex sandy gravels and loamy gravels with minor areas of shallow gravels, deep sandy gravels, yellow deep sands, and yellow and pale deep sands, often gravelly	364.0 ha (80.6%)
Hester Subsystem	255DpHR	Ridges and hill crests on laterite and gneiss, relief 5-40 m, slopes 5-15%. Soils are sandy gravels, loamy gravels, and loamy earths	3.9 ha (0.9%)
Mornington Hill Subsystem	255DpMH	Low hills on laterite overlying granite, relief 40-80 m, slope 5-20%. Soils are sandy and loamy gravels with some deep sands and loamy earths	23.6 ha (5.2%)
Yarragil DpYGh phase	255DpYGh	Very gentle to moderately inclined (<20%) concave valley sideslopes. Moderately well drained yellow duplex soils and yellow and brown massive earths	20.2 ha (4.5%)
Yarragil subsystem	255DpYG	Shallow, narrow, upper valleys of the deeply dissected Murray, Bindoon, and Helena units. Alluvial, clay and loam soils, moderately well drained, often gravelly, with some sands and loams. Salt prone. Woodland of <i>E. wandoo</i> , <i>E. accedens</i>	39.0 ha (8.6%)
Yarragil Swamp phase	255DpYGsw	Level to very gently inclined valley floors. Swampy river flats and terraces in granitic rocks; loamy and sandy duplex, wet soils, non-cracking clays, and loams	1.0 ha (0.2%)
<b>Total area and percentage within Survey Area</b>			<b>451.8 ha (100%)</b>

## 2.2.4 Hydrography

A total of two hydrographic features intersect the Survey Area, and a total of nine hydrographical features occur within a 5 km radius of the Survey Area are described in **Table 2** and shown in **Map 3** (DWER, 2018).

**Table 2: Hydrographic features in the vicinity of the Survey Area**

Hydrographical feature	Description	
Bancell Brook	Significant Stream	4 km west
Clarke Brooke	Significant Stream	5 km southwest



Hydrographical feature	Description	
Harvey River	Mainstream	Intersects two polygons in the west of the Survey Area
Logue Brook	Minor River	3.0 km southwest
Logue Brook Dam	Water Supply Reservoir	2.9 km west
Samson Brook Dam – Lake Kabbanup	Water Supply Reservoir	3.4 km north
Samson Brook	Signification stream	0.4 km north
Unnamed Significant Stream	Significant stream	3.7 km northwest
Unnamed Tributary	Major tributary	Intersects the eastern polygon of the Survey Area
Unnamed Tributary	Minor tributary	5.5 km west
Unnamed Tributary	Minor tributary	4.0 km west

### 2.2.5 Pre-European Vegetation

The major source of data for pre-European vegetation mapping in Western Australia is the published and unpublished mapping of J. S. Beard at 1:250,000 scale. These vegetation types were later refined by Shepherd, Beeston, and Hopkins (2002), resulting in 819 Vegetation Association-level units, and a subsequent reclassification resulted in the creation of over 2,175 finer-scale System Associations (Beard *et al.*, 2013). The Survey Area occurs within one System Association, WEST DARLING\_3, which comprises Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) (**Map 4**).

### 2.2.6 Conservation Areas

Conservation areas consist of areas protected for the purpose of conservation, including but not limited to National Parks, Nature Reserves, Conservation Parks, and Regional Parks. The Survey Area occurs within the Dwellingup State Forest which is vested under Conservation Commission of WA (DBCA, 2023a, 2023b) and shown in **Map 5**.

### 2.2.7 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are declared by the Department of Water and Environmental Regulation (DWER) to prevent the degradation of important environmental values such as Threatened flora, Threatened Ecological Communities (TECs), or significant wetlands. The Survey Area does not intersect any mapped ESAs (DWER, 2021). There are nine Swan Coastal Plain wetland ESAs within a 5 km radius of the Survey Area. ESAs are shown in **Map 5**.

### 2.2.8 Land Use

No pastoral leases apply to the Survey Area. The Survey Area is under one mining tenement, Alcoa of Australia Ltd (AML7000001) (DMIRS, 2024). Three pending exploration licences also intersect the Survey Area:

- Eastern Goldfields Exploration Pty Ltd E7002338.
- G E Resources Pty Ltd E7005390.
- G E Resources Pty Ltd E7005543.



## 3.0 Methods

The surveys documented in this report were undertaken in accordance with relevant EPA and DCCEEW guidelines (see **Section 2.1**).

### 3.1 Desktop Assessment

#### 3.1.1 Literature Review

Background information on the Survey Area and surrounds (the Desktop Study Area) was compiled prior to the field survey. The literature review considered a selection of relevant reports detailing assessments undertaken in the region that were either publicly available from sources such as the Index of Biodiversity Surveys for Assessments (IBSA) website, the EPA Consultation Hub, or internet searches, or provided by Alcoa. These reports are listed below, summarised in **Appendix B**, and their locations in relation to the current Survey Area, as represented by their nearest point, are shown in **Map 6**:

- *Fauna Assessment Pinjarra - Williams Road (SLK 14 – 67)* (Harewood, 2017), 14 km north of the Survey Area.
- *Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment for Huntly Mine - Holyoake* (GHD, 2021a), 18 km north of the Survey Area.
- *Black Cockatoo Habitat Assessment – Pinjarra Racecourse* (Harewood, 2019), 30 km north of the Survey Area.
- *Chuditch Pre-mine Survey, Myara* (Way, 2013), 43 km north of the Survey Area.
- *Vertebrate Fauna Survey of Planned Mining Areas at Alcoa’s Willowdale Larego Mining Region* (Environmental Management and Research Consultants, 2006), 43 km north of the Survey Area.
- *Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment for Huntly Mine - Myara North* (GHD, 2021b), 54 km north of the Survey Area.
- *Report for Rail Reserves in the Shire of Serpentine Jarrahdale - Spring Flora and Vegetation Survey and Fauna and Habitat Assessment* (GHD, 2012), 60 km north of the Survey Area.

#### 3.1.2 Database Searches

Database searches were undertaken to compile a list of fauna known to occur in the Desktop Study Area and identify significant fauna with potential to occur within the Survey Area (**Table 3**).

**Table 3: Database search details**

Database name	Date received	Search target	Buffer around the Survey Area
Threatened and Priority Fauna database search (DBCA, 2023c)	08 June 2023	Threatened and Priority fauna	20 km
Protected Matters Search Tool (PMST) (DCCEEW, 2023)	14 July 2023	Threatened flora, fauna, and ecological communities	20 km



Database name	Date received	Search target	Buffer around the Survey Area
NatureMap (DBCA, 2023d)	07 June 2023	Fauna	20 km

### 3.1.3 Likelihood of Occurrence

Significant fauna taxa identified during the desktop assessment were assessed to determine the likelihood of their occurrence within the Survey Area before and after the field survey. The assessment used the likelihood of occurrence criteria presented in **Table 4**.

Taxa listed as Marine only under the EPBC Act were not considered to be significant taxa because the Marine listing does not constitute MNES under the EPBC Act. Additionally, erroneous records (i.e. records that occur well outside a taxon's known distribution) were excluded from consideration. Only taxa that have been recorded within the Survey Area or were assessed as having a high or medium likelihood of occurrence are discussed in detail.

**Table 4: Likelihood of occurrence criteria**

Rank	Criteria
Recorded	The taxon was recorded within the Survey Area during the current survey.
Previously Recorded	The taxon has been previously recorded within the Survey Area according to database search or literature review results.
High (Likely to occur)	The taxon has been recorded within the Desktop Study Area more than once in the last 15 years and suitable habitat is present within the Survey Area.
Medium (May occur)	There are existing records of the taxon within the Desktop Study Area, however the taxon has not been recorded within the Desktop Study Area in the last 15 years or suitable habitat within the Survey Area is marginal or limited in extent.
Low (Unlikely to occur)	Suitable habitat is not present within the Survey Area, or the taxon is very infrequently recorded in the locality despite reasonable previous search effort, or the taxon is believed to be extinct or locally extinct.

## 3.2 Field Survey

### 3.2.1 Survey Timing

The field surveys were undertaken across two field trips as shown in **Table 5**.

**Table 5: Survey timing**

Survey trip	Tasks completed	Dates	Person field days
1	Active searches, deployment of camera traps, habitat assessment, spotlighting.	13 <sup>th</sup> October – 16 <sup>th</sup> October 2023	16
2	Collection of camera traps	7 <sup>th</sup> November – 8 <sup>th</sup> November 2023	4



### 3.2.2 Field Personnel and Licences

Details of field personnel, including their level of experience and role for each field trip are detailed in **Table 6**. Fieldwork was completed under Fauna Taking (Biological Assessment) License – Regulation 27 (08-005511-1) (**Appendix C**).

**Table 6: Field personnel**

Personnel	Experience	Role	Trips
Dr Michael Lohr	11 years	Principal Zoologist	1
Evan Webb	7 years	Associate Zoologist	1 and 2
Poppy Walker	5 years	Senior Zoologist	2
Lewis Berry	2 years	Ecologist	1
Datta Li	2 years	Zoologist	1

### 3.2.3 Habitat Assessment and Mapping

Habitat assessments were undertaken in representative areas of fauna habitat within the Survey Area to record habitat values. A habitat assessment was recorded at each camera trap site, and two additional standalone habitat assessments were recorded. Habitat assessment locations are shown in **Map 7**.

The following information was collected at each habitat assessment locations using a GPS-enabled handheld device:

- Site photo.
- Landform.
- Soil type and colour.
- Rock types, surface stone cover, and size classes.
- Key habitat and microhabitat features including leaf litter, logs, burrows, rocky outcrops, rock crevices, hollows, and water sources.
- Habitat quality, fire history, and evidence of disturbance.
- General description of vegetation structure.

Fauna habitat mapping was based on a combination of field observations, habitat assessment data, aerial imagery, and vegetation mapping. Polygons were digitised using GIS software.

### 3.2.4 Camera Traps

A total of 45 motion sensitive camera traps were deployed during the field survey. Each camera trap was deployed for a minimum of 23 nights and total survey effort consisted of 1,119 trap nights. Cameras were placed in areas of suitable habitat for (Chuditch, Quokka, and Woylie) and non-target taxa (Wambenger Brush-tailed Phascogale, Quenda, and Western Brush Wallaby) and were baited with universal bait (rolled oats, peanut butter, and sardines) and chopped apples. Camera trap locations are shown in **Map 7**.

### 3.2.5 Spotlighting

Spotlighting was undertaken on two nights during the field survey. Spotlighting commenced approximately one hour after sunset and consisted of traversing areas of suitable habitat, generally near stream crossings, on foot for a duration of two hours. A total of 16 person



hours was completed during the field survey. Spotlighting was also undertaken opportunistically from the vehicle while travelling to and from the spotlighting location. Spotlighting was undertaken at the following locations (**Map 7**):

- 5890-CAM-02-EW
- 5890-CAM-20-EW
- 5890-CAM-21-EW
- 5890-CAM-44-EW

### 3.2.6 Opportunistic Observations

Opportunistic observations of fauna were recorded throughout the Survey Area, including primary evidence (direct sightings, calls) and secondary evidence (tracks, scats, diggings, remains).

### 3.2.7 Active Searches

Untimed active searches were undertaken at each camera trap site. These searches included flipping rocks and logs and raking leaf litter in search of direct sightings, scats, tracks, and other traces of fauna, with a particular focus on Chuditch (scats, dens in hollow logs or burrows), Quokka (scats, runnels in sedges), Woylie (scats, diggings, nests), Numbat (scats, diggings), and Western Ringtail Possums (dreys, scats).

## 3.3 Limitations

Limitations and constraints of the fauna survey are detailed below in **Table 7**.

**Table 7: Limitations and constraints associated with the survey**

Variable	Degree of limitation	Potential constraints on survey outcomes
<b>Availability of data and information</b>	No	Sufficient data and information, including regional and local contextual information, was available to complete the scope of the survey.
<b>Competency and experience of the survey team</b>	No	The survey was undertaken by a team with extensive experience undertaking similar scopes within the bioregion. <ul style="list-style-type: none"> <li>• Principal Zoologist Dr Michael Lohr – 11 years' experience.</li> <li>• Associate Zoologist Evan Webb – 7 years' experience.</li> <li>• Senior Zoologist Poppy Walker – 5 years' experience.</li> <li>• Zoologist Datta Li – 2 years' experience.</li> <li>• Ecologist Lewis Berry – 2 years' experience.</li> </ul>
<b>The proportion of fauna identified, recorded, or collected</b>	No	All targeted fauna taxa were able to be identified to species level with a high degree of confidence.
<b>Scope of the survey</b>	No	The scope of the survey was limited to terrestrial vertebrate fauna targeting threatened marsupials. No further exclusions were made within this group.
<b>Adequacy of the survey intensity and proportion of survey achieved</b>	No	Sufficient time and effort were allocated to the survey given the size and complexity of the Survey Area and the expected level of survey intensity.



Variable	Degree of limitation	Potential constraints on survey outcomes
<b>Access problems</b>	No	The Survey Area was sufficiently accessed by vehicle and on foot.
<b>Timing and season</b>	No	Targeted Chuditch, Quokka, and Woylie surveys can be undertaken at any time of year.
<b>Disturbance that may have affected the results of survey</b>	No	Areas of disturbance associated with mining activities and bushfires were present within the Survey Area but were not a limitation on the results of the survey.
<b>Problems with data and analysis, including sampling biases</b>	No	Survey effort for significant fauna taxa was concentrated in preferred habitats. This may introduce bias where the use of non-preferred habitat is underrepresented, however, this is not considered a limitation on the survey outcomes.



## 4.0 Results

### 4.1 Desktop Assessment

The database searches and literature review identified 189 terrestrial vertebrate fauna taxa occurring within the Desktop Study Area, of which 33 are significant (Threatened or Priority):

- 126 birds, of which 19 are significant.
- 28 mammals, of which 10 are significant.
- 25 reptiles, of which 4 are significant.
- 10 amphibians, of which none are significant.



Key findings of the literature review are summarised in **Appendix B**, a complete list of fauna taxa recorded within the Desktop Study Area is presented in **Appendix D**, and DBCA database search results are displayed in **Map 8**.

### 4.2 Fauna Habitat

Two fauna habitats (excluding cleared areas) were identified and mapped within the Survey Area. Fauna habitats are presented in **Map 9**, described below in **Table 8**, and site sheets for each habitat assessment are provided in **Appendix E**. Small discrepancies in fauna habitat extents (i.e., not adding up to the exact area extent of the Survey Area) are due to rounding.



**Table 8: Fauna habitats recorded within the Survey Area**

Fauna habitat	Total area, percentage of Survey Area	Habitat description	Representative photograph
Jarrah-Marri Forest	439.2 ha, 97.2%	<p>Undulating plains and hills over clay loam soils and laterite rock. Vegetation consists of Jarrah (<i>Eucalyptus marginata</i>) and Marri (<i>Corymbia calophylla</i>) open forest with patchy <i>Allocasuarina Fraseriana</i> over a mixed midstorey typically dominated by <i>Bossiaea aquifolium</i>, <i>Xanthorrhoea preissi</i>, and <i>Macrozamia fraseri</i>, over sedges and bracken. Disturbances consisted primarily of historic logging and bushfire. Microhabitats present within this habitat include hollows in trees and logs, leaf litter and woody debris.</p> <p>This habitat is core habitat Chuditch and supporting habitat for Woylie and Quokka. The canopy is core habitat for black cockatoos.</p>	
Drainage Line	12.7 ha, 2.8%	<p>Areas of drainage over clay loam soils, often with thin channels of surface water present. Vegetation consists of a closed mosaic upperstorey of Bullich (<i>E. megacarpa</i>), Blackbutt (<i>E. patens</i>), and Flooded Gum (<i>E. rudis</i>), forest over a closed mixed shrubland of <i>Melaleuca</i> sp., <i>B. aquifolium</i>, and other <i>Myrtaceae</i> sp. and <i>Acacia</i> sp., over tall sedgeland.</p> <p>This habitat typically had low levels of disturbance. Microhabitats present within this habitat include tree and log hollows, woody debris, peeling bark and leaf litter.</p> <p>Drainage Line habitat is core habitat Chuditch, Woylie, and Quokka and the canopy constitutes core habitat for black cockatoos. This habitat is analogous to Blackbutt, Bullich, and Flooded Gum fauna habitats recorded by GHD (2021b, 2021a).</p>	
<b>Total</b>	<b>451.8 ha, 100%</b>		



### 4.3 Recorded Fauna

The basic terrestrial vertebrate fauna survey recorded 30 fauna taxa from 19 families, comprising three amphibian taxa, 12 bird taxa, 10 mammal taxa, and five reptile taxa. Of the taxa recorded, five were significant (see **Section 4.4**). Three introduced taxa were recorded, the Cat (*Felis catus*), Black Rat (*Rattus rattus*), and Pig (*Sus scrofa*).

An inventory of fauna recorded during the field survey is provided below in **Table 9**.



**Table 9: Fauna recorded within the Survey Area**

Family	Scientific Name	Common Name	Conservation Status		Call	Camera Trap	Capture	Feather	Foraging evidence	Scat	Sighting	Sighting - overhead	Total
			State	Common wealth									
<b>Amphibians</b>													
Limnodynastidae	<i>Heleioporus inornatus</i>	Whooping Frog	-	-							1		1
Myobatrachidae	<i>Crinia georgiana</i>	Quacking Frog	-	-	7						1		8
Myobatrachidae	<i>Crinia glauerti</i>	Clicking Frog	-	-	10						1		11
<b>Birds</b>													
Acanthizidae	<i>Gerygone fusca</i>	Western Gerygone	-	-	1								1
Acanthizidae	<i>Sericornis maculatus</i>	Spotted Scrubwren	-	-		7							7
Cacatuidae	<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black Cockatoo	VU	VU				3	2		12	3	20
Cacatuidae	<i>Zanda baudinii</i>	Baudin's Cockatoo	EN	EN					1				1
Columbidae	<i>Phaps elegans</i>	Brush Bronzewing	-	-		3							3
Maluridae	<i>Malurus elegans</i>	Red-winged Fairywren	-	-		26							26
Maluridae	<i>Malurus splendens</i>	Splendid Fairywren	-	-		1							1
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrikethrush	-	-	1								1
Petroicidae	<i>Eopsaltria griseogularis</i>	Western Yellow Robin	-	-		1							1
Petroicidae	<i>Quoyornis georgianus</i>	White-breasted Robin	-	-		5							5
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail	-	-		2							2
Strigidae	<i>Ninox boobook</i>	Boobook Owl	-	MA	1								1
<b>Mammals</b>													
Dasyuridae	<i>Antechinus flavipes leucogaster</i>	Mardo	-	-		78							78
Dasyuridae	<i>Dasyurus geoffroii</i>	Chuditch	VU	VU						1			1
Felidae	* <i>Felis catus</i>	Cat	-	-		1							1



Family	Scientific Name	Common Name	Conservation Status		Call	Camera Trap	Capture	Feather	Foraging evidence	Scat	Sighting	Sighting - overhead	Total
			State	Common wealth									
Macropodidae	<i>Macropus fuliginosus melanops</i>	Western Grey Kangaroo	-	-		10							10
Macropodidae	<i>Notamacropus irma</i>	Western Brush Wallaby	P4	-		26					3		29
Muridae	<i>Hydromys chrysogaster</i>	Rakali	P4	-		1							1
Muridae	* <i>Rattus rattus</i>	Black Rat	-	-		70							70
Phalangeridae	<i>Trichosurus vulpecula hypoleucus</i>	Common Brushtail Possum	-	-		1							1
Suidae	* <i>Sus scrofa</i>	Pig	-	-		16					1		17
Tachyglossidae	<i>Tachyglossus aculeatus acanthion</i>	Short-beaked Echidna	-	-		17							17
<b>Reptiles</b>													
Scincidae	<i>Egernia napoleonis</i>	South-western Crevice-skink	-	-		93	1				2		96
Scincidae	<i>Lissolepis luctuosa</i>	Western Swamp Skink	-	-		1					1		2
Scincidae	<i>Morethia obscura</i>	Shrubland Morethia Skink	-	-			1						1
Scincidae	<i>Tiliqua rugosa</i>	Bobtail	-	-		51							51
Varanidae	<i>Varanus gouldii</i>	Bungarra	-	-		1					1		2

\* = introduced species



## 4.4 Significant Fauna

Five significant fauna taxa were recorded within the Survey Area during the field survey. These are listed below, and locations are presented in **Map 9** and **Appendix F**:

- Baudin's Cockatoo (*Zanda baudinii*) – EN (BC Act; EPBC Act), recorded once within Jarrah-Marri Forest habitat.
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) – VU (BC Act; EPBC Act), recorded 20 times within Jarrah-Marri Forest and Drainage Line habitats.
- Chuditch (*Dasyurus geoffroyi*) – VU (BC Act; EPBC Act), recorded once within Jarrah-Marri Forest habitat (**Figure 1**).
- Rakali (*Hydromys chrysogaster*) – P4 (DBCA), recorded once within Drainage Line habitat (**Figure 2**).
- Western Brush Wallaby (*Notamacropus irma*) – P4 (DBCA), recorded 29 times within Jarrah-Marri Forest and Drainage Line habitats (**Figure 3**).

Seven significant fauna taxa were assessed as having a high likelihood of occurring within the Survey Area:

- Woylie (*Bettongia penicillata ogilbyi*) – CR (BC Act); EN (EPBC Act)
- Carnaby's Cockatoo (*Zanda latirostris*) – EN (BC Act; EPBC Act).
- Quokka (*Setonix brachyurus*) – VU (BC Act; EPBC Act)
- Wambenger Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*) – CD (BC Act).
- Quenda (*Isoodon fusciventer*) – P4 (DBCA).
- Western False Pipistrelle (*Falsistrellus mackenziei*) – P4 (DBCA).
- Dell's Ctenotus (*Ctenotus delli*) – P4 (DBCA).

Six significant fauna taxa were assessed as having a medium likelihood of occurring within the Survey Area:

- Western Ringtail Possum (*Pseudocheirus occidentalis*) – CR (BC Act; EPBC Act).
- Australasian Bittern (*Botaurus poiciloptilus*) – EN (BC Act).
- Malleefowl (*Leipoa ocellata*) – VU (BC Act; EPBC Act).
- Peregrine Falcon (*Falco peregrinus*) – OS (BC Act).
- Woma Python (*Aspidites ramsayi*) – P1 (DBCA).
- Southern Death Adder (*Acanthophis antarcticus*) – P4 (DBCA).

The complete results of the significant fauna likelihood of occurrence assessment including justification for the assessment outcome for each taxon is provided in **Table 10**.





**Figure 1: Chuditch scat recorded within Jarrah-Marri Forest (-32.9758445, 116.0860574)**



**Figure 2: Rakali recorded by camera trap 5890-CAM-07-EW within Drainage Line habitat (-32.9941287, 116.0524062).**





**Figure 3: Western Brush Wallaby recorded by camera trap 5870-CAM-12-LB within Jarrah-Marri Forest (-32.97344506, 116.0826827).**



**Table 10: Significant fauna likelihood of occurrence within the Survey Area**

Family	Scientific Name and Common Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Commonwealth			
<b>Birds</b>						
Acanthizidae	<i>Aphelocephala leucopsis</i> Southern Whiteface	-	VU	Sparse open forest/woodland; inland scrubs e.g. mallee, mulga cypress pine; saltbush, dead trees, stumps, black box/lignum flats (Pizzey and Knight, 2001).	No nearby records identified.	Low No nearby records and limited suitable habitat within the Survey Area.
Accipitridae	<i>Elanus scriptus</i> Letter-winged Kite	P4	-	Open country and grasslands of arid and semi-arid interior (Pizzey and Knight, 2001).	No DBCA records, one record from literature 60 km north of the Survey Area in 2011 (GHD, 2012).	Low No suitable habitat within the Survey Area.
Anatidae	<i>Oxyura australis</i> Blue-billed Duck	P4	-	Densely vegetated freshwater lakes, swamps, dams (Morcombe, 2003).	Five DBCA records within 20 km of the Survey Area. Including 15.8 km southwest of the Survey Area in 2013 (DBCA, 2023c).	Low No suitable habitat within the Survey Area.
Ardeidae	<i>Botaurus poiciloptilus</i> Australasian Bittern	EN	EN	Freshwater wetlands with heavy vegetation, shrubbery, reedbeds, sedges (Morcombe, 2003).	Two DBCA records within 20 km of the Survey Area, including 5.8 km north in 2017 (DBCA, 2023c).	Medium One record 5.8 km from the Survey Area, limited suitable habitat within the Survey Area.



Family	Scientific Name and Common Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Commonwealth			
Atrichornithidae	<i>Atrichornis clamosus</i> Noisy Scrubbird	EN	EN	Dense heaths, rushes, tall sedges, under stunted trees in coastal hills, coastal swamps (Morcombe, 2003).	Forty-four DBCA records within 20 km of the Survey Area, including eight records within the 1 km of the Survey Area as recent as 2007, many of which are translocated individuals (DBCA, 2023c).	Low No nearby records within the last 15 years and limited suitable habitat within the Survey Area. Individuals were translocated to the northern Jarrah forest in 1997 – 2003 but are now considered locally extinct (GHD, 2021b, 2021a).
Cacatuidae	<i>Calyptorhynchus banksii naso</i> Forest Red-tailed Black Cockatoo	VU	VU	Tall eucalypt forest, woodland, feeds on seeds of large-fruited eucalypts (Menkhorst <i>et al.</i> , 2019).	Eighty-five DBCA records within 20 km of the Survey Area, including two records within 1 km of the Survey Area as recent as 2018 (DBCA, 2023c).	Recorded Recorded during the current survey.
Cacatuidae	<i>Zanda baudinii</i> Baudin's Cockatoo	EN	EN	Forests, farm trees; feeds on Marri and wood-boring insects (Morcombe, 2003).	Fifty DBCA records within 20 km of the Survey Area, including two records within 1 km of the Survey Area as recent as 2002 (DBCA, 2023c).	Recorded Recorded during the current survey.
Cacatuidae	<i>Zanda latirostris</i> Carnaby's Cockatoo	EN	EN	Forests, woodlands, heathlands, farms; feeds on Banksias and Hakeas, pine plantations (Morcombe, 2003).	Forty-eight DBCA records within 20 km of the Survey Area, including three records within 1 km of the Survey Area as recent as 2007 (DBCA, 2023c).	High Nearby records, and suitable habitat within the Survey Area.



Family	Scientific Name and Common Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Commonwealth			
Charadriidae	<i>Charadrius leschenaultia</i> Greater Sand Plover	VU	VU, MI, MA	Tidal flats, beaches .	No nearby records identified.	Low
						No nearby records, and no suitable habitat within the Survey Area.
Charadriidae	<i>Thinornis cucullatus</i> Hooded Dotterel	P4	MA	Beaches, margins of inland salt lakes (Menkhorst <i>et al.</i> , 2019).	No DBCA or literature records, one Naturemap record within 20 km of the Survey Area (DBCA, 2023d).	Low
						One NatureMap record, and no suitable habitat within the Survey Area.
Falconidae	<i>Falco hypoleucos</i> Grey Falcon	VU	VU	Open plains with treed watercourses in arid inland (Menkhorst <i>et al.</i> , 2019).	No nearby records identified.	Low
						No nearby records, and no suitable habitat within the Survey Area.
Falconidae	<i>Falco peregrinus</i> Peregrine Falcon	OS	-	Most environments with suitable nest sites: cliff faces preferred, including man-made ones, commonly uses stick nests built by other species (Menkhorst <i>et al.</i> , 2019).	Two DBCA records within 20 km of the Survey Area, including 15 km south of the Survey Area in 2007 (DBCA, 2023c).	Medium
						Records <15 km from the Survey Area and may use the Survey Area for hunting.
Laridae	<i>Sternula nereis</i> Fairy Tern	VU	VU	Coastal, bays, inlets, beaches, salt ponds and lakes (Morcombe, 2003).	No nearby records identified.	Low
						No suitable habitat within the Survey Area.



Family	Scientific Name and Common Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Commonwealth			
Megapodiidae	<i>Leipoa ocellata</i> Malleefowl	VU	VU	Unburned mallee and woodland with abundant litter and low scrub (Morcombe, 2003).	Two DBCA records within 20 km of the Survey Area, including 17.6 km north of the Survey Area in 2014 (DBCA, 2023c).	<p style="text-align: center;">Medium</p> <p>Outside known distribution, however, taxon has been sighted near the Survey Area. Furthermore, individuals were translocated to the nearby Dryandra Woodland, 79 km east-northeast of the Survey Area, within the last five years (Traill, 2019).</p>
Rostratulidae	<i>Rostratula australis</i> Australian Painted Snipe	EN	EN, MA	Well vegetated surrounds and shallows of wetlands (Morcombe, 2003).	No nearby records identified.	<p style="text-align: center;">Low</p> <p>No nearby records, and no suitable habitat within the Survey Area.</p>
Scolopacidae	<i>Calidris canutus</i> Red Knot	EN	EN, MI, MA	Coastal, extensive firm tidal flats (Menkhorst <i>et al.</i> , 2019).	No nearby records identified.	<p style="text-align: center;">Low</p> <p>No nearby records, and no suitable habitat within the Survey Area.</p>
Scolopacidae	<i>Calidris ferruginea</i> Curlew Sandpiper	CR	-	Inter-tidal mudflats of estuaries, lagoons, mangrove channels, dams, floodwaters, flooded saltbush surrounds of inland lakes (Morcombe, 2003).	No nearby records identified from the database searches or literature.	<p style="text-align: center;">Low</p> <p>No nearby records, and no suitable habitat within the Survey Area.</p>



Family	Scientific Name and Common Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Commonwealth			
Scolopacidae	<i>Numenius madagascariensis</i> Eastern Curlew	CR	CR, MI, MA	Coastal, tidal flats (Menkhorst <i>et al.</i> , 2019).	No nearby records identified from the database searches or literature.	Low
						No nearby records, and no suitable habitat within the Survey Area.
Tytonidae	<i>Tyto novaehollandiae</i> Australian Masked Owl	P3	-	Forests and woodlands with hollow bearing large old trees; roosts in tree hollows, foliage, and caves (Menkhorst <i>et al.</i> , 2019).	One DBCA record 13.6 km north of the Survey Area in 1971 (DBCA, 2023c).	Low
						No recent nearby records, suitable habitat within the Survey Area.
<b>Mammals</b>						
Dasyuridae	<i>Dasyurus geoffroii</i> Chuditch	VU	VU	Sclerophyll forest or drier woodland, heath, and mallee shrubland (Van Dyck and Strahan, 2008).	Eighty-eight DBCA records within 20 km of the Survey Area, and one record 1.7 km northeast from the Survey Area (DBCA, 2023c).	Recorded
						Recorded during the current survey.
Dasyuridae	<i>Phascogale tapoatafa wambenger</i> Wambenger Brush-tailed Phascogale	CD	-	Mature rough-barked trees, large logs, dead standing trees (Van Dyck and Strahan, 2008).	Seventeen DBCA records within 20 km of the Survey Area, including one 13.1 km southwest of the Survey Area in 2022 (DBCA, 2023c).	High
						Recorded <15 km and suitable habitat within the Survey Area.



Family	Scientific Name and Common Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Commonwealth			
Macropodidae	<i>Setonix brachyurus</i> Quokka	VU	VU	Dense wet ground cover in forest or swampy flats (Van Dyck and Strahan, 2008).	Twenty-six DBCA records within 20 km of the Survey Area, including one record within 200 m of the Survey Area in 2016 (DBCA, 2023c).	High Recorded 200 m from the Survey Area, and suitable habitat within the Survey Area.
Macropodidae	<i>Notamacropus irma</i> Western Brush Wallaby	P4	-	Open forest and woodland, open seasonally wet flats (Van Dyck and Strahan, 2008).	Nineteen DBCA records within 20 km of the Survey Area, including 14.8 km north in 2006 (DBCA, 2023c).	Recorded Recorded during the current survey.
Muridae	<i>Hydromys chrysogaster</i> Rakali	P4	-	Permanent fresh to brackish water bodies (Van Dyck and Strahan, 2008).	Seven DBCA records within 20 km of the Survey Area, including one within 15.6 km north of the Survey Area in 2018 (DBCA, 2023c).	Recorded Recorded during the current survey.
Myrmecobiidae	<i>Myrmecobius fasciatus fasciatus</i> Numbat, Walpurti	EN	EN	Jarrah forests, Wandoo woodlands; requires hollow logs and branches for shelter and termites for food (Van Dyck and Strahan, 2008).	Two historic records from 1980 and 1954 within 20 km of the Survey Area.	Low No nearby recent records.
Peramelidae	<i>Isodon fusciventer</i> Quenda	P4	-	Sandy soils with dense heathy vegetation (Van Dyck and Strahan, 2008).	Sixty-four DBCA records within 20 km of the Survey area, including records within 1.6 km of the Survey Area in 1995 (DBCA, 2023c).	High Nearby records, and suitable habitat within the Survey Area.



Family	Scientific Name and Common Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Commonwealth			
Potoroidae	<i>Bettongia penicillata ogilbyi</i> Brush-tailed Bettong, Woylie	CR	EN	Areas dominated by <i>Gastrolobium</i> thickets (Van Dyck and Strahan, 2008).	Thirty-nine DBCA records within 20 km of the Survey Area, including 10 records within 500 m of the Survey Area as recent as 2004 (DBCA, 2023c).	High Recorded <500m from the Survey Area, and suitable habitat within the Survey Area.
Pseudocheiridae	<i>Pseudocheirus occidentalis</i> Western Ringtail Possum	CR	CR	<i>Agonis</i> forest and woodland, Tuart Forest with <i>Agonis</i> mid storey, and Jarrah, Marri and Wandoo woodlands (Van Dyck and Strahan, 2008).	Seventeen DBCA records within 18 km of the Survey Area, including 9.2 km north of the Survey Area in 2020 (DBCA, 2023c).	Medium Survey Area is outside of the taxon's distribution. Nearby records may be associated with translocations at the Lane Poole Reserve and other sites.
Vespertilionidae	<i>Falsistrellus mackenziei</i> Western False Pipistrelle	P4	-	Mature Karri forests, wetter stands of Jarrah and Tuart, and woodlands on Swan Coastal Plain (Van Dyck and Strahan, 2008).	Four DBCA records within 15 km of the Survey Area, including two 8.8 km northwest of the Survey Area in 2013 (DBCA, 2023c).	High Records <9 km from the Survey Area, and suitable habitat within the Survey Area.
<b>Reptiles</b>						
Elapidae	<i>Acanthophis antarcticus</i> Southern Death Adder	P3	-	Habitats range from rainforest to shrublands and heath (Wilson and Swan, 2021).	One record 55 km north of the Survey Area in 2021 (GHD, 2021b).	Medium No nearby records, however, species is cryptic and suitable habitat present within the Survey Area.



Family	Scientific Name and Common Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Common wealth			
Pythonidae	<i>Aspidites ramsayi</i> Woma Python	P1 (SW subpop.)	-	Woodlands, heaths and shrublands, often with spinifex. Shelters mainly in abandoned monitor and mammal burrows and in soil cracks (Wilson and Swan, 2021).	One DBCA record 10.3 km northwest of the Survey Area in 2020 (DBCA, 2023c).	Medium
						One record <15 km from the Survey Area, limited suitable habitat within the Survey Area.
Scincidae	<i>Ctenotus delli</i> Dell's Ctenotus	P4	-	Restricted to the Darling range; Jarrah and Marri woodlands over shrubs on lateritic, sandy, and clay soils (Wilson and Swan, 2021).	Three DBCA records within 15 km of the Survey Area, including 11.6 km east of the Survey Area in 1981 (DBCA, 2023c).	High
						Recorded <15 km from the Survey Area, and suitable habitat within the Survey Area.
Scincidae	<i>Ctenotus ora</i> Coastal Plain Skink	P3	-	Open eucalypt woodland over <i>Banksia</i> and low vegetation on sandy coastal plain and coastal dunes south of Perth, from Pinjarra south to Yallingup Brook (Wilson and Swan, 2021).	One DBCA record 15 km west of the Survey Area in 2014 (DBCA, 2023c).	Low
						No suitable habitat.



## 5.0 Discussion

### 5.1 Fauna Habitat

The two fauna habitats, Jarrah-Marri Forest and Drainage Line recorded within the Survey Area, are typical of the Jarrah Forest bioregion. These habitats are consistent with the habitats previously recorded in studies in the region (**Appendix B**) and extend outside the Survey Area to form larger ecosystems which are widespread within the surrounding region. Overall connectivity at a regional level is relatively intact, as the Survey Area occurs within a landscape that retains large areas of natural vegetation. At a local level, habitats within and surround the immediate vicinity of the Survey Area are fragmented due to mining activities.

The Drainage Line habitat provides the most value to significant fauna and the overall fauna assemblage within the Survey Area. It is core habitat for all three targeted fauna taxa and often has surface water present which is a vital resource for the local fauna assemblage. A wide variety of fauna taxa will use this habitat as a dispersal corridor due the linear nature of the habitat and the presence of dense understory vegetation. Drainage Lines require relatively uninterrupted connectivity to allow fauna movement and dispersal, therefore, the Drainage Line habitat within the Survey Area is important to maintain this ecosystem function.

The Jarrah-Marri Forest habitat is relatively widespread and abundant at a regional scale. It is core habitat for the Chuditch and Woylie, and supporting habitat for the Quokka which tends to occupy dense understorey vegetation associated with wet areas such as Drainage Line habitat.

Both habitats contain tree hollows and hollow logs which are important microhabitats for hollow-dependent species. Hollow logs are often used by Chuditch for denning. The canopy of both habitats comprises valuable foraging and roosting habitat for birds such as black cockatoos, and the multitude of microhabitats (leaf litter, hummocks, woody debris, logs, and stones) provide refuge and feeding opportunities for a wide array of fauna species, particularly herpetofauna and small mammals.

### 5.2 Significant Fauna

#### 5.2.1 Recorded within the Survey Area

##### **Baudin's Cockatoo (*Zanda baudinii*) – EN (BC Act; EPBC Act)**

The Baudin's Cockatoo is distributed through the south-west WA from the northern Darling Range and adjacent far east of the Swan Coastal Plain (south of the Swan River), south to Bunbury and across to Albany (Johnstone and Kirkby, 2011). The taxon rarely occurs near coastal communities north of Mandurah, and rarely occurs north of the Swan River (Johnstone and Storr, 1998; Johnstone and Kirkby, 2008). The species forages primarily in eucalypt forest, where it feeds on Marri seeds, flowers, nectar, and buds. They also feed on a wide range of seeds of *Eucalyptus* spp., *Banksia* spp., *Hakea* spp., and *Pinus* spp., as well as fruiting apples and pears and beetle larvae from under the bark of trees (Johnstone and Storr, 1998; Johnstone and Kirkby, 2008). Baudin's Cockatoo forages at all levels of the forest from the canopy to the ground, often feeding in the understorey on proteaceous trees and shrubs (especially *Banksia*) and in orchard trees within the canopy and on fallen fruit.

Secondary evidence of Baudin's Cockatoo was recorded during the survey, however direct sightings did not occur. The species can be cryptic due to its similarity in appearance to Carnaby's Cockatoos, and it can often be misidentified as such (Birdlife Australia, 2016). Within the Survey Area, the Jarrah-Marri Forest and Drainage Line habitats constitute core habitat for the Baudin's Cockatoo because of their value for breeding, roosting, and foraging.



The taxon is likely to use the Survey Area for nesting and raising chicks in the breeding season and may use the habitats during the wintering season as core roosting and foraging habitat.

### **Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) - VU (BC Act; EPBC Act)**

The Forest Red-tailed Black Cockatoo is distributed through the south-west of WA from Gingin through the Darling Ranges to the south-west from Bunbury to Albany. The Forest Red-tailed Black Cockatoo inhabits dense Jarrah, Karri (*E. diversicolor*), and Marri forests and feeds primarily on the fruit of Marri and Jarrah trees (Johnstone and Kirkby, 1999).

The Jarrah-Marri Forest and Drainage Line habitats constitute core habitat for the Forest Red-tailed Black Cockatoo because of their value for breeding, roosting, and foraging. The taxon is likely to use the Survey Area for nesting and raising chicks during the breeding season and may use the habitats during the wintering season as core roosting and foraging habitat.

### **Chuditch (*Dasyurus geoffroii*) – VU (BC Act; EPBC Act)**

The Chuditch inhabits areas dominated by sclerophyll forest or drier woodland, heath, and mallee shrubland (Van Dyck and Strahan, 2008). The species is generally highly mobile and uses bush remnants as corridors (Woinarski, Burbidge and Harrison, 2012). The Chuditch is a largely nocturnal animal, feeding on a carnivorous diet of mammals, birds, lizards, and frogs. They have been recorded foraging during the day such as during the breeding season or when cold and wet weather restricts their nocturnal movements (Van Dyck and Strahan, 2008). Most diurnal denning sites in sclerophyll forest consist of hollow logs or earth burrows, although Quenda nests and hollow tree bases may be used (Van Dyck and Strahan, 2008). The Chuditch was abundant prior to European settlement, and it is now largely restricted to the south-west of Western Australia, with small numbers in the Midwest, Wheatbelt and South Coast Regions (DBCA, 2017a).

The Chuditch was recorded via secondary evidence in the form of scat. The Jarrah-Marri Forest and Drainage Line habitats constitute core habitat for the Chuditch because of their value for denning and foraging. The Drainage Line habitat is of particular importance as it provides water sources and dispersal corridors. Population numbers may be low and dispersed through the widespread Jarrah-Marri Forest making detection difficult.

### **Rakali (*Hydromys chrysogaster*) - P4 (DBCA)**

The Rakali (also known as the Water Rat) is a native rodent species that lives in burrows on the banks of rivers, lakes, and estuaries and is an opportunistic predator feeding on aquatic insects, fish, crustaceans, mussels, snails, frogs, birds' eggs, and water birds (Atkinson, Lund, and Morris, 2008). The species can be found in permanent water systems in Australia, New Guinea, and offshore islands, with a home range of approximately 19 ha in coastal wetlands and streams of south-western Australia, individuals will establish sedentary territories where resident male and female ranges will overlap (Van Dyck and Strahan, 2008).

The Rakali was detected by camera trap within the Drainage Line habitat within the Survey Area. Drainage Line habitat constitutes core habitat for this species and the habitat within the survey area is important for connectivity.

### **Western Brush Wallaby (*Notamacropus irma*) – P4 (DBCA)**

The Western Brush Wallaby occurs in the south-west of Western Australia and closely resembles a larger kangaroo (Van Dyck and Strahan, 2008). Its preferred habitat consists of open forest or woodland, particularly favouring open and seasonally wet flats with low grasses and open scrubby thickets (Van Dyck and Strahan, 2008). The Western Brush Wallaby was a common species during the early days of settlement, however, ongoing



clearing and fragmentation of bushland in the Wheatbelt as well as the dramatic increase in fox numbers within the south-west of Western Australia has led to this species' decline (Van Dyck and Strahan, 2008).

The Western Brush Wallaby was recorded during the survey by both camera trap and direct sighting. Within the Survey Area, the Jarrah-Marri Forest and Drainage Line habitats constitute core habitat for the taxon because of their value for foraging and dispersal. The Drainage Line habitat is of particular importance as the taxon may rely on the seasonal wet flats within this habitat for the grasses and scrubby thickets for foraging and shelter.

### **5.2.2 High likelihood of occurrence within the Survey Area**

#### **Woylie (*Bettongia penicillata ogilbyi*) – CR (BC Act); EN (EPBC Act)**

The Woylie is restricted to three small wheatbelt reserves in Western Australia: Dryandra Woodland, Tutanning Nature Reserve, and the Kingston/Perup Forest, all characterised by the presence thickets of the plant genus *Gastrolobium* (Van Dyck and Strahan, 2008). Fox predation is considered the driving factor in the Woylie's distribution contraction, with habitat destruction and disease also impacting populations to be rare and scattered (Van Dyck and Strahan, 2008). The Woylie primarily eats fungus and supplements its diet with seed kernels of the Desert Quandong (*Santalum acuminatum*), various tubers, bulbs, and invertebrates (Van Dyck and Strahan, 2008).

Within the Survey Area, the Jarrah-Marri Forest and Drainage Line habitats constitute core habitat for the Woylie because of their value for shelter and foraging. The Drainage Line habitat is of particular significance to the taxon as this habitat contains valuable water sources and dense thickets which provide refuge from predators.

#### **Carnaby's Cockatoo (*Zanda latirostris*) – EN (BC Act; EPBC Act)**

Carnaby's Cockatoos nest in the hollows of a wide range of *Eucalyptus* trees, with a preference for smooth barked trees such as Salmon Gum (*E. salmonophloia*) and Wandoo (*E. wandoo*) but also rough barked *Eucalyptus* and *Corymbia* trees such as Red Morrell (*E. longicornis*), York Gum (*E. loxophleba*), Marri (*Corymbia calophylla*) and Tuart (*E. gomphocephala*) (Johnstone and Storr, 1998). Carnaby's Cockatoos feed on seeds, nuts, and flowers of a variety of native and exotic plants, including *Banksia* spp., Pine trees (*Pinus* sp.), Marri, Jarrah (*E. marginata*), *Grevillea* spp., *Allocasuarina* spp., and *Hakea* spp. (Shah, 2006).

The Jarrah-Marri Forest within the Survey Area provides core foraging, roosting and nesting habitat which may be used by this taxon. Recent previous studies have recorded foraging and unconfirmed breeding of this taxon in similar Jarrah-Marri Forest north of the Survey Area.

#### **Quokka (*Setonix brachyurus*) – VU (BC Act; EPBC Act)**

The Quokka is a small macropod found on two offshore islands (Rottnest and Bald Island) and several mainland sites in south-west Western Australia (Van Dyck and Strahan, 2008; DBCA, 2017a). The distribution of the Quokka is severely fragmented and there is little to no migration between populations. Mainland populations of the Quokka favour dense riparian vegetation; however, they also make use of heath and shrubland, swamp Peppermint, and swampy shrublands as well as Karri Forest regrowth (Van Dyck and Strahan, 2008; DBCA, 2017a). The populations of Quokkas on the mainland are largely restricted to areas of high rainfall of 1,000 mm or more (Van Dyck and Strahan, 2008).

The Drainage Line habitat constitutes core habitat for the Quokka due to the dense understorey vegetation. The Jarrah-Marri habitat constitutes supporting habitat for the taxon. A recent survey has recorded this taxon within Drainage Line habitat north of the Survey Area (GHD, 2021a). The Drainage Line habitat is limited in extent within the Survey Area



and extends outside the Survey Area, therefore it is possible that the taxon is present within the area but was not detected at camera trap locations during the survey.

### **Wambenger Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*) – CD (BC Act)**

The Wambenger Brush-tailed Phascogale is a rat-sized, arboreal, carnivorous marsupial, characterised by a tuft of black hair on its tail (Van Dyck and Strahan, 2008). Typically, the species has been observed in dry sclerophyll forests and open woodlands containing hollow-bearing trees with a sparse ground cover. The distribution of the Wambenger Brush-tailed Phascogale is widespread but fragmented, stemming from habitat destruction and predation by cats and foxes (Van Dyck and Strahan, 2008). In the south-west of Australia, the species is thought to have declined within the last 10 years given the lower number of records despite an increase in survey effort (Van Dyck and Strahan, 2008).

Wambenger Brush-tailed Phascogale was not recorded during the survey. The taxon has been recorded within 100 m of the Survey Area (DBCA, 2023c) and recent surveys in the region detected the species via trapping and camera trapping in nearby Jarrah-Marri Forest (GHD, 2021a). The Jarrah-Marri Forest and Drainage Line habitats constitute core habitat for this species because of their value for shelter, foraging, and dispersal.

### **Quenda (*Isoodon fusciventer*) – P4 (DBCA)**

Quenda are nocturnal and omnivorous, feeding on insects, spiders, worms, and plant roots and are typically found in dense vegetation, including wetland fringes, forest, woodland, shrub, and heath communities (Van Dyck and Strahan, 2008; DBCA, 2012). They are found only in the southwestern corner of Western Australia, where these regions generally display a combination of sandy soils with dense heathy vegetation in the lower stratum (Van Dyck and Strahan, 2008; DBCA, 2012).

Within the Survey Area, the Jarrah-Marri Forest and Drainage Line habitats constitute core habitat for the taxon because of their value for shelter, foraging, and dispersal. The Drainage Line habitat is of particular importance as provides water sources and dense understorey for shelter.

### **Western False Pipistrelle (*Falsistrellus mackenziei*) – P4 (DBCA)**

The Western False Pipistrelle is endemic to the south-western region of Western Australia, making use of high rainfall forests dominated by Jarrah, Karri, Marri, and Tuart. The species is a specialist of tall mature forest, foraging within the canopy and roosting in tree hollows (Van Dyck and Strahan, 2008).

Western False Pipistrelle was not targeted during the surveys and so presence was not detected; however, this taxon is widely documented within the area and the Survey Area contains core Jarrah-Marri Forest and Drainage Line habitat which provides high value foraging habitat and roost sites which are associated with hollows in *Eucalyptus* (Baker and Gynther, 2023).

### **Dell's Ctenotus (*Ctenotus delli*) – P4 (DBCA)**

Dell's Ctenotus is endemic to the north Darling Range, south-western Australia, inhabiting dry sclerophyll forest on stony hills and ranges (Cogger, 2014).

This taxon may use the Jarrah-Marri Forest with lateritic clay substrate within the Survey Area which provides suitable foraging and breeding habitats.



### 5.2.3 Medium likelihood of occurrence within the Survey Area

#### **Western Ringtail Possum (*Pseudocheirus occidentalis*) – CR (BC Act; EPBC Act)**

The Western Ringtail Possum is found in the South-West, particularly around Busselton, largely in areas of Peppermint (*Agonis flexuosa*) or Tuart (*Eucalyptus gomphocephala*) forest, generally with a Peppermint midstory (Van Dyck and Strahan, 2008). The species is nocturnal, and typically feeds on the leaves of Peppermint or Eucalypt trees. In coastal Peppermint habitat, Western Ringtail Possums constructs dreys anywhere from the upper canopy to the understory, which are used as rest sites during the day. Coastal populations are under immediate threat from habitat loss and fragmentation and recent research from Jarrah Forest sites indicates that increasing fire intensity at the local scale and fox predation are also impacting the species (Van Dyck and Strahan, 2008).

The Western Ringtail Possum has been recorded within the Desktop Study Area and may occur within the Survey Area. Records range between 1997 and 2020 due to multiple translocations occurring at Lane Poole Reserve (17 km north of the Survey Area), Yalgorup National Reserve (37 km northwest of the Survey Area), and Leschenault Peninsula (41 km southwest of the Survey Area) between 1991 and 2004. Due to predation, disease, habitat destruction by fires and limited post-translocation monitoring data, translocated populations were unstable with numbers considered to be low and undetectable. The Survey Area has the potential to support this taxon as Jarrah-Marri Forest constitutes core habitat for inland populations where Peppermint and Tuart is absent.

#### **Australasian Bittern (*Botaurus poiciloptilus*) – EN (BC Act)**

The Australasian Bittern is a secretive bird with a distinct booming call that nests and forages within dense wetland vegetation (Johnstone and Storr, 1998). In Western Australia, the Australasian Bittern was formerly widespread throughout the southwest, however this range has declined. It is now considered that the Australasian Bittern only occurs in select habitats, including the western coastal plain between Lancelin and Busselton, the southern coastal region from Augusta to the east of Albany and inland to some wetlands in the Jarrah Forest belt with small, isolated populations in swamps from west of Esperance eastwards to near Cape Arid (Marchant and Higgins, 1990). The main cause of this decline is thought to be wetland drainage and degradation.

Although the Australasian Bittern typically occurs in swamps, the taxon was recorded 5.8 km north of the Survey Area in 2017 in Drainage Line habitat that appears to be similar to that which occurs within the Survey Area. Therefore, the Drainage Line habitat constitutes potential habitat for the taxon.

#### **Malleefowl (*Leipoa ocellata*) – VU (BC Act; EPBC Act)**

The Malleefowl is found in semi-arid to arid shrublands and low woodlands, especially those dominated by mallee or *Acacia*. A sandy substrate and abundance of leaf litter are required for breeding (DEE, 2018). Densities of the birds are generally greatest in areas of higher rainfall and on more fertile soils where habitats tend to be thicker and there is an abundance of food plants. Much of the best habitat for Malleefowl has already been cleared or has been modified by grazing via Sheep, Cattle, Rabbits, and Goats (Benshemesh, 2007). The species nests in large mounds of dirt and leaf litter, up to five metres wide and one metre tall (Menkhorst *et al.*, 2019).

Malleefowl was sighted 17.6 km from the Survey Area in 2014 (DBCWA, 2023c) Furthermore, individuals were translocated to the nearby Dryandra Woodland, 79 km east-northeast of the Survey Area, within the last five years (Traill, 2019). The Jarrah-Marri Forest and Drainage Line habitats have the potential to support this species, though no evidence of foraging or nesting was recorded during the survey. Malleefowl are often cryptic and nest in areas of dense shrubland, making detection of the species difficult without LiDAR mapping of potential nesting mounds.



### **Peregrine Falcon (*Falco peregrinus*) – OS (DBCA)**

The Peregrine Falcon is an uncommon but wide-ranging bird across Australia (Barrett *et al.*, 2003). It occurs along rivers and ranges as well as wooded watercourses and lakes. It nests primarily on cliffs, granite outcrops and quarries, although is also known to occupy existing raptor and corvid stick nests (Menkhorst *et al.*, 2019). The diet of the Peregrine Falcon has been well studied and primarily includes flocking species such as parrots, pigeons and on the east coast, European Starlings (Olsen and Fuentes, 2008).

Peregrine Falcon was not observed during the survey; however, this species has been previously recorded within the region flying over similar Jarrah-Marri Forest (GHD, 2021a). In the absence of cliff ledges, Peregrine Falcons will use trees for nesting (Morcombe, 2003). The Jarrah-Marri Forest within the Survey Area and surrounds may provide suitable nesting and hunting habitat to support this species.

### **Woma Python (*Aspidites ramsayi*) – P1 (DBCA)**

The Woma Python is a nocturnal, terrestrial snake that inhabits woodland, heaths, and shrublands, often with spinifex. It shelters in hollow logs, abandoned monitor and mammal burrows, and soil cracks (Wilson and Swan, 2021). It is usually restricted to arid and dry inland areas, however there is an isolated population in south-western Australia (Cogger, 2014).

Within the Survey Area, both the Jarrah-Marri Forest and Drainage Line habitats provide suitable resources for hunting and shelter.

### **Southern Death Adder (*Acanthophis antarcticus*) – P4 (DBCA)**

The Southern Death Adder is found in Southwest and South Australia to Eastern and Central Queensland where, due to habitat destruction and altered fire regimes, populations are in decline (Cogger, 2014; Wilson and Swan, 2021). Habitats range from rainforest to shrublands and heath (Wilson and Swan, 2021).

The Survey Area falls within distribution of the Southern Death Adder and microhabitats within the Jarrah-Marri Forest and Drainage Line habitats have the potential to be used by the taxon for shelter and hunting.



## 6.0 Conclusion

Two fauna habitats were mapped within the Survey Area, Jarrah-Marri Forest, and Drainage Line habitats. The Drainage Line habitat provides the most value for the targeted taxa as it is core habitat for the Chuditch, Quokka, and Woylie. The Jarrah-Marri Forest also provides value for targeted taxa as core habitat for the Chuditch and Woylie and supporting habitat for the Quokka.

One targeted taxon was recorded during the survey; secondary evidence of Chuditch was recorded in the form of scat within the Jarrah-Marri Forest. The Quokka and Woylie were not recorded during the current survey however, they have previously been recorded within 200 m and 40 m of the Survey Area respectively.

In addition to the targeted fauna taxa, four significant taxa were recorded during the fauna survey:

- Forest Red-tailed Black Cockatoo – VU (EPBC; BC Act).
- Baudin's Cockatoo – EN (EPBC; BC Act).
- Western Brush Wallaby – P4 (DBCA).
- Rakali – P4 (DBCA).

A further seven significant fauna taxa were assessed as having a high likelihood and six significant fauna taxa were assessed as having a medium, and 15 significant fauna taxa were assessed as having have a low likelihood of occurring within the Survey Area.

Three introduced taxa were recorded during the survey: Pig (*Sus scrofa*), Cat (*Felis catus*) and Black Rat (*Rattus rattus*).



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## 8.0 Feedback

At SLR, we are committed to delivering professional quality service to our clients. We are constantly looking for ways to improve the quality of our deliverables and our service to our clients. Client feedback is a valuable tool in helping us prioritise services and resources according to our client needs.

To achieve this, your feedback on the team's performance, deliverables and service are valuable and SLR welcome all feedback via <https://www.slrconsulting.com/en/feedback>. We recognise the value of your time, and we will make a \$10 donation to our 2023 Charity Partner - Lifeline, for every completed form.





# Appendix A Maps

## Targeted Chuditch, Quokka, and Woylie Survey

Willowdale Mine – Larego Region

Alcoa of Australia Ltd

SLR Project No.: 675.VX5890.00001

17 June 2024

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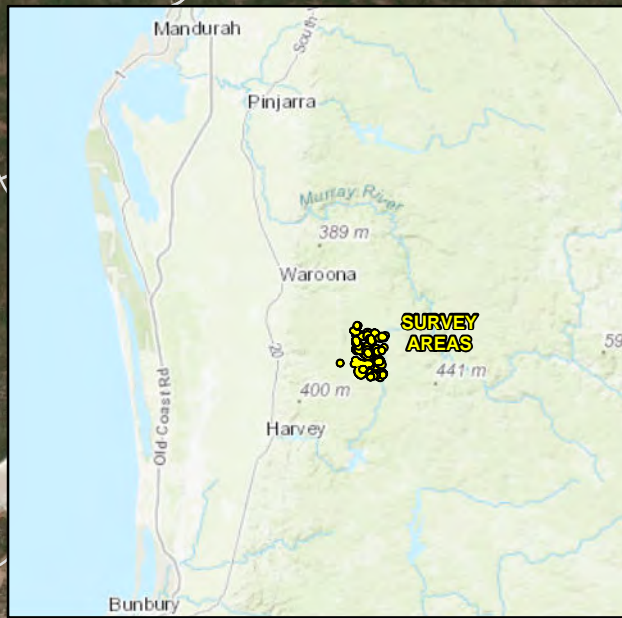
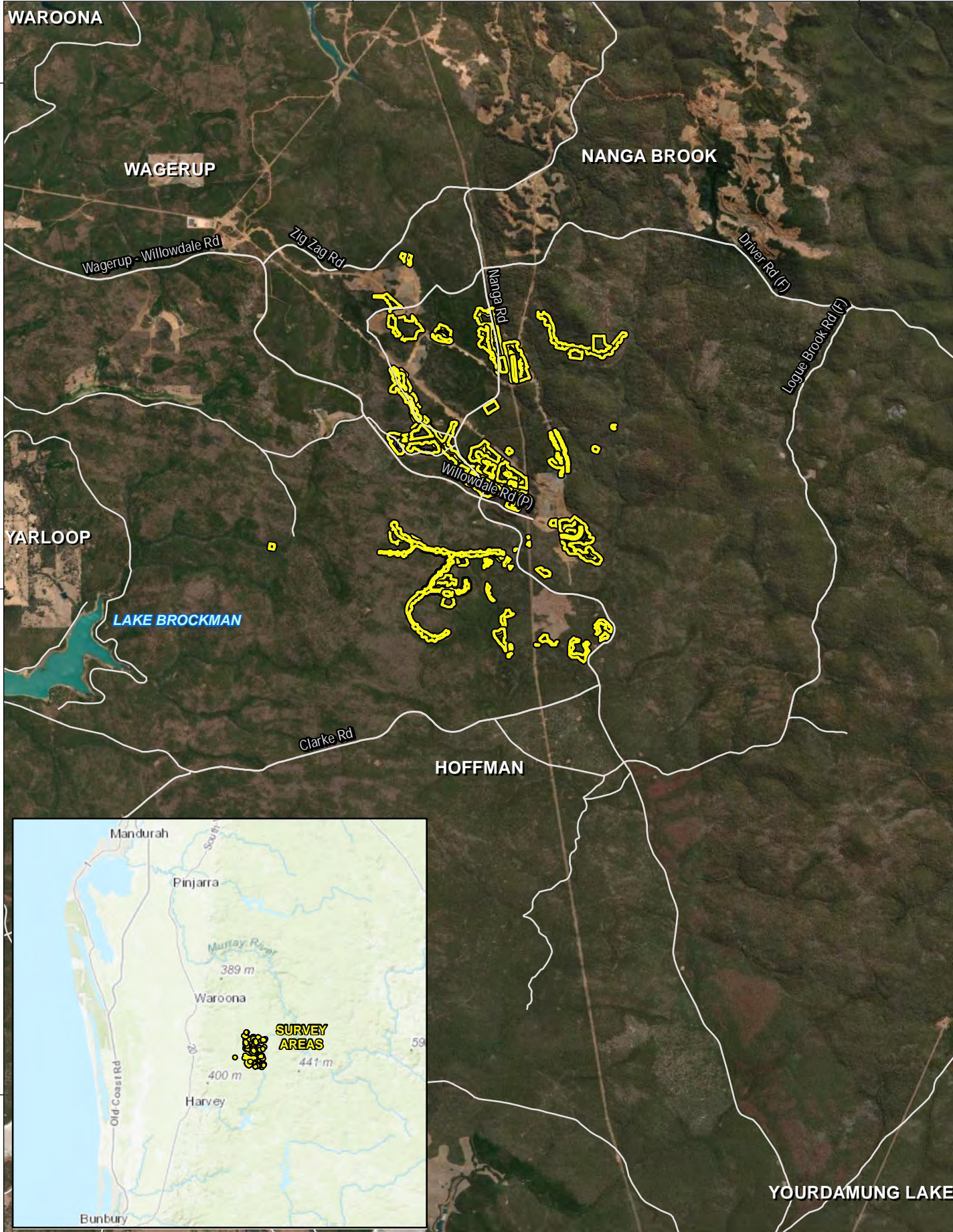
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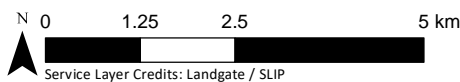
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Coordinate System: GDA 1994 MGA Zone 50 @ A4  
 Scale : 1:100,000 @ A4  
 Project Number : 675.VX5890.00001  
 Date Drawn : 18/03/2024  
 Drawn By : Environmaps  
 Reviewed By : PD

Alcoa  
 Targeted Chuditch, Quokka, and  
 Woylie Surveys Willowdale Mine  
 Larego Region

Survey Area  
 MAP 1

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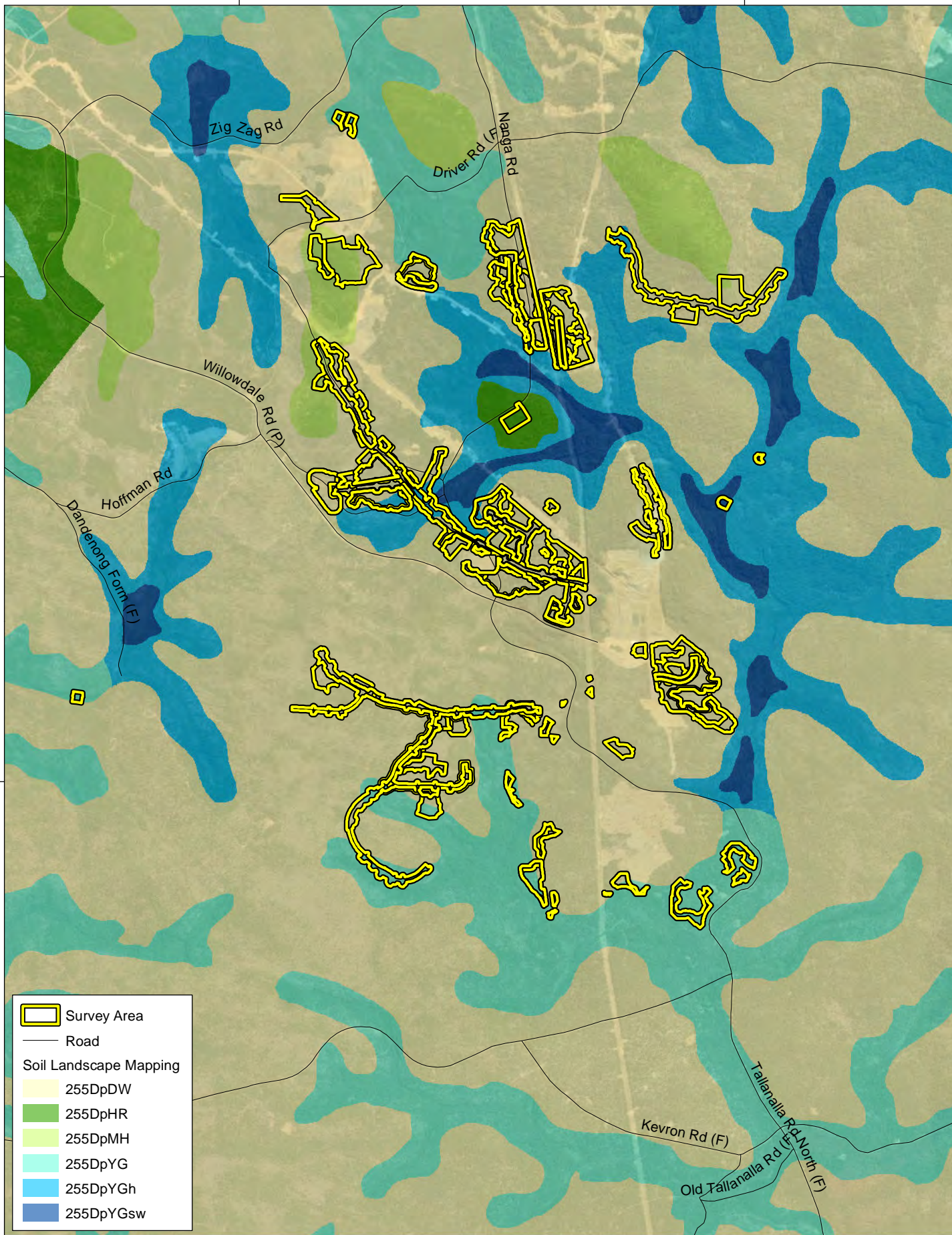
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	Survey Area
	Road
<b>Soil Landscape Mapping</b>	
	255DpDW
	255DpHR
	255DpMH
	255DpYG
	255DpYGh
	255DpYGsw



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 Date Drawn : 18/03/2024  
 Drawn By : Environmaps  
 Reviewed By : PD

Alcoa  
 Targeted Chuditch, Quokka, and  
 Woylie Surveys Willowdale Mine  
 Larego Region

Soil Landscape Mapping  
 MAP 2

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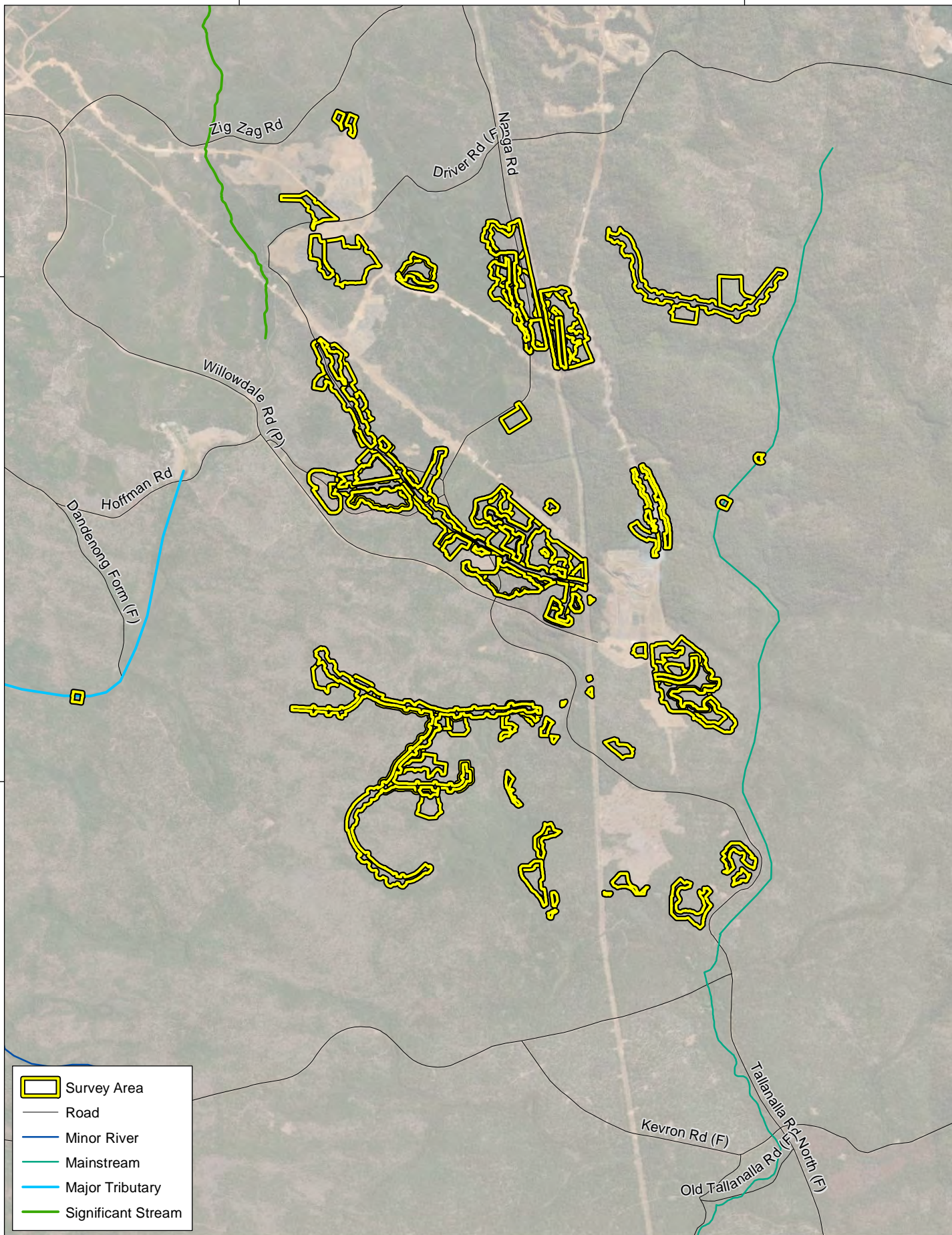
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	Survey Area
	Road
	Minor River
	Mainstream
	Major Tributary
	Significant Stream



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Coordinate System: GDA 1994 MGA Zone 50 @ A4  
 Scale : 1:50,000 @ A4  
 Project Number : 675.VX5890.00001  
 Date Drawn : 18/03/2024  
 Drawn By : Environmaps  
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Alcoa  
 Targeted Chuditch, Quokka, and  
 Woylie Surveys Willowdale Mine  
 Larego Region

Hydrography  
 MAP 3

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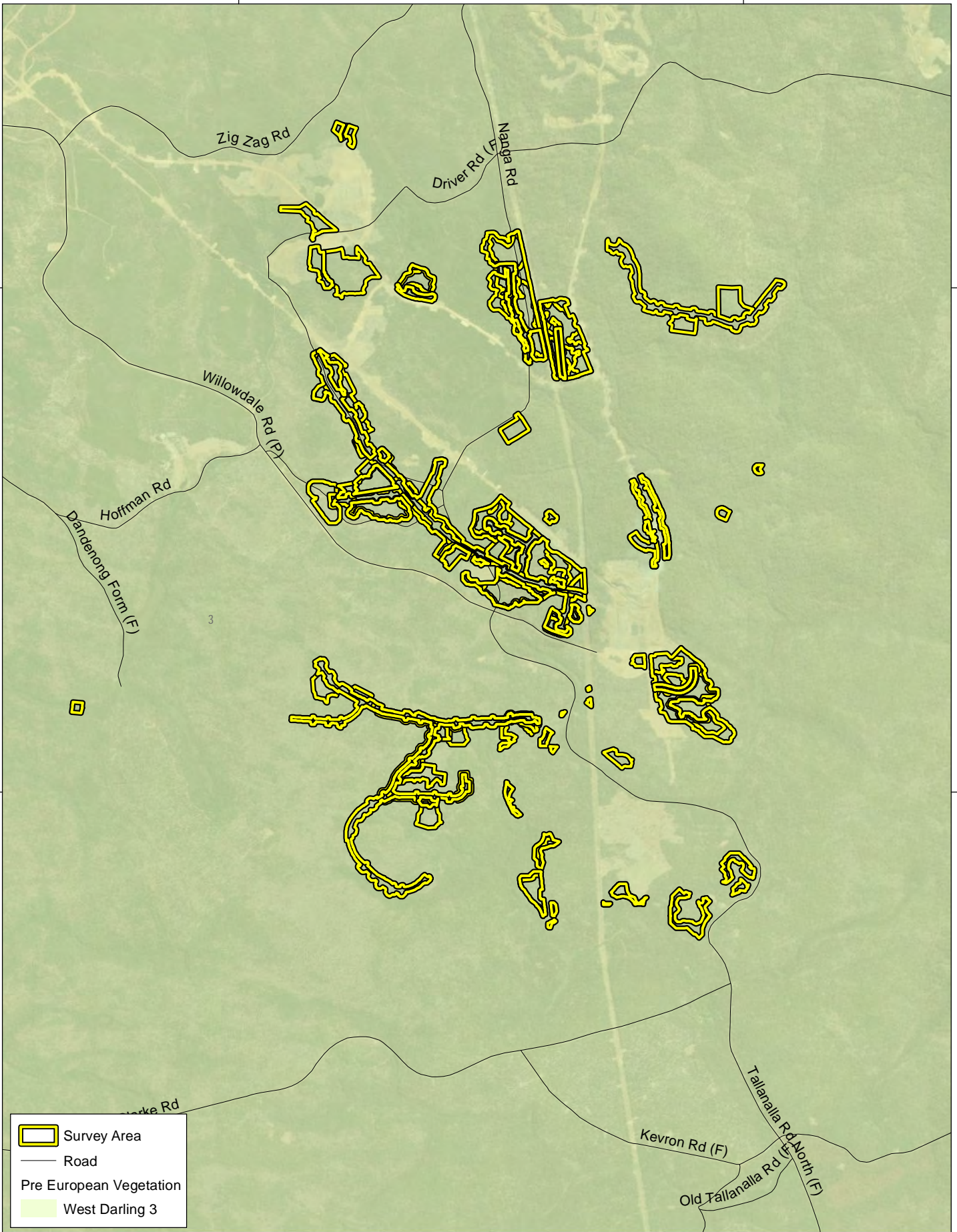
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
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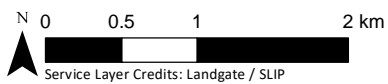
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 Survey Area  
 Road  
 Pre European Vegetation  
 West Darling 3



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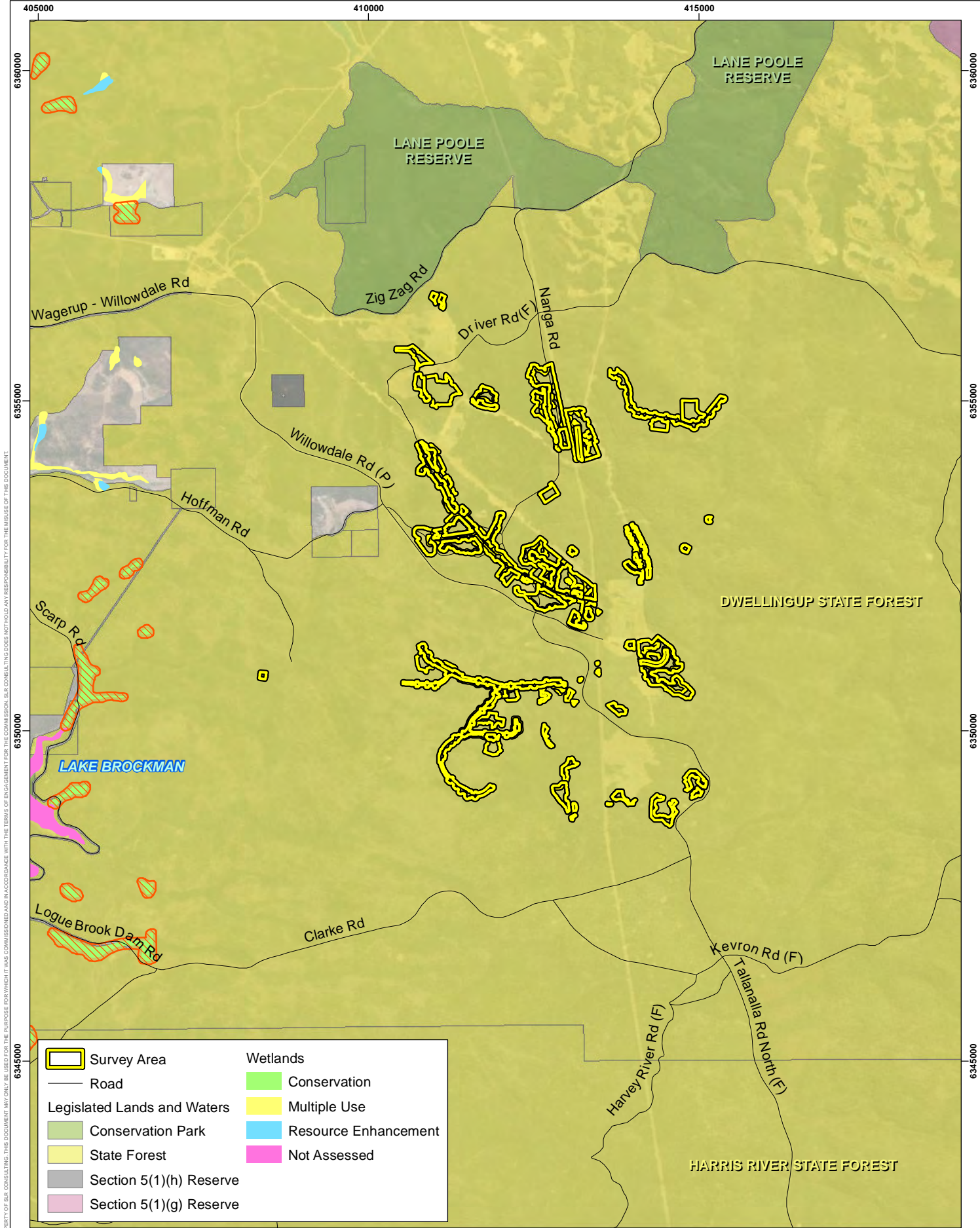


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Alcoa  
 Targeted Chuditch, Quokka, and  
 Woylie Surveys Willowdale Mine  
 Larego Region

Pre-European Vegetation  
 MAP 4

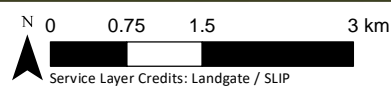
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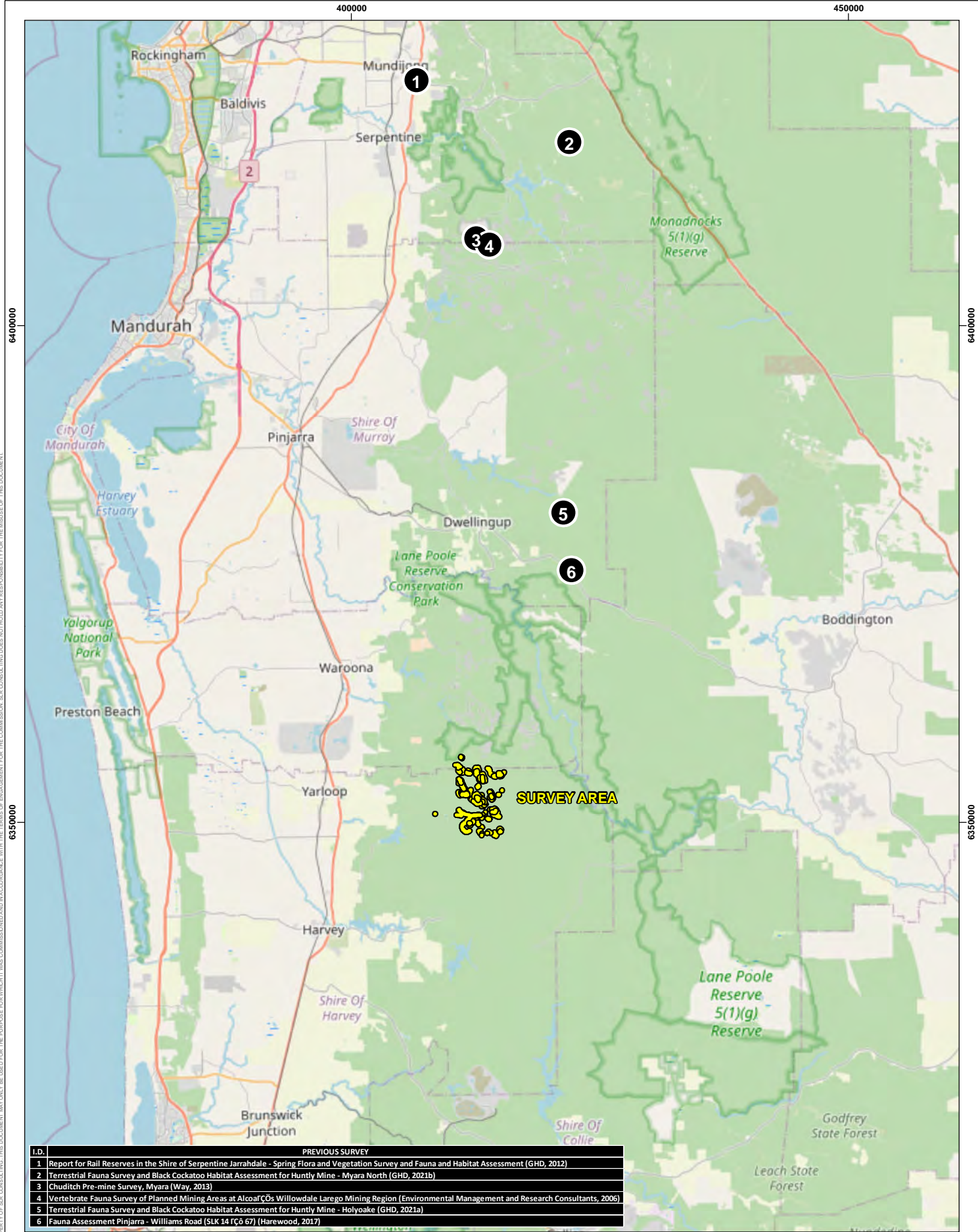


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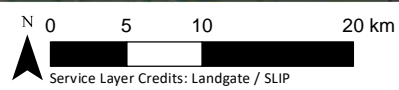
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 Targeted Chuditch, Quokka, and  
 Woylie Surveys Willowdale Mine  
 Larego Region  
 Conservation and Environmentally  
 Sensitive Areas  
 MAP 5



I.D.	PREVIOUS SURVEY
1	Report for Rail Reserves in the Shire of Serpentine Jarrahdale - Spring Flora and Vegetation Survey and Fauna and Habitat Assessment (GHD, 2012)
2	Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment for Huntly Mine - Myara North (GHD, 2021b)
3	Chuditch Pre-mine Survey, Myara (Way, 2013)
4	Vertebrate Fauna Survey of Planned Mining Areas at Alcoa's Willowdale Larego Mining Region (Environmental Management and Research Consultants, 2006)
5	Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment for Huntly Mine - Holyoake (GHD, 2021a)
6	Fauna Assessment Pinjarra - Williams Road (SLK 14 fC6 67) (Harewood, 2017)



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 Woylie Surveys Willowdale Mine  
 Larego Region

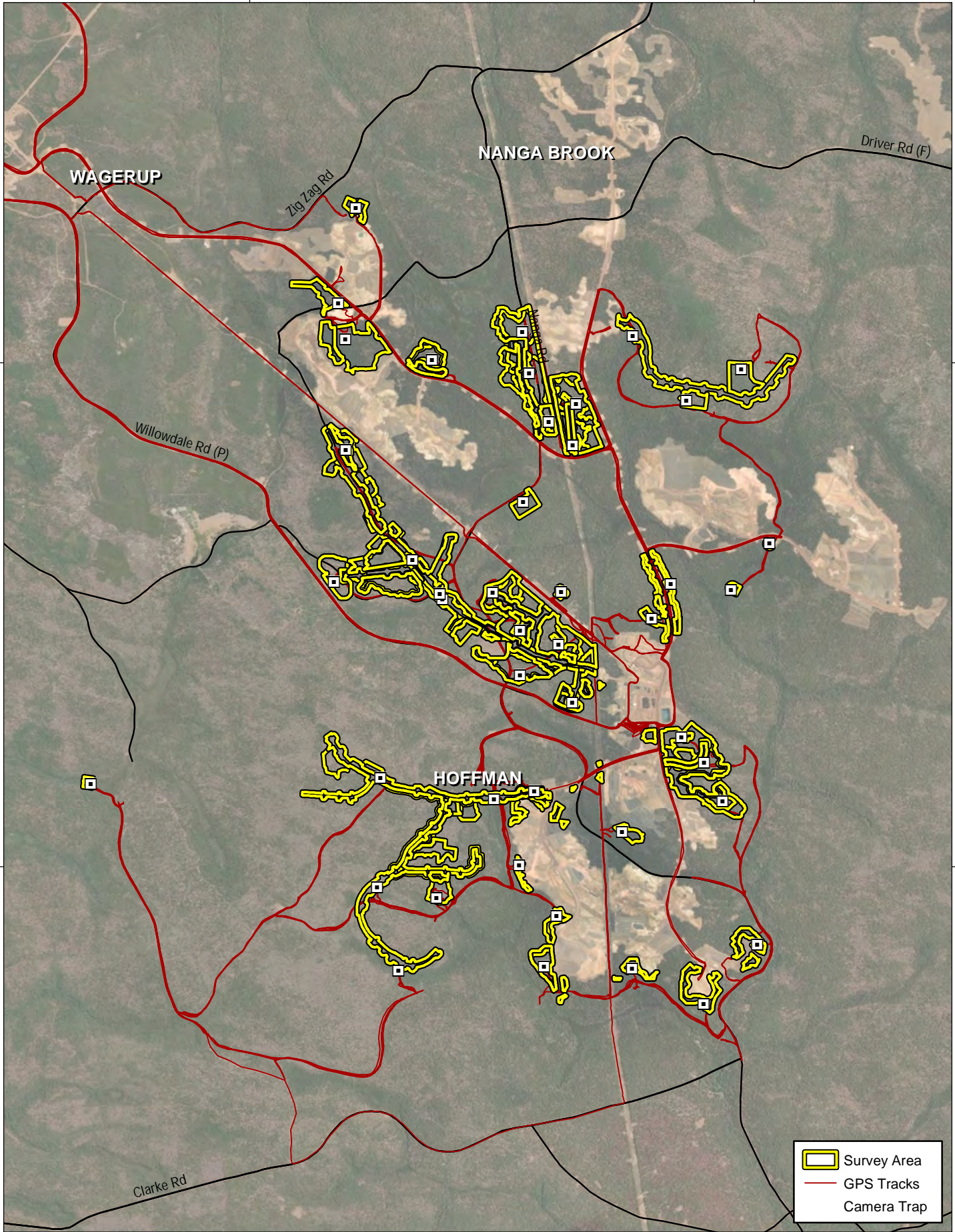
Previous Surveys in the Locality  
 MAP 6

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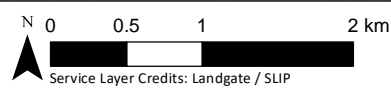
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Survey Area  
 GPS Tracks  
 Camera Trap



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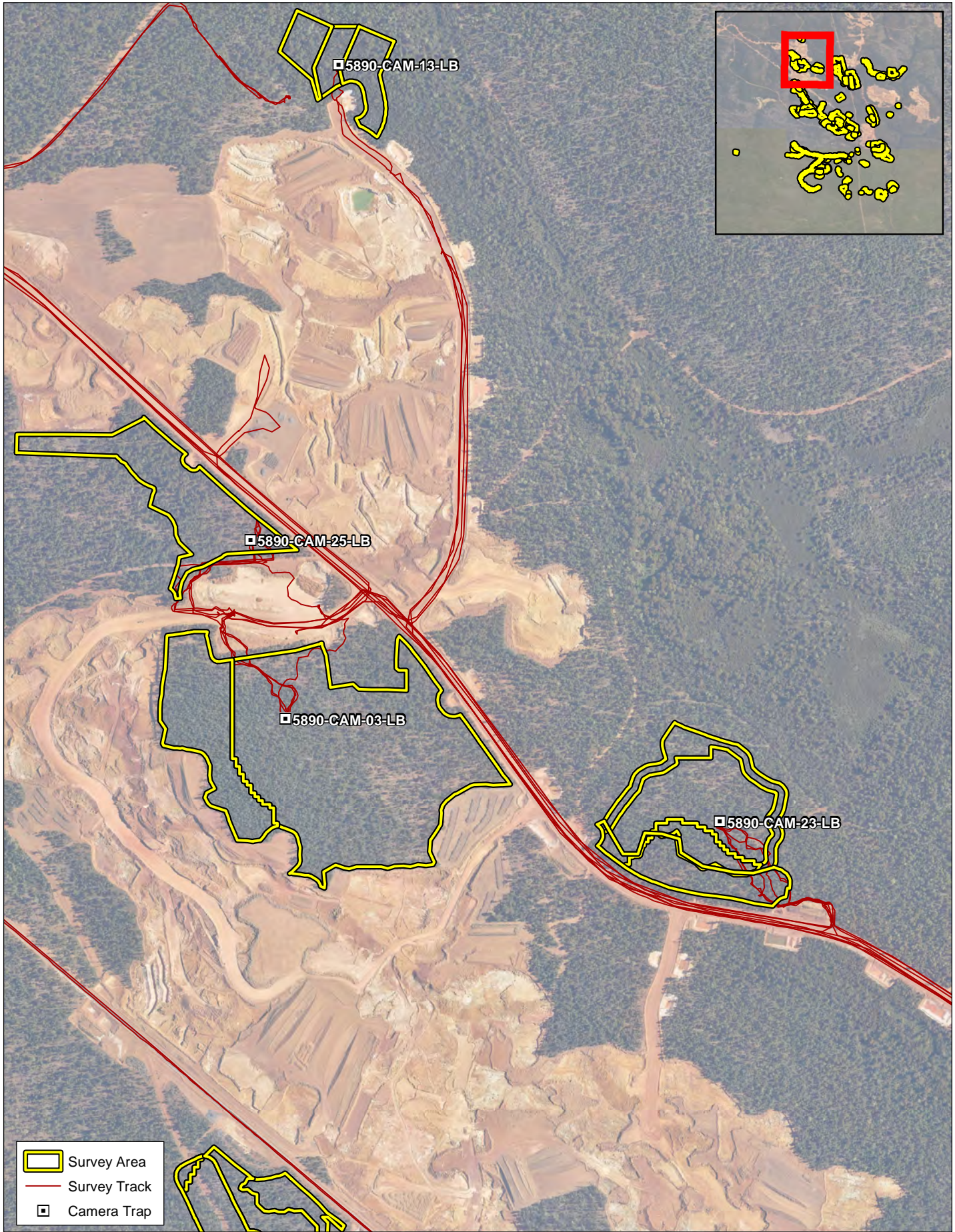





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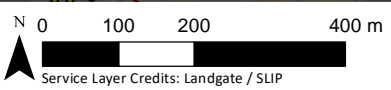
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 Woylie Surveys Willowdale Mine  
 Larego Region

Survey Effort  
 MAP 7-1

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 Survey Area  
 Survey Track  
 Camera Trap



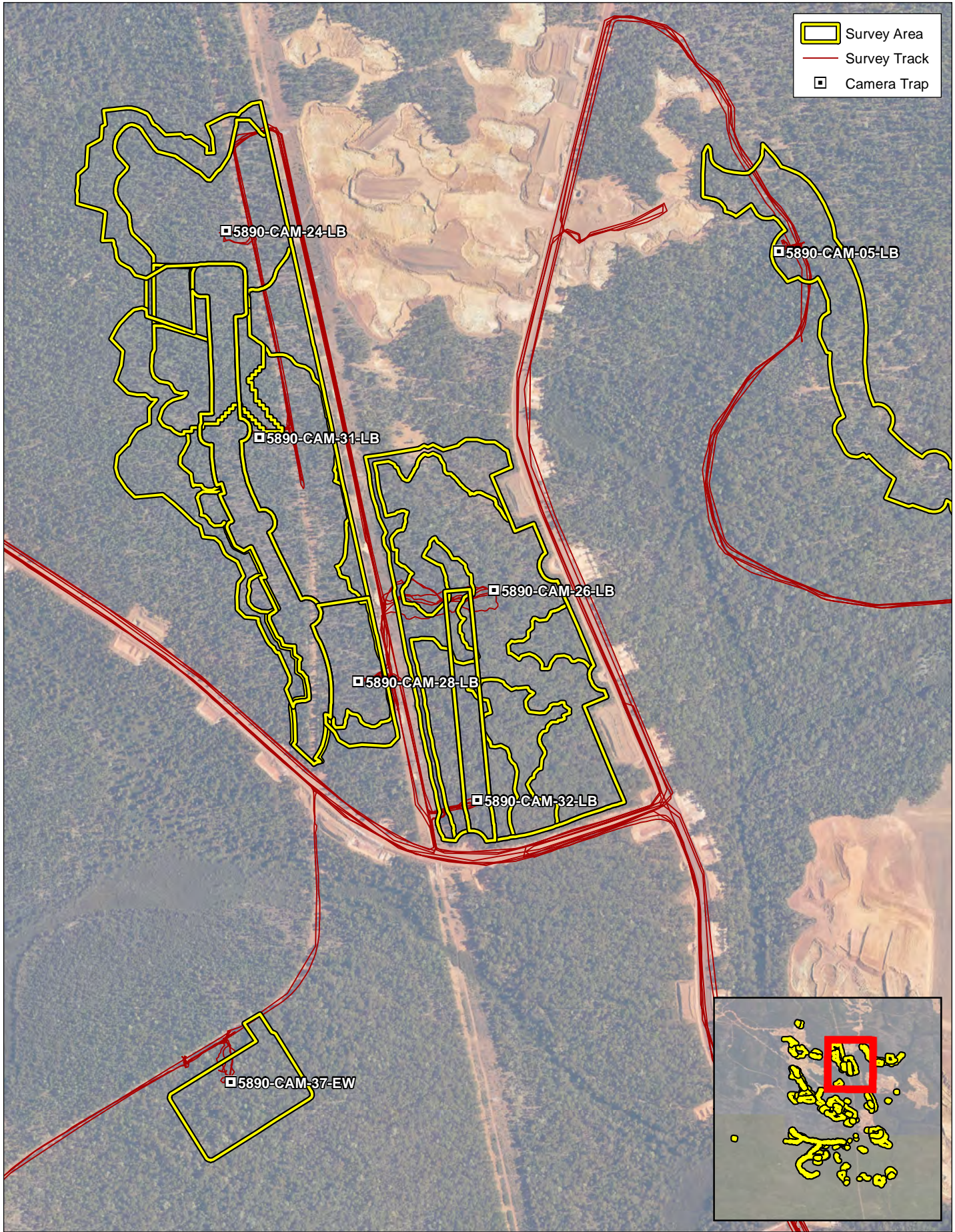
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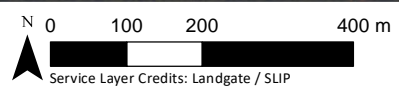
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 Woylie Surveys Willowdale Mine  
 Larego Region

Survey Effort  
 MAP 7-2

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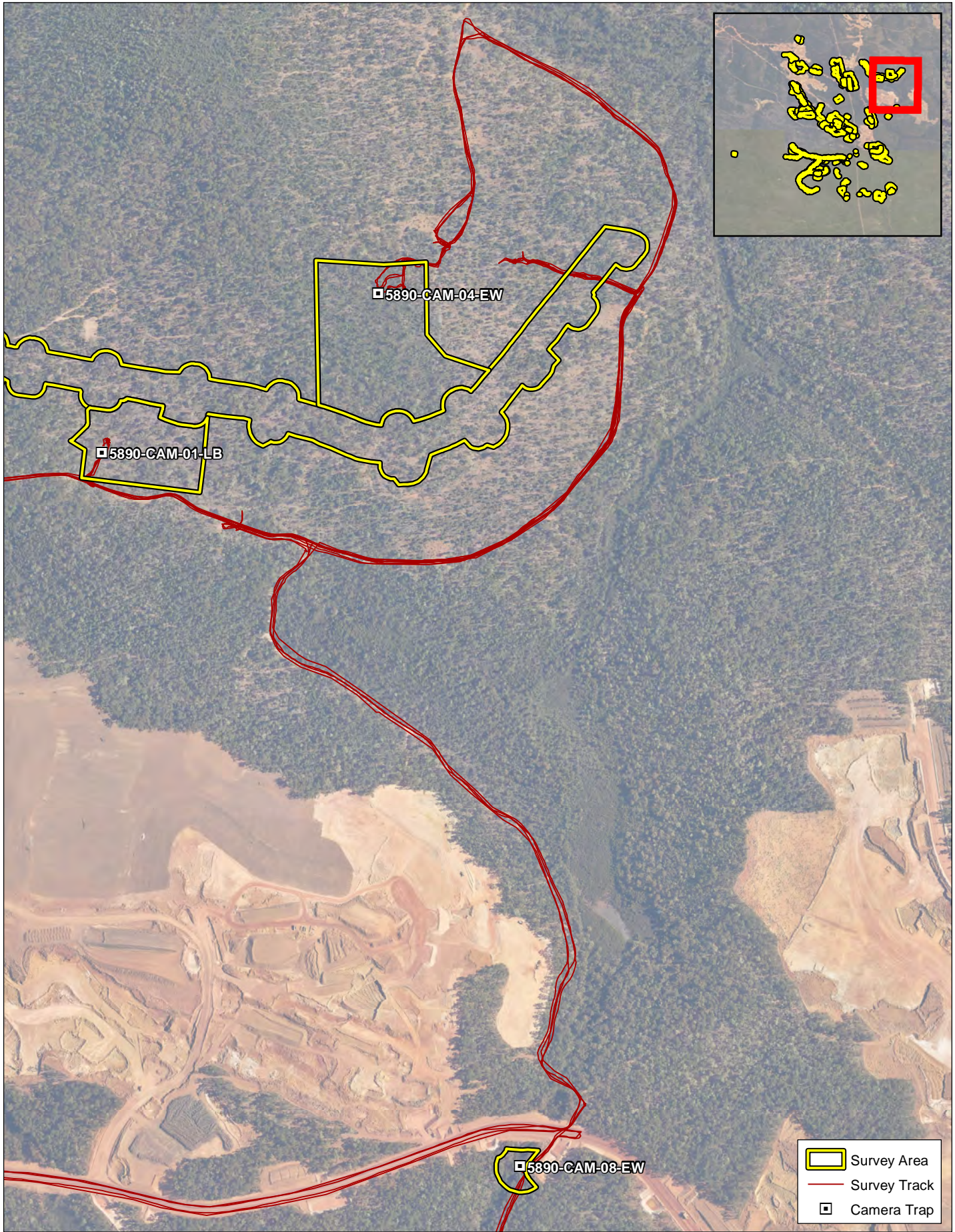


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Alcoa  
 Targeted Chuditch, Quokka, and  
 Woylie Surveys Willowdale Mine  
 Larego Region

Survey Effort  
 MAP 7-3

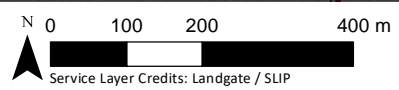
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	Survey Area
	Survey Track
	Camera Trap



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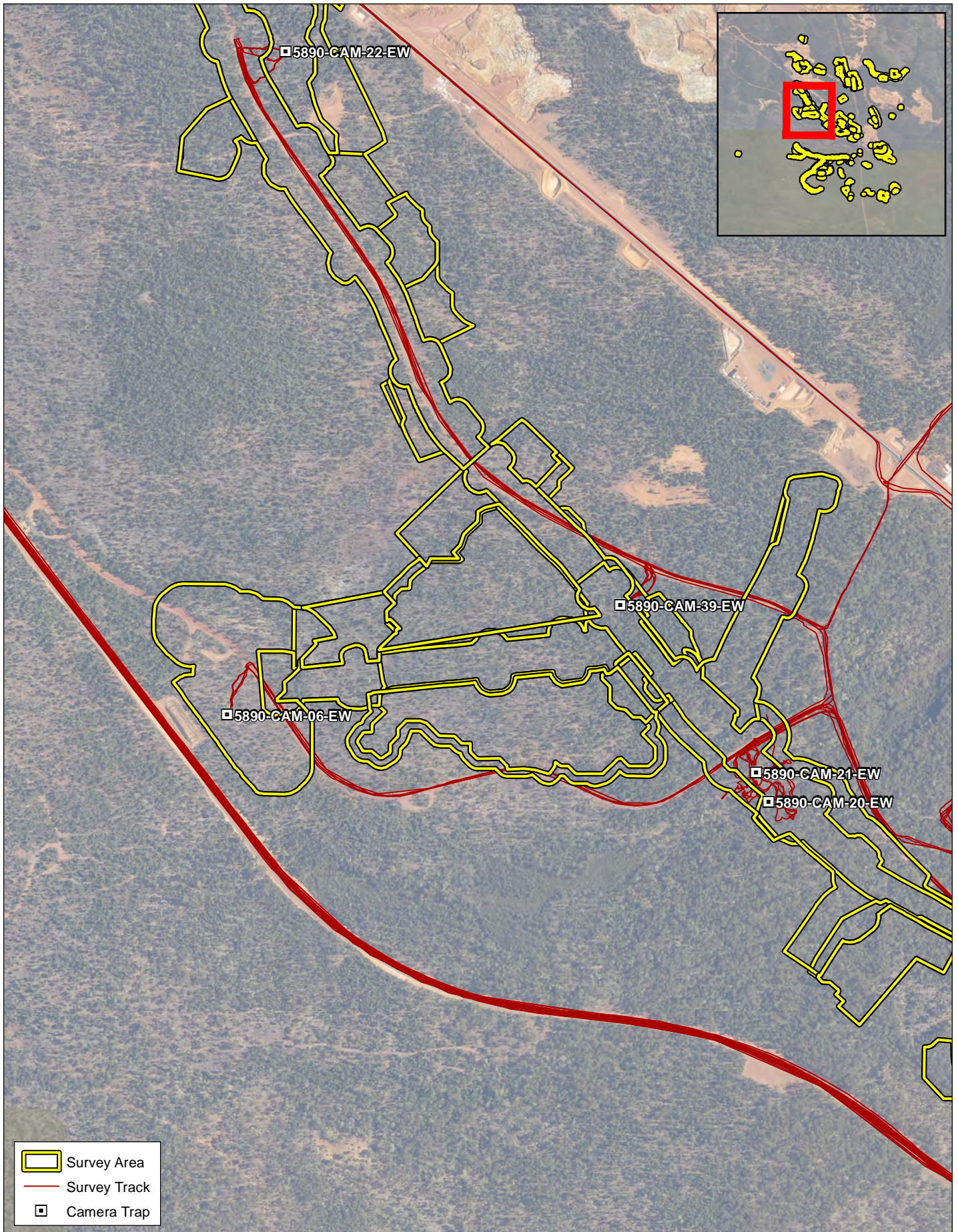


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Alcoa  
 Targeted Chuditch, Quokka, and  
 Woylie Surveys Willowdale Mine  
 Larego Region

Survey Effort  
 MAP 7-4

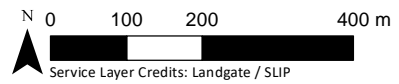
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Survey Area  
 Survey Track  
 Camera Trap



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




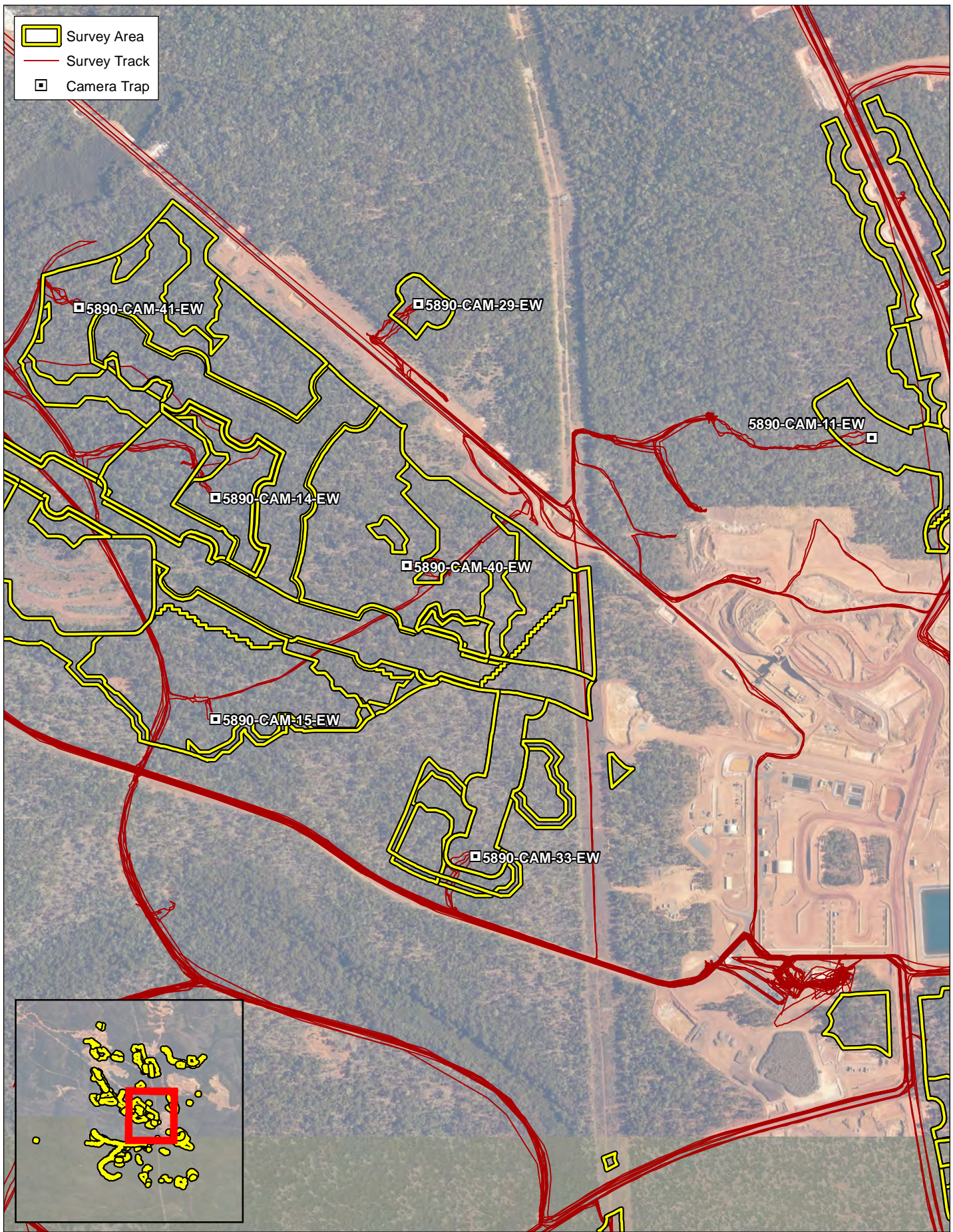
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Alcoa  
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 Woylie Surveys Willowdale Mine  
 Larego Region

Survey Effort  
 MAP 7-5

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-  Survey Area
-  Survey Track
-  Camera Trap



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5890-CAM-29-EW

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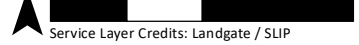
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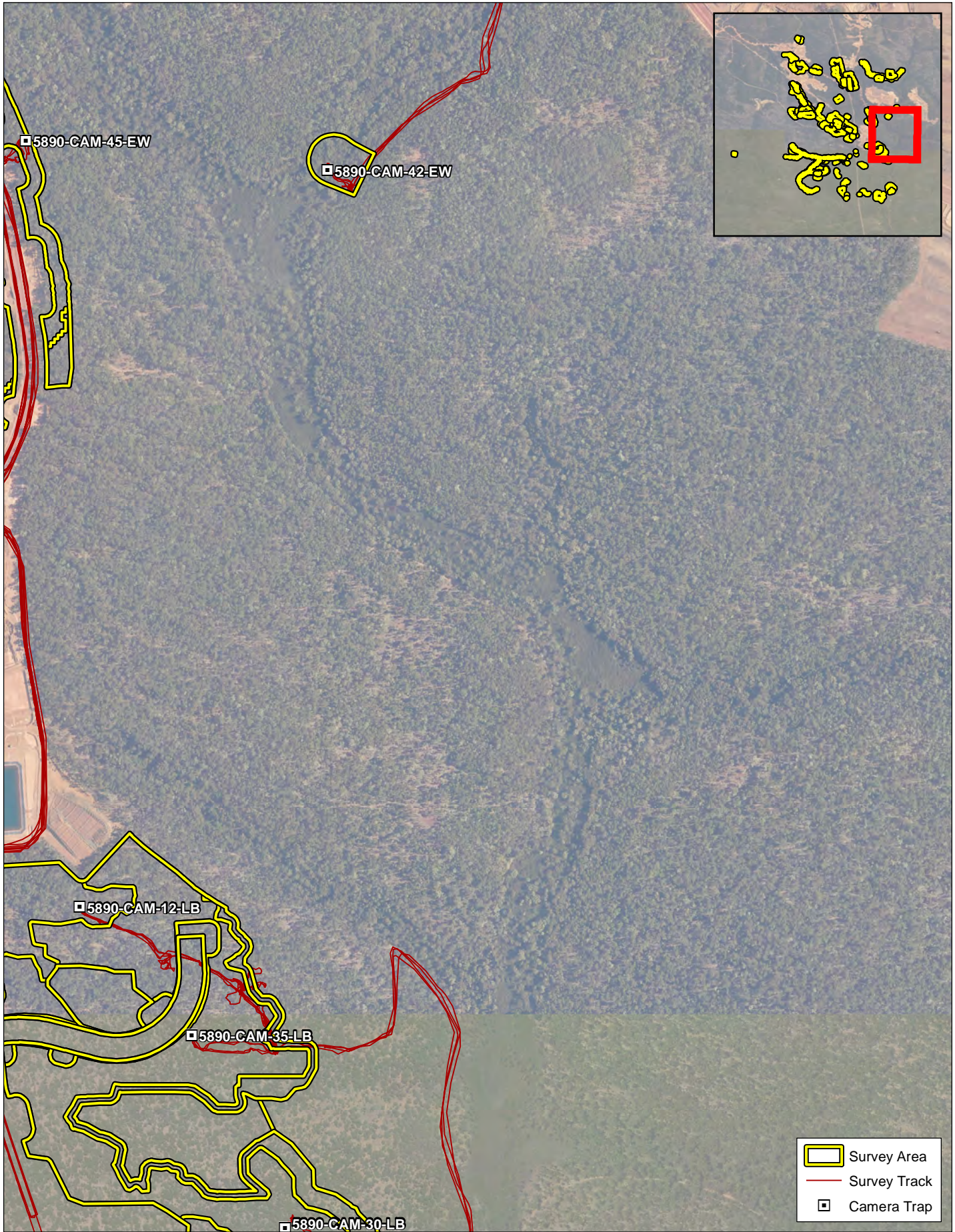
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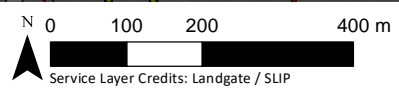
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 Larego Region

Survey Effort  
 MAP 7-6

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-  Survey Area
-  Survey Track
-  Camera Trap



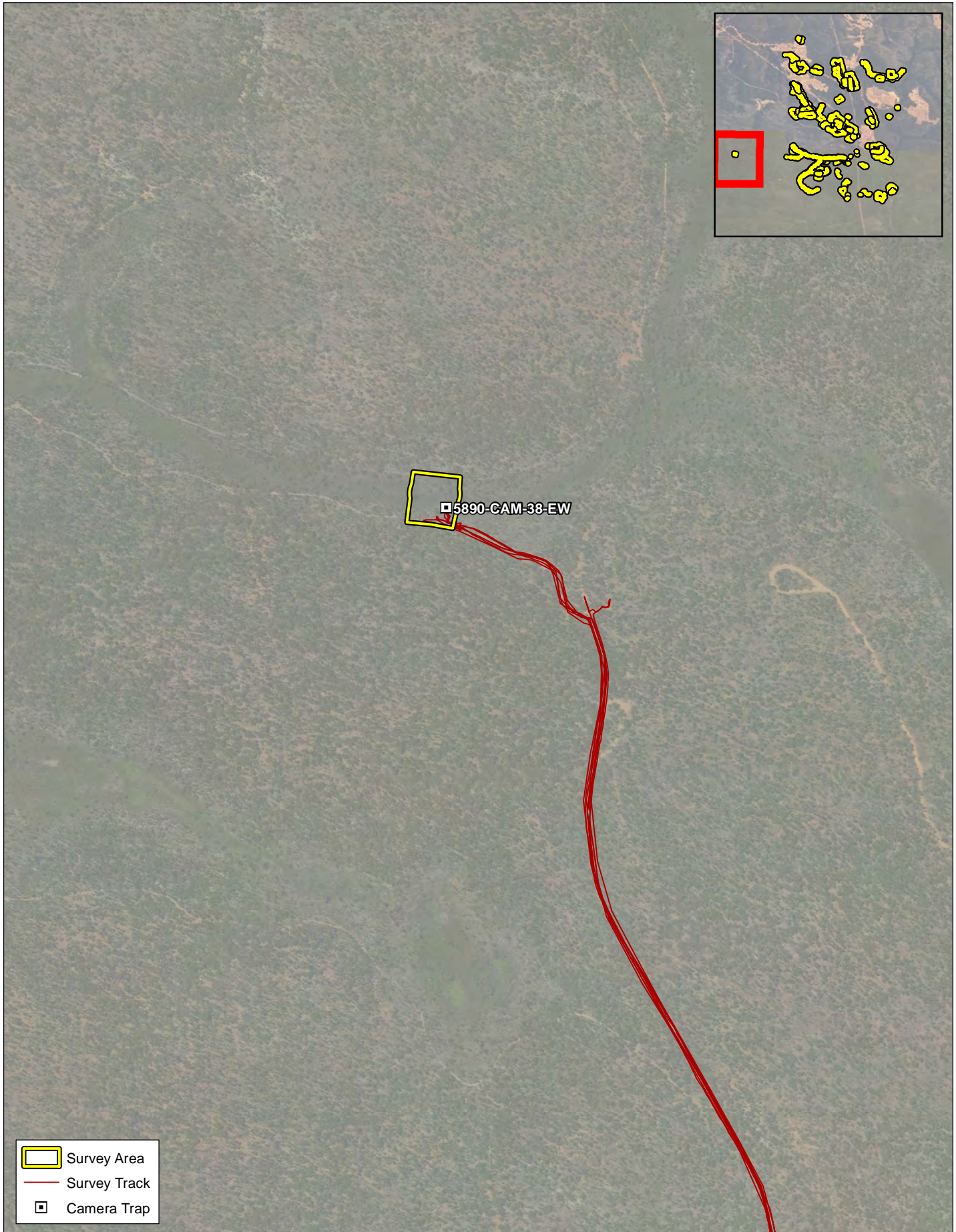
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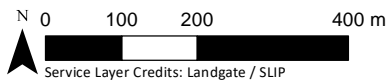
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 Larego Region

Survey Effort  
 MAP 7-7

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-  Survey Area
-  Survey Track
-  Camera Trap

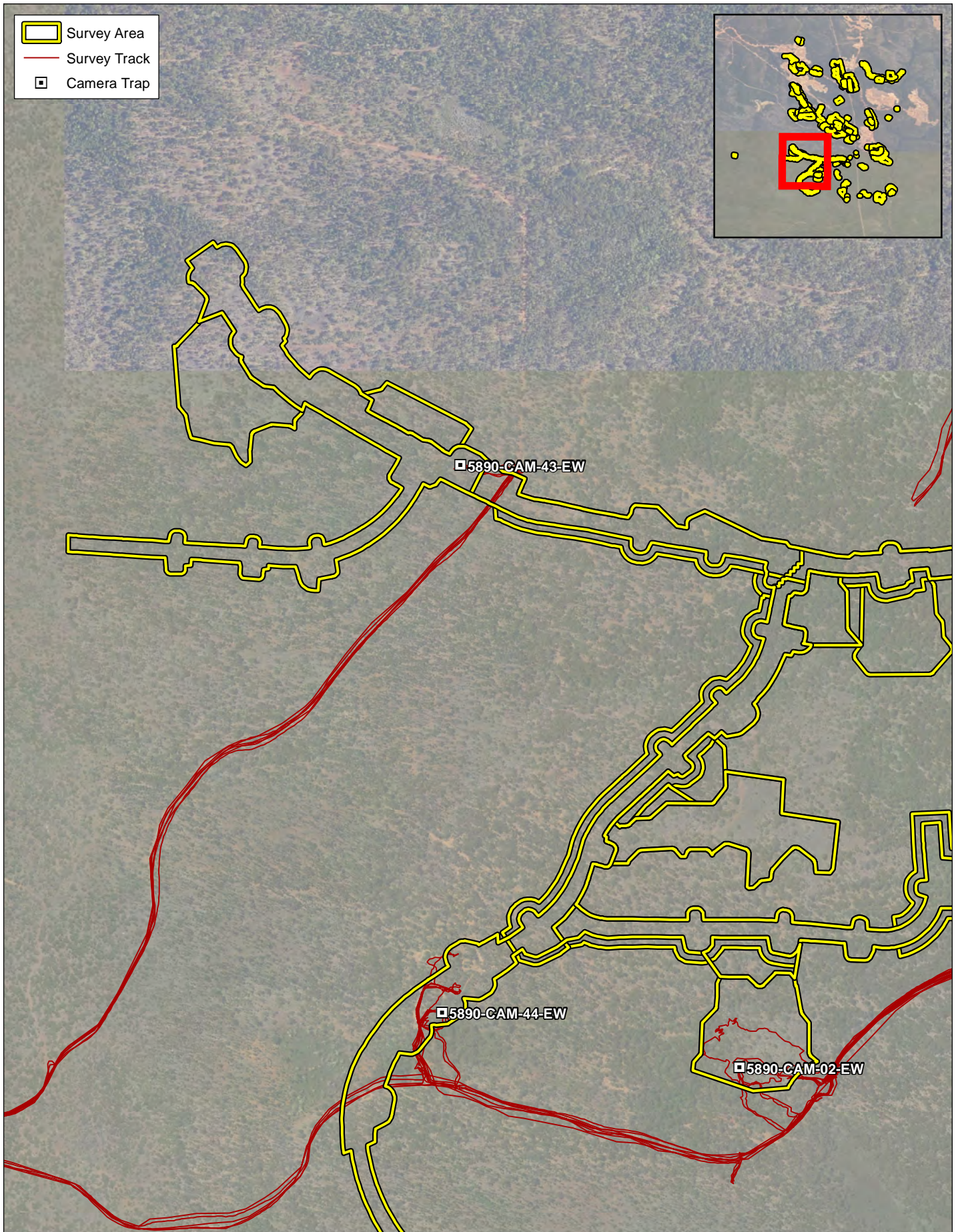


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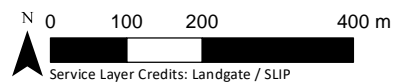
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Alcoa  
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 Woylie Surveys Willowdale Mine  
 Larego Region  
 Survey Effort  
 MAP 7-8

-  Survey Area
-  Survey Track
-  Camera Trap



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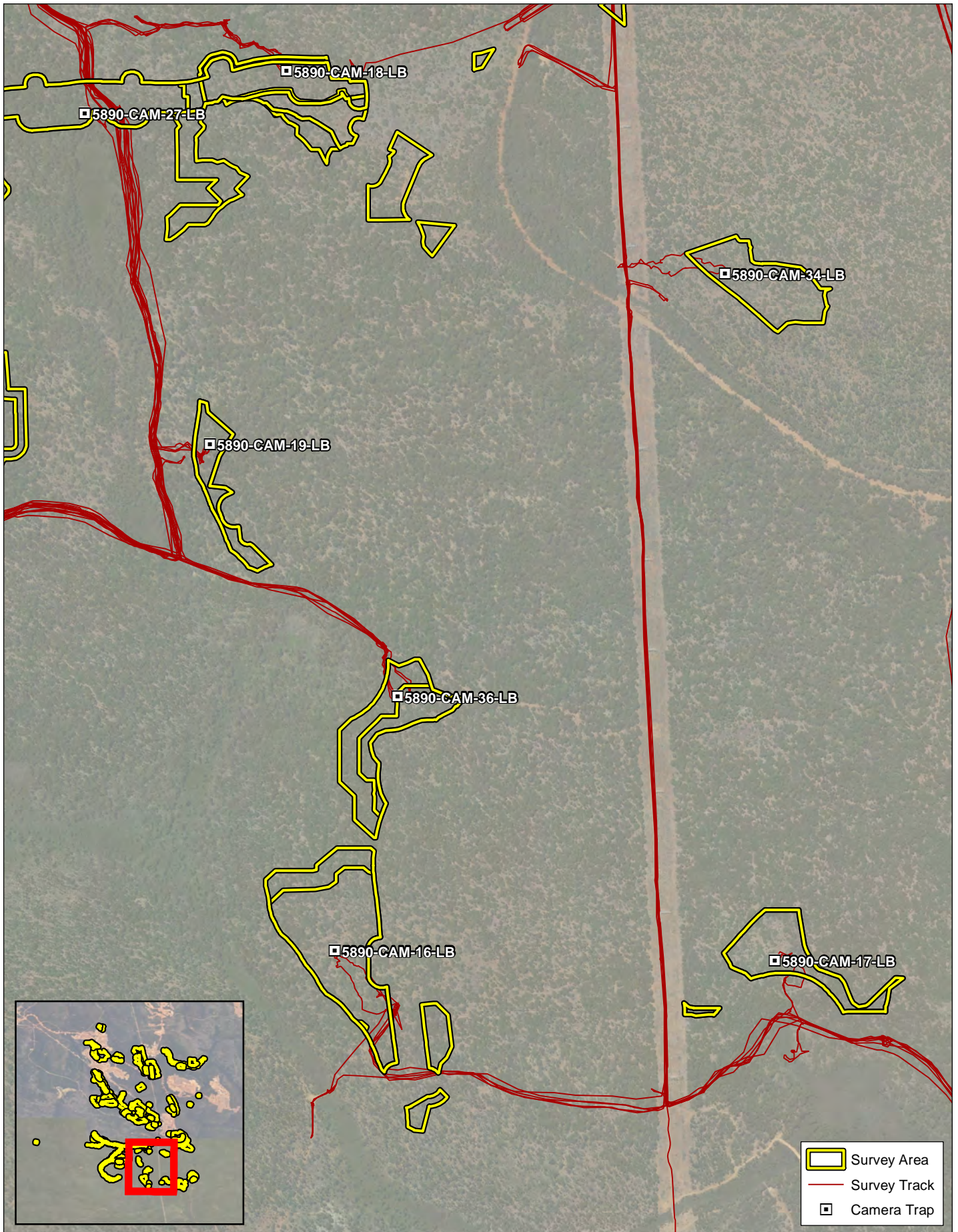
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 Woylie Surveys Willowdale Mine  
 Larego Region

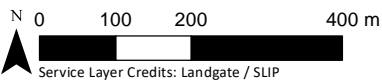
Survey Effort  
 MAP 7-9

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- Survey Area
- Survey Track
- Camera Trap



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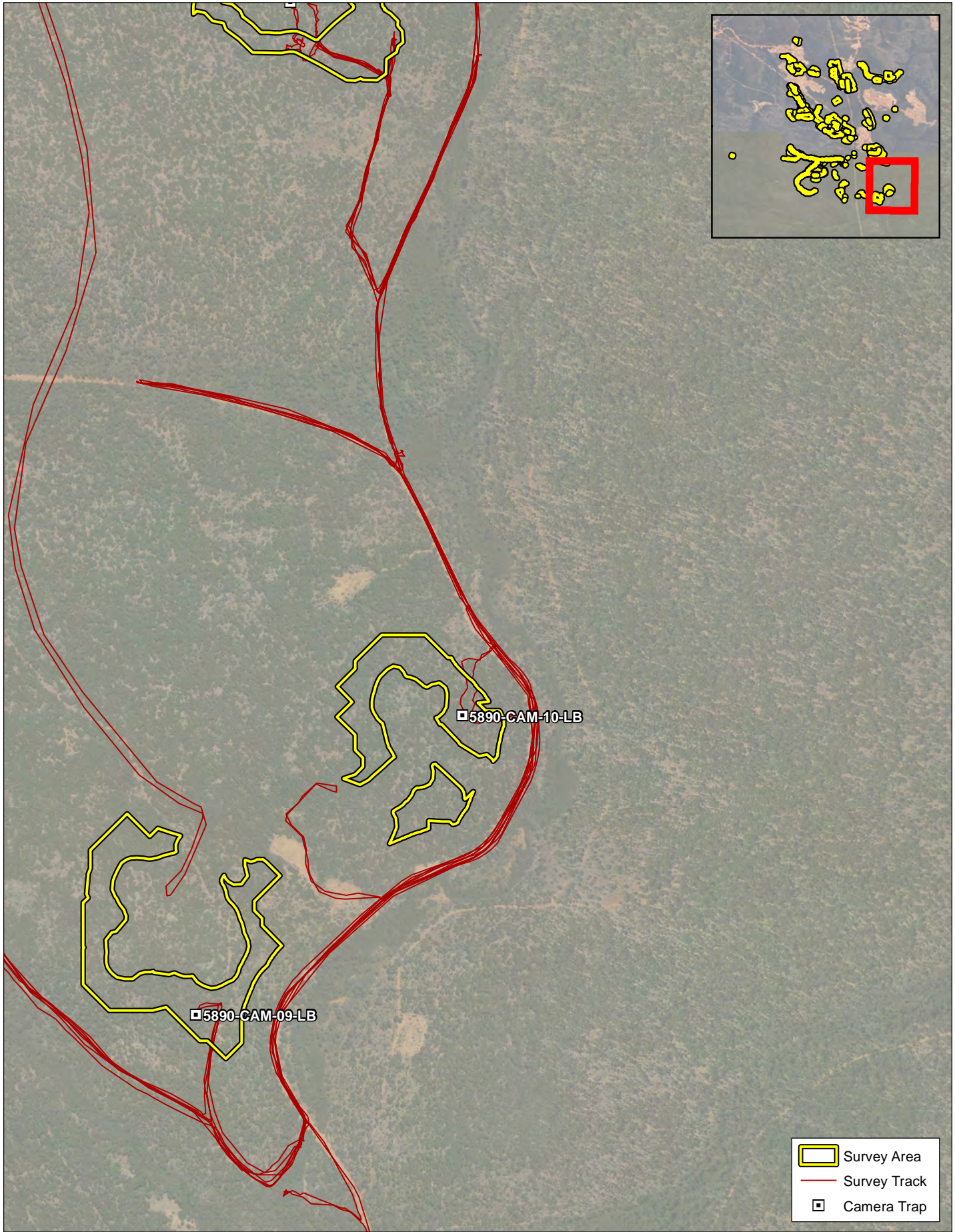
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 Larego Region




Survey Effort  
 MAP 7-10



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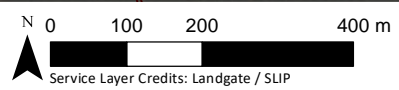
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	Survey Area
	Survey Track
	Camera Trap



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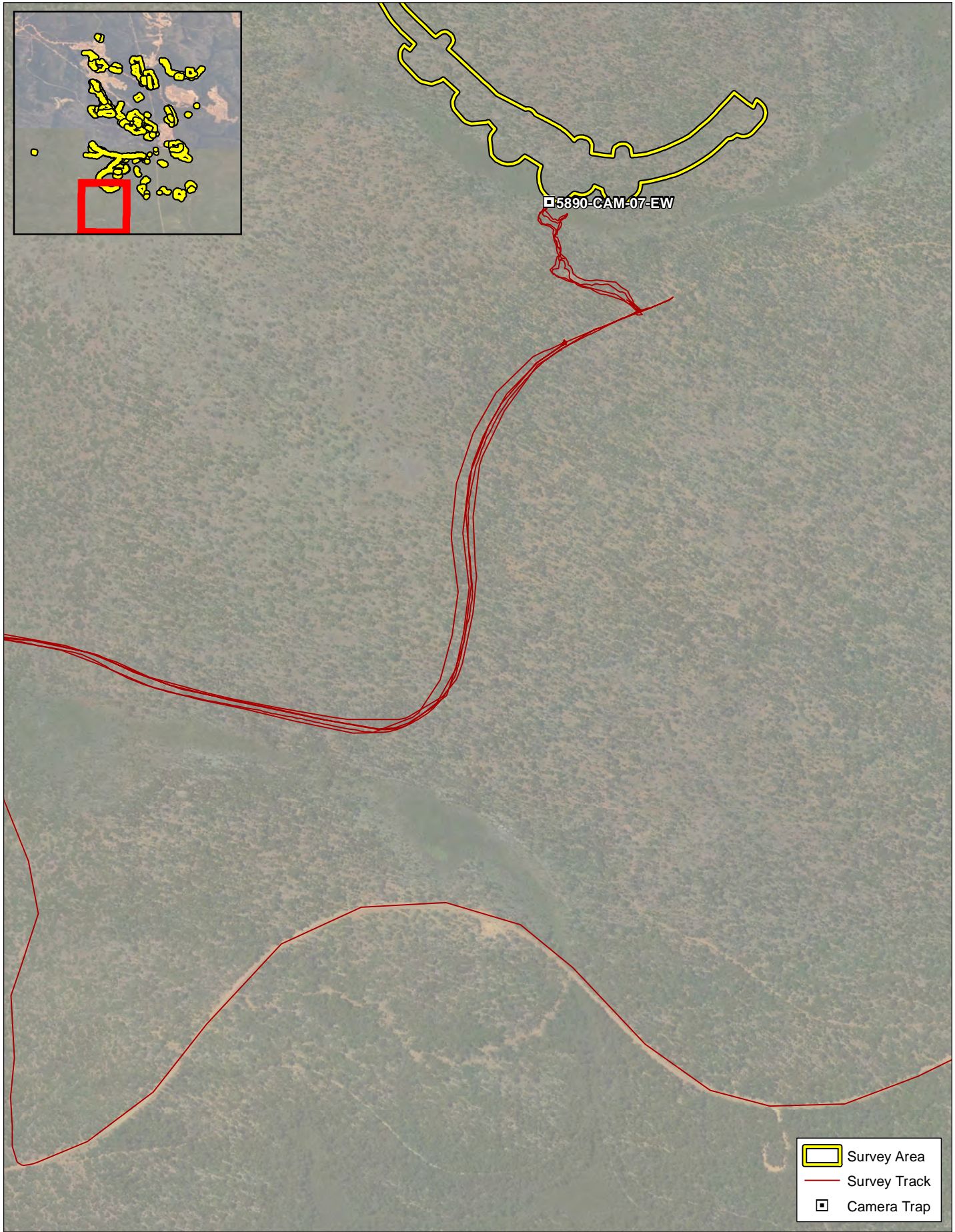





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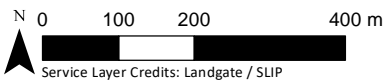
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 Larego Region

Survey Effort  
 MAP 7-11

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-  Survey Area
-  Survey Track
-  Camera Trap



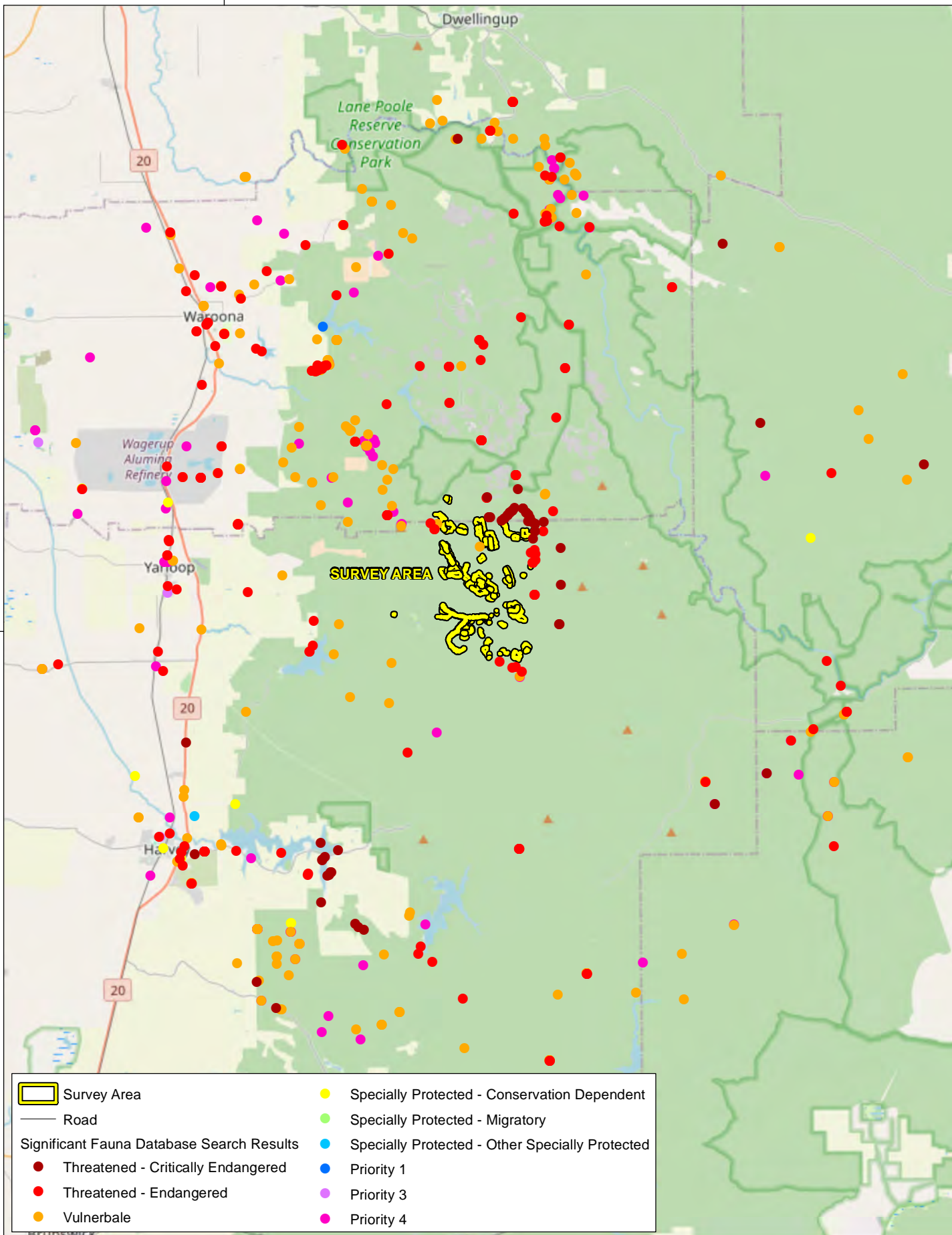
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 Woylie Surveys Willowdale Mine  
 Larego Region

**Survey Effort**  
**MAP 7-12**

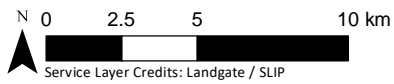
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- |  |   |
|--|---|
| Survey Area                                      | Specially Protected - Conservation Dependent    |
| Road   | Specially Protected - Migratory                 |
| <b>Significant Fauna Database Search Results</b> | Specially Protected - Other Specially Protected |
| Threatened - Critically Endangered               | Priority 1                                      |
| Threatened - Endangered                          | Priority 3                                      |
| Vulnerable                                       | Priority 4                                      |



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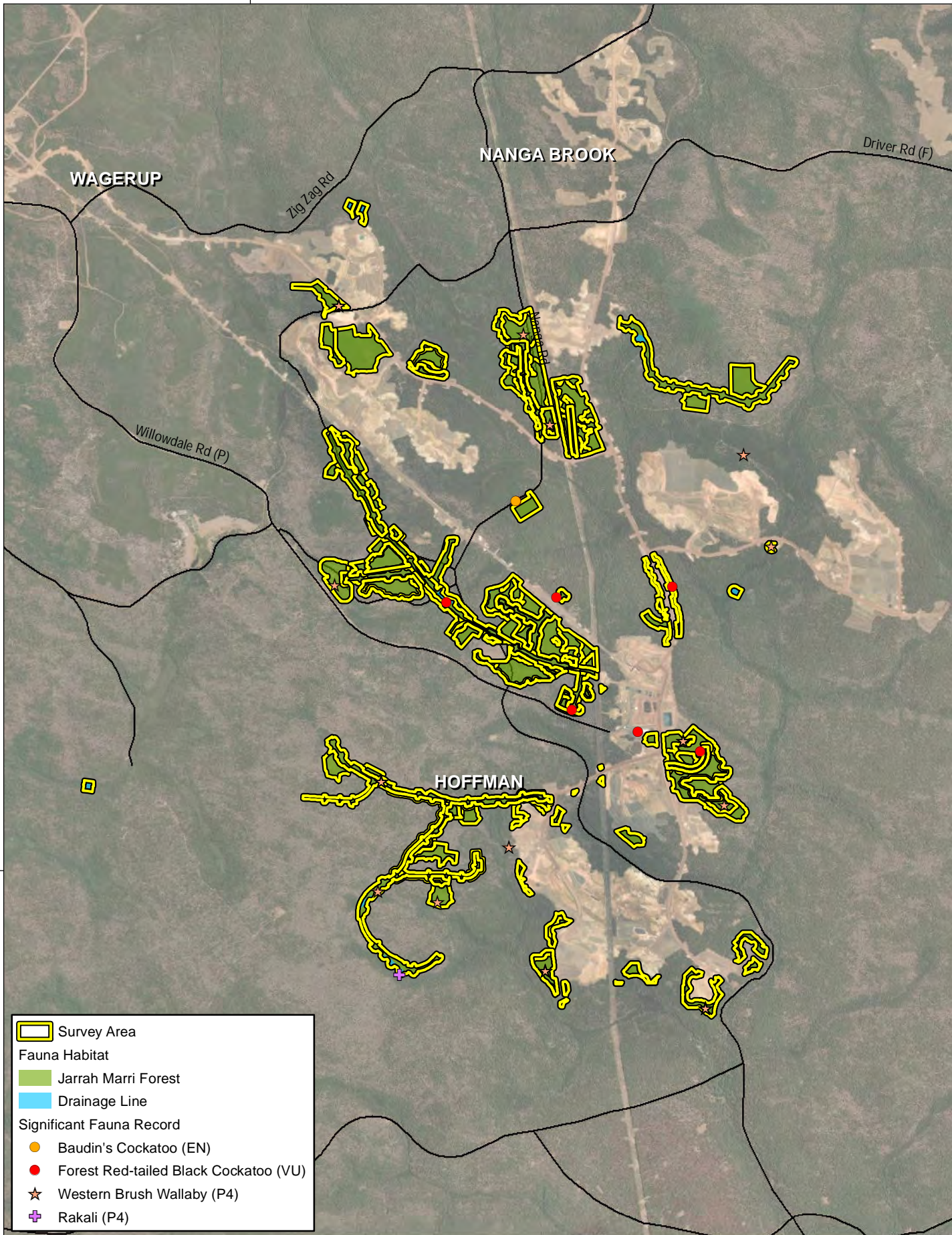


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 Larego Region

Significant Fauna Database Search Results  
 MAP 8

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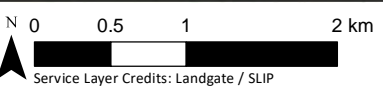
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**Legend**

- Survey Area
- Fauna Habitat**
- Jarrah Marri Forest
- Drainage Line
- Significant Fauna Record**
- Baudin's Cockatoo (EN)
- Forest Red-tailed Black Cockatoo (VU)
- ★ Western Brush Wallaby (P4)
- + Rakali (P4)

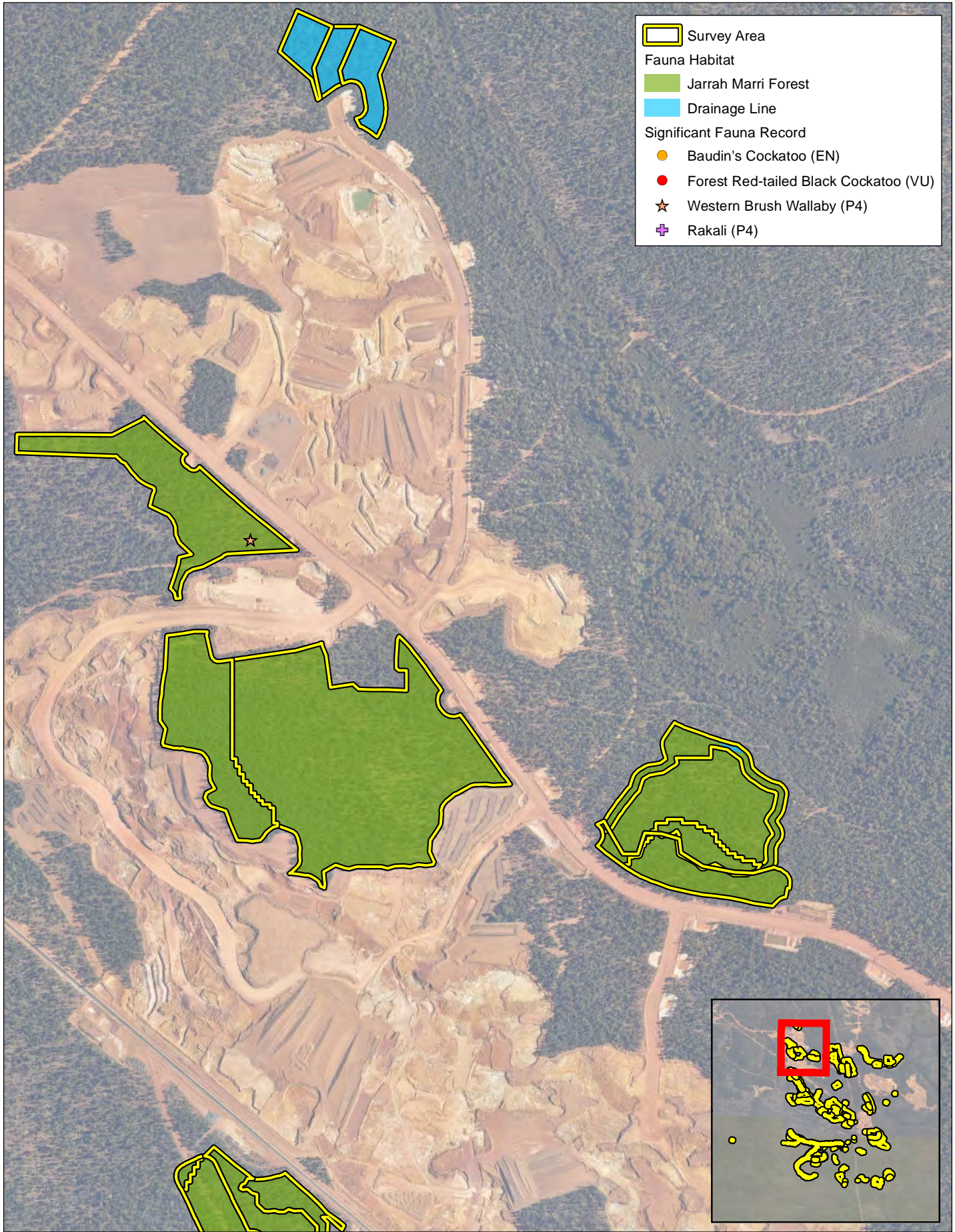


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 Reviewed By : PD

Alcoa  
 Targeted Chuditch, Quokka, and  
 Woylie Surveys Willowdale Mine  
 Larego Region  
 Fauna Habitat and  
 Significant Fauna Records  
**MAP 9-1**

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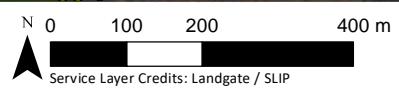


**Legend**

- Survey Area
- Fauna Habitat**
  - Jarrah Marri Forest
  - Drainage Line
- Significant Fauna Record**
  - Baudin's Cockatoo (EN)
  - Forest Red-tailed Black Cockatoo (VU)
  - ★ Western Brush Wallaby (P4)
  - + Rakali (P4)



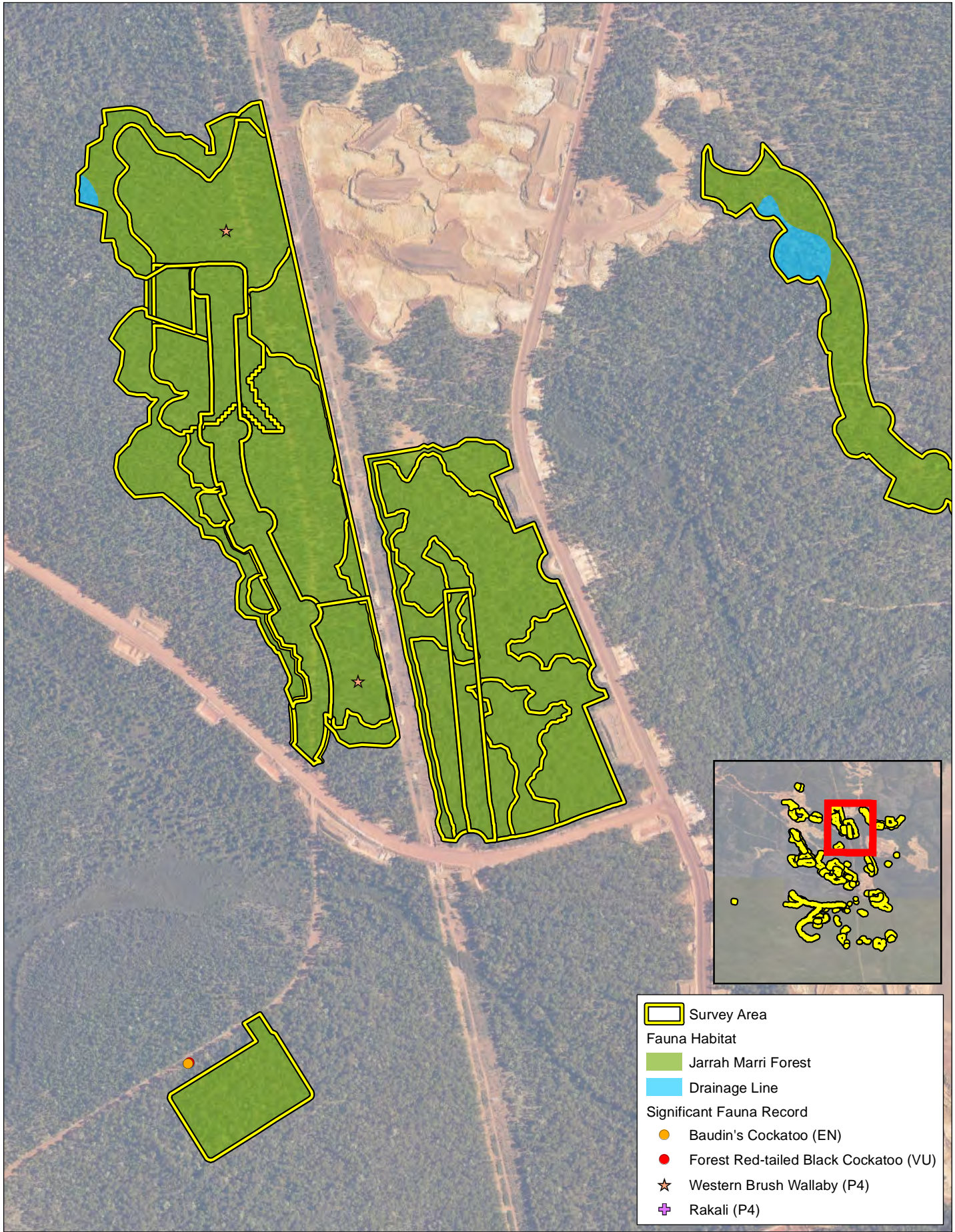
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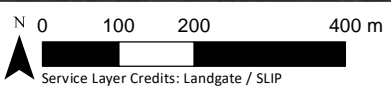
Alcoa  
 Targeted Chuditch, Quokka, and  
 Woylie Surveys Willowdale Mine  
 Larego Region  
 Fauna Habitat and  
 Significant Fauna Records  
 MAP 9-2

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**Legend**

- Survey Area
- Fauna Habitat**
- Jarrah Marri Forest
- Drainage Line
- Significant Fauna Record**
- Baudin's Cockatoo (EN)
- Forest Red-tailed Black Cockatoo (VU)
- Western Brush Wallaby (P4)
- Rakali (P4)



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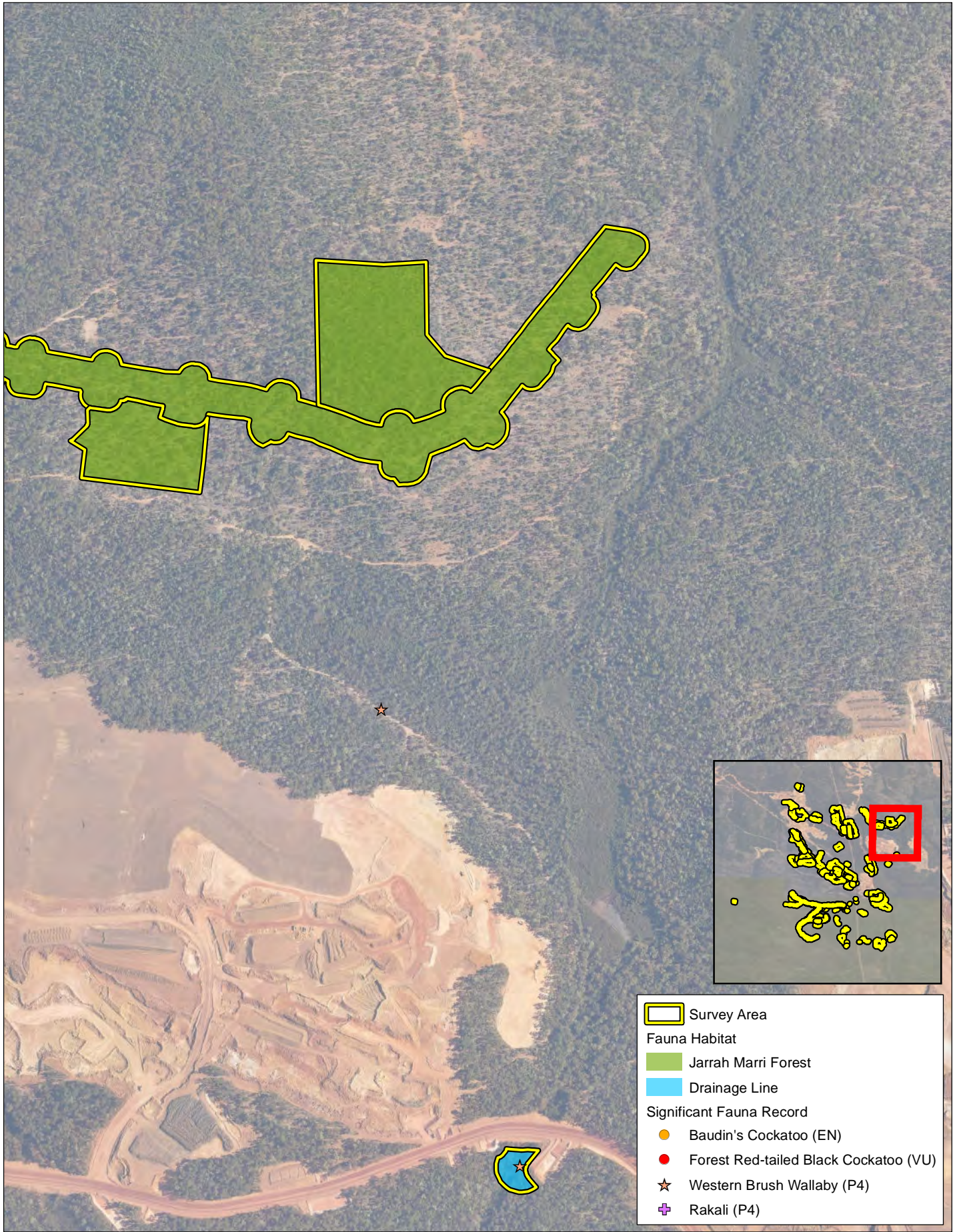
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 Drawn By : Environmaps  
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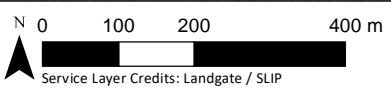
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 Larego Region  
 Fauna Habitat and  
 Significant Fauna Records  
 MAP 9-3

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- Survey Area
- Fauna Habitat**
- Jarrah Marri Forest
- Drainage Line
- Significant Fauna Record**
- Baudin's Cockatoo (EN)
- Forest Red-tailed Black Cockatoo (VU)
- Western Brush Wallaby (P4)
- Rakali (P4)



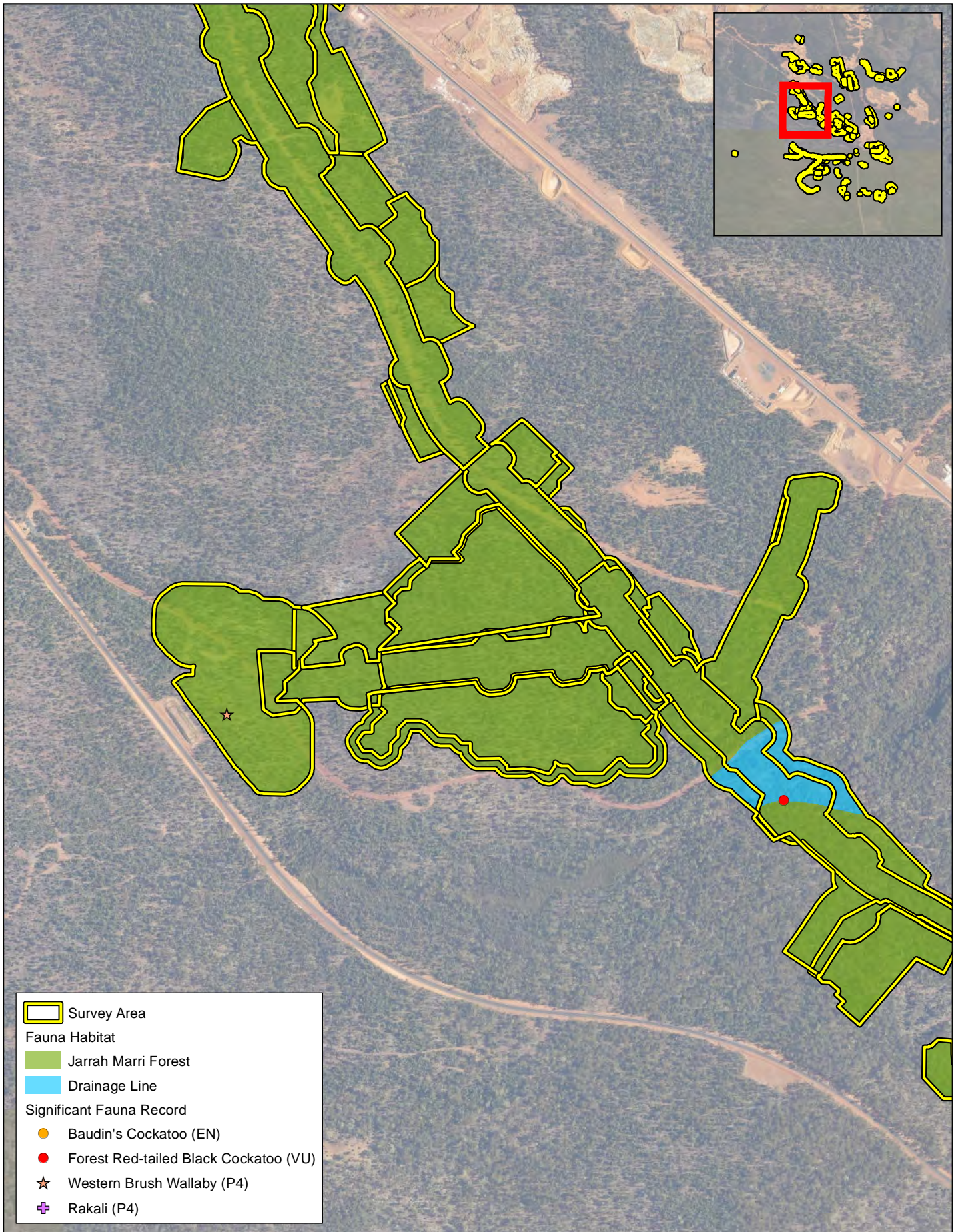
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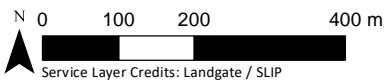
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Alcoa  
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 Woylie Surveys Willowdale Mine  
 Larego Region  
 Fauna Habitat and  
 Significant Fauna Records  
 MAP 9-4

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	Survey Area
<b>Fauna Habitat</b>	
	Jarrah Marri Forest
	Drainage Line
<b>Significant Fauna Record</b>	
	Baudin's Cockatoo (EN)
	Forest Red-tailed Black Cockatoo (VU)
	Western Brush Wallaby (P4)
	Rakali (P4)

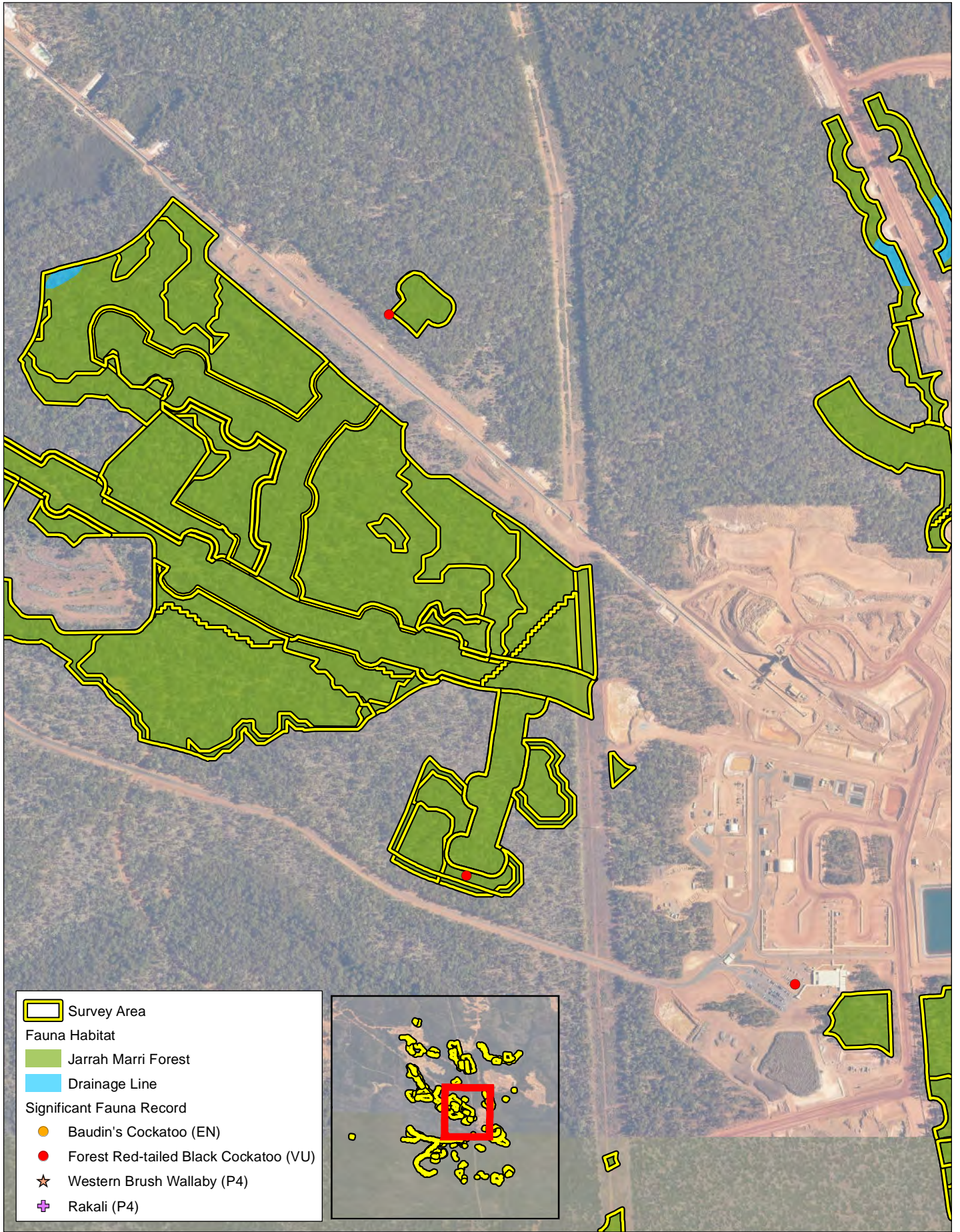


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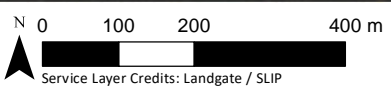
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 Project Number : 675.VX5890.00001  
 Date Drawn : 7/06/2024  
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 Reviewed By : PD

Alcoa  
 Targeted Chuditch, Quokka, and  
 Woylie Surveys Willowdale Mine  
 Larego Region  
 Fauna Habitat and  
 Significant Fauna Records  
 MAP 9-5

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- Survey Area
- Fauna Habitat**
- Jarrah Marri Forest
- Drainage Line
- Significant Fauna Record**
- Baudin's Cockatoo (EN)
- Forest Red-tailed Black Cockatoo (VU)
- Western Brush Wallaby (P4)
- Rakali (P4)

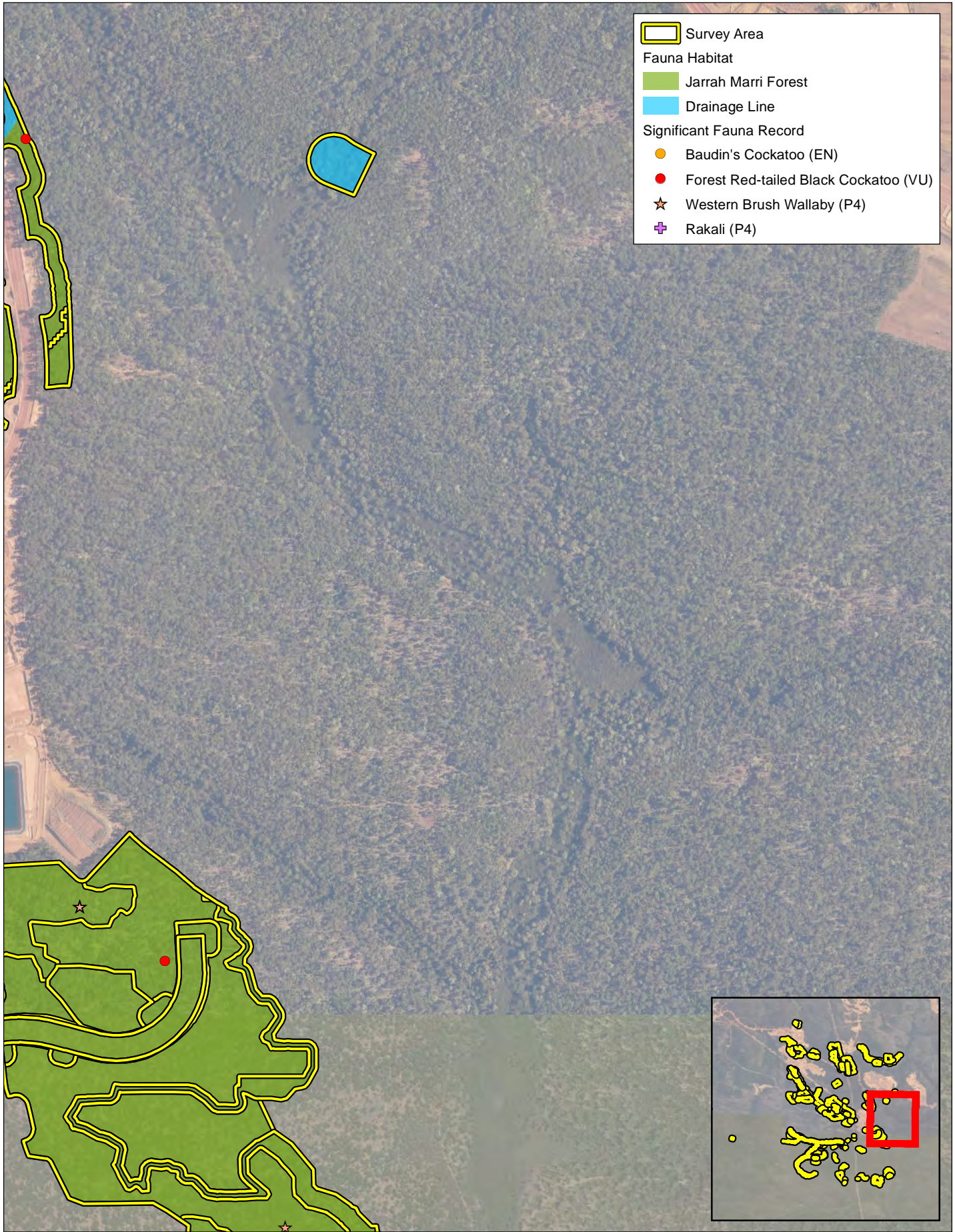


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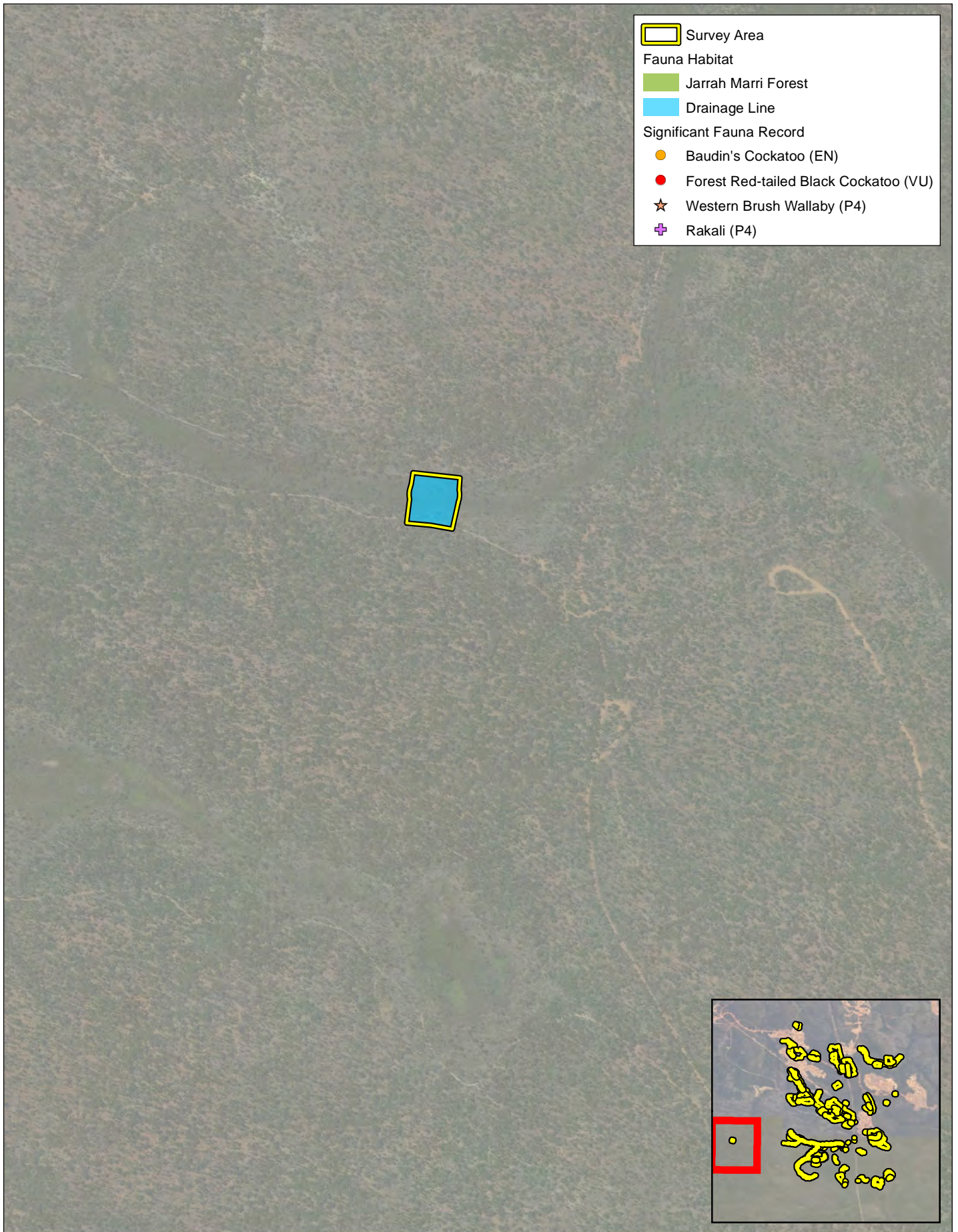
Alcoa  
 Targeted Chuditch, Quokka, and  
 Woylie Surveys Willowdale Mine  
 Larego Region  
 Fauna Habitat and  
 Significant Fauna Records  
 MAP 9-6

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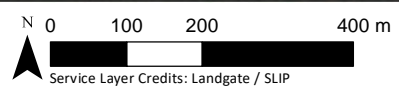


**Legend**

- Survey Area
- Fauna Habitat**
- Jarrah Marri Forest
- Drainage Line
- Significant Fauna Record**
- Baudin's Cockatoo (EN)
- Forest Red-tailed Black Cockatoo (VU)
- ★ Western Brush Wallaby (P4)
- + Rakali (P4)



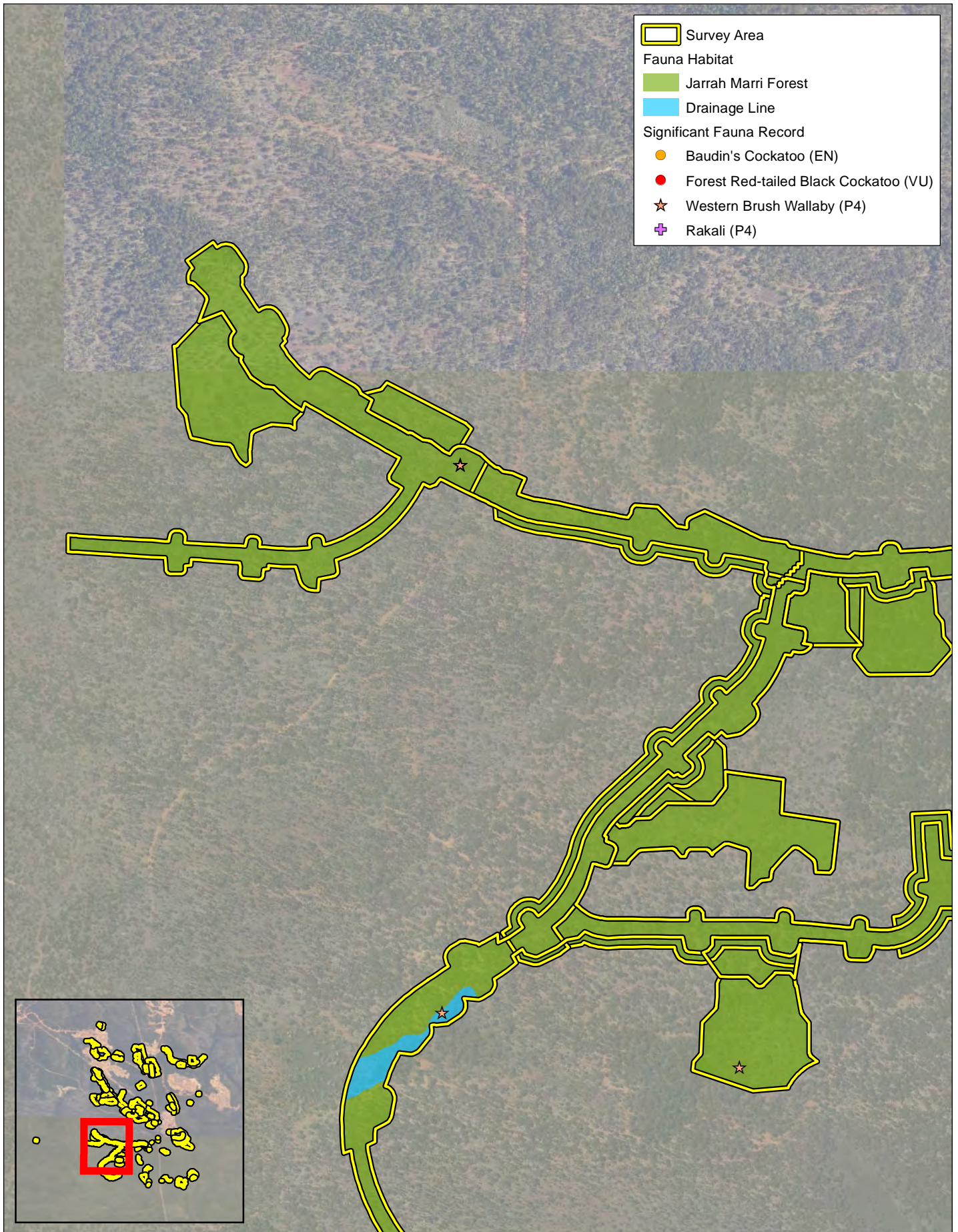
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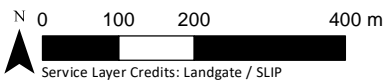
Alcoa  
 Targeted Chuditch, Quokka, and  
 Woylie Surveys Willowdale Mine  
 Larego Region  
 Fauna Habitat and  
 Significant Fauna Records  
 MAP 9-8

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**Legend**

- Survey Area
- Fauna Habitat**
- Jarrah Marri Forest
- Drainage Line
- Significant Fauna Record**
- Baudin's Cockatoo (EN)
- Forest Red-tailed Black Cockatoo (VU)
- ★ Western Brush Wallaby (P4)
- + Rakali (P4)



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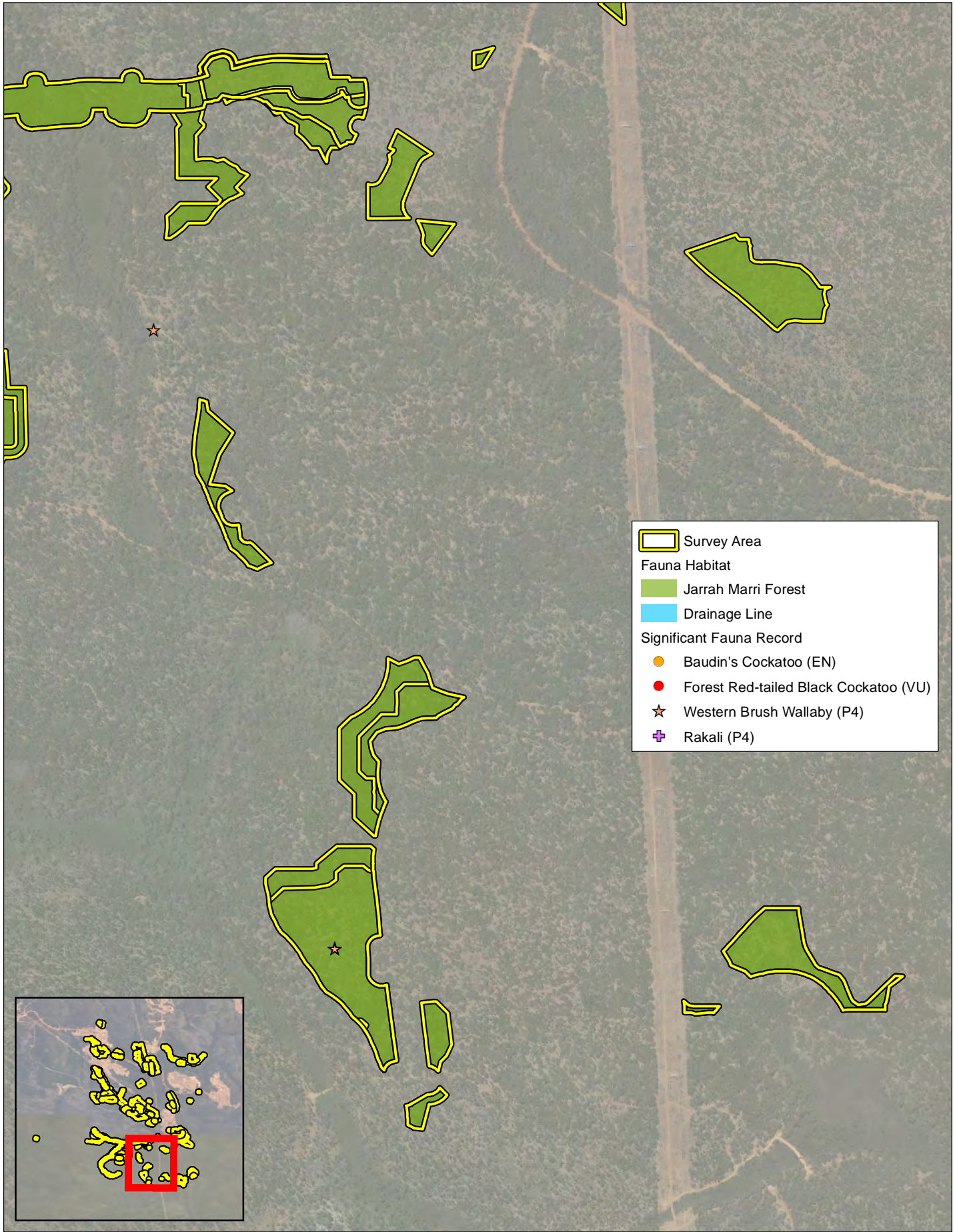
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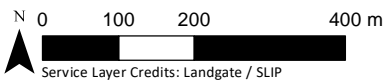
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 Woylie Surveys Willowdale Mine  
 Larego Region  
 Fauna Habitat and  
 Significant Fauna Records  
 MAP 9-9

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	Survey Area
<b>Fauna Habitat</b>	
	Jarrah Marri Forest
	Drainage Line
<b>Significant Fauna Record</b>	
	Baudin's Cockatoo (EN)
	Forest Red-tailed Black Cockatoo (VU)
	Western Brush Wallaby (P4)
	Rakali (P4)

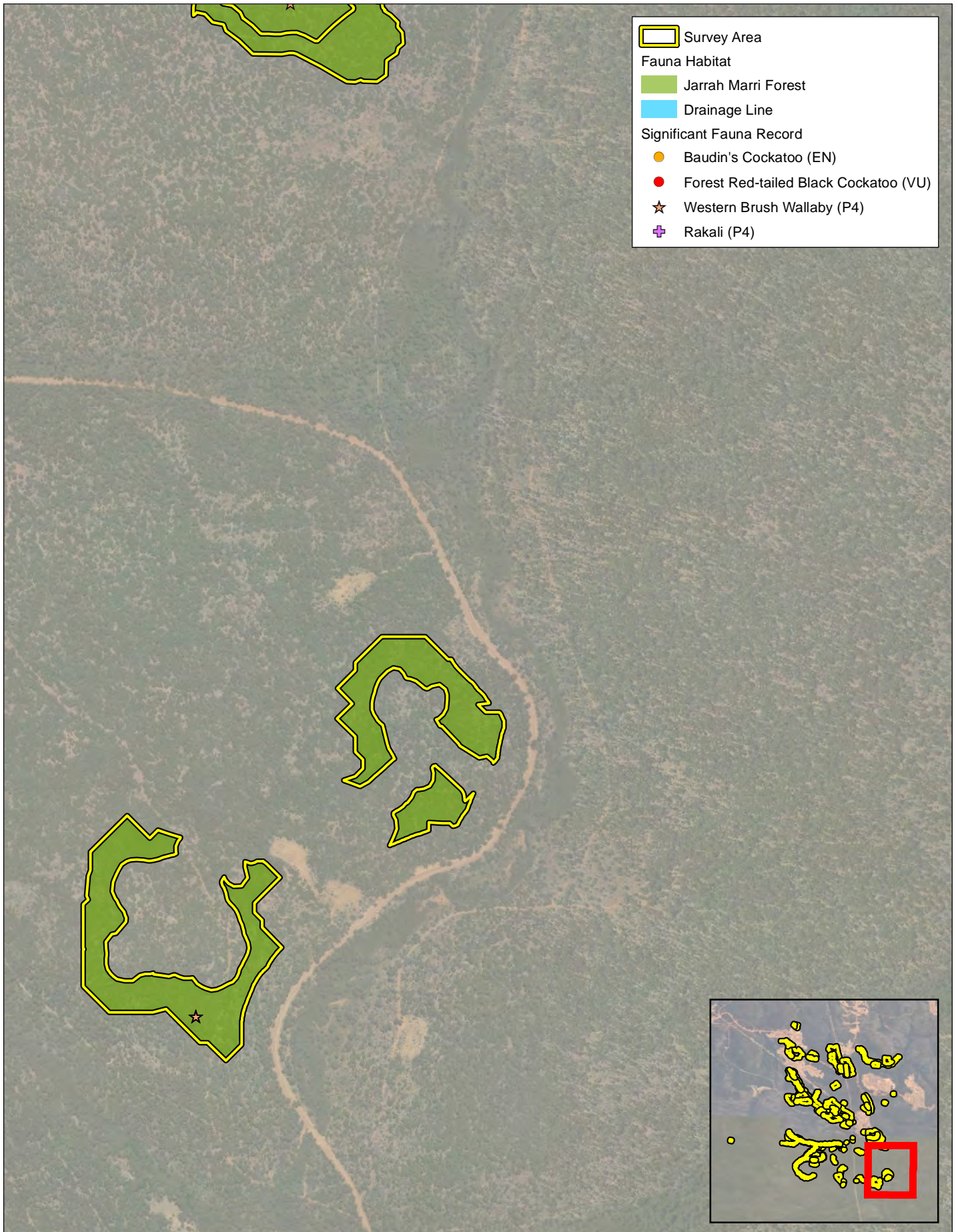


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Alcoa  
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Woylie Surveys Willowdale Mine  
Larego Region  
Fauna Habitat and  
Significant Fauna Records  
MAP 9-10

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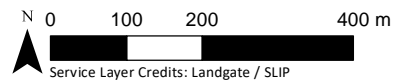


**Legend**

- Survey Area
- Fauna Habitat**
- Jarrah Marri Forest
- Drainage Line
- Significant Fauna Record**
- Baudin's Cockatoo (EN)
- Forest Red-tailed Black Cockatoo (VU)
- ★ Western Brush Wallaby (P4)
- + Rakali (P4)



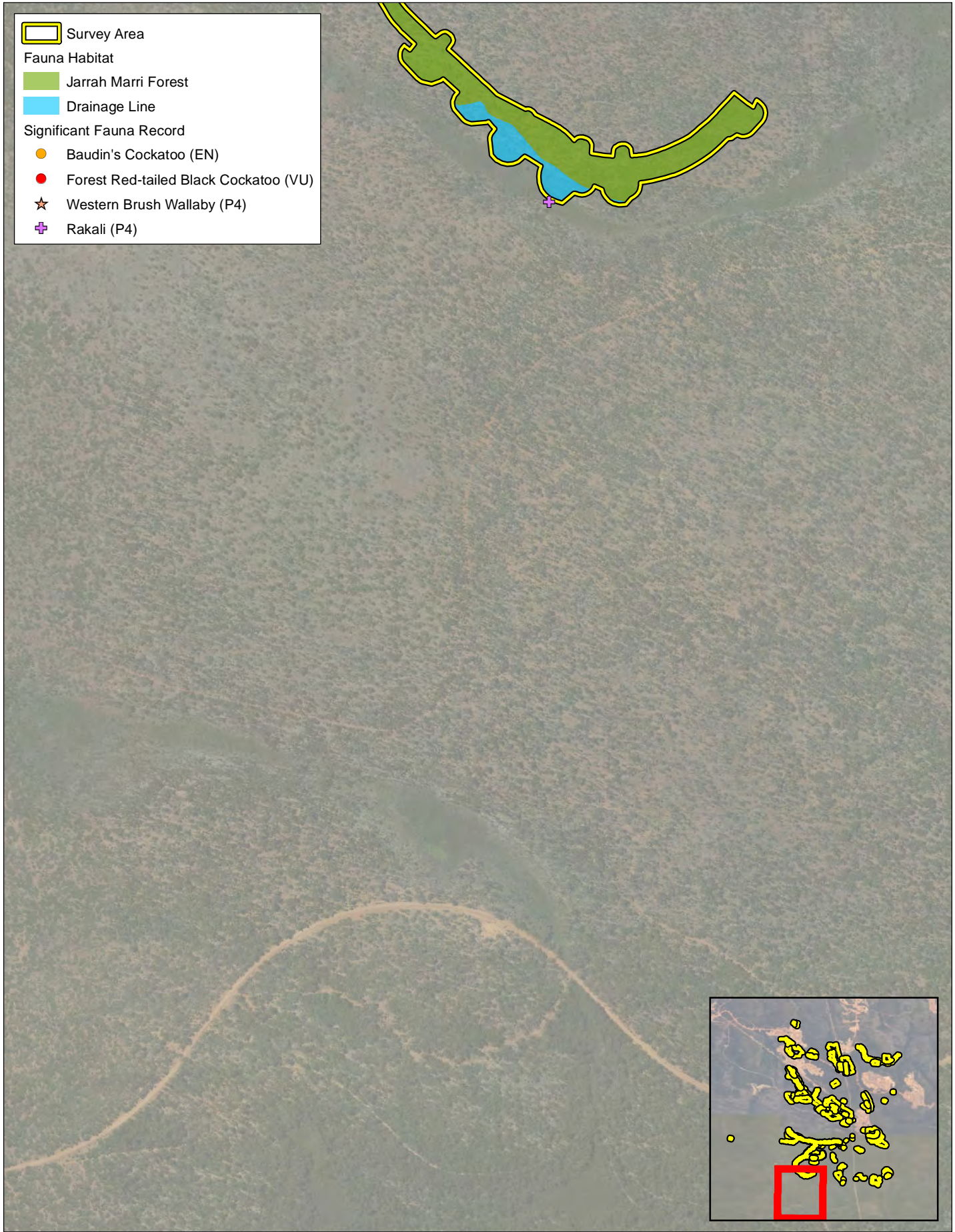
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 Targeted Chuditch, Quokka, and  
 Woylie Surveys Willowdale Mine  
 Larego Region  
 Fauna Habitat and  
 Significant Fauna Records  
**MAP 9-11**

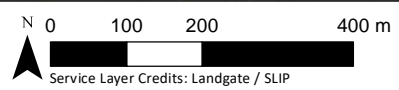
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- Survey Area
- Fauna Habitat**
- Jarrah Marri Forest
- Drainage Line
- Significant Fauna Record**
- Baudin's Cockatoo (EN)
- Forest Red-tailed Black Cockatoo (VU)
- Western Brush Wallaby (P4)
- Rakali (P4)



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Alcoa  
 Targeted Chuditch, Quokka, and  
 Woylie Surveys Willowdale Mine  
 Larego Region  
 Fauna Habitat and  
 Significant Fauna Records  
 MAP 9-12



# **Appendix B Literature Review Summary**

## **Targeted Chuditch, Quokka, and Woylie Survey**

**Willowdale Mine – Larego Region**

**Alcoa of Australia Ltd**

SLR Project No.: 675.VX5890.00001

17 June 2024

ID	Report	Survey location	Survey timing	Survey type	Significant fauna recorded during the survey	Fauna habitats recorded during the survey
Lit A	<i>Fauna Assessment Pinjarra - Williams Road (SLK 14 – 67)</i> (Harewood, 2017)	14 km north of the Survey Area	August 2011	Basic Fauna Assessment and Black Cockatoo Habitat Assessment	<ul style="list-style-type: none"> <li>• Baudin's Cockatoo (<i>Zanda baudinii</i>) – Listed as Endangered under the BC Act and EPBC Act</li> <li>• Carnaby's Cockatoo (<i>Zanda laltrostris</i>) - Listed as Endangered under the BC Act and EPBC Act</li> <li>• Forest Red-tailed Cockatoo (<i>Calyptorhynchus banksii naso</i>) – Listed at Vulnerable under the BC Act and EPBC Act</li> <li>• Western Brush Wallaby (<i>Notamacropus irma</i>) - Listed as Priority 4 by the DBCA</li> </ul>	<p>Four fauna habitats were identified:</p> <ul style="list-style-type: none"> <li>• Remnant native vegetation</li> <li>• Plantations</li> <li>• Existing cleared areas</li> <li>• River and ephemeral streams</li> </ul>
Lit B	<i>Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment for Huntly Mine - Holyoake</i> (GHD, 2021a)	18 km north of the Survey Area	August 2021	Targeted Forest Red-tailed Black Cockatoo, Carnaby's Cockatoo, Baudin's Cockatoo, Chuditch, Quokka, Carters's Freshwater Mussel, and other Priority species	<ul style="list-style-type: none"> <li>• Baudin's Cockatoo (<i>Zanda baudinii</i>) – Listed as Endangered under the BC Act and EPBC Act</li> <li>• Carnaby's Cockatoo (<i>Zanda laltrostris</i>) - Listed as Endangered under the BC Act and EPBC Act</li> <li>• Forest Red-tailed Cockatoo (<i>Calyptorhynchus banksii naso</i>) – Listed at Vulnerable under the BC Act and EPBC Act</li> </ul>	<p>Seven fauna habitats were identified:</p> <ul style="list-style-type: none"> <li>• Bullich forest</li> <li>• Granite outcrop</li> <li>• Blackbutt forest</li> <li>• Flooded Gum woodland</li> <li>• Jarrah-Marri forest</li> <li>• Mine rehabilitation</li> <li>• Pine plantation</li> </ul>

ID	Report	Survey location	Survey timing	Survey type	Significant fauna recorded during the survey	Fauna habitats recorded during the survey
					<ul style="list-style-type: none"> <li>• Quokka (<i>Setonix brachyurus</i>) – Listed as Vulnerable under the BC Act and EPBC Act</li> <li>• Chuditch (<i>Dasyurus geoffroii fortis</i>) - Listed at Vulnerable under the BC Act and EPBC Act</li> <li>• Peregrine Falcon (<i>Falco peregrinus</i>) – Listed as Special Protection under the BC Act</li> <li>• Brush-tailed Phascogale (<i>Phascogale tapoatafa wambenger</i>) – Listed as Conservation Dependent By DBCA</li> <li>• Western False Pipistrelle (<i>Falsistrellus mackenziei</i>) - Listed as Priority 3 by the DBCA</li> <li>• Quenda (<i>Isodon fusciventer</i>) - Listed as Priority 4 by the DBCA</li> <li>• Western Brush Wallaby (<i>Notamacropus irma</i>) - Listed as Priority 4 by the DBCA</li> </ul>	
Lit C	<i>Black Cockatoo Habitat Assessment – Pinjarra Racecourse</i> (Harewood, 2019)	30 km north of the	2019	Targeted Black Cockatoo Habitat Assessment	<ul style="list-style-type: none"> <li>• Forest Red-tailed Cockatoo (<i>Calyptorhynchus banksii naso</i>) – Listed at</li> </ul>	No fauna habitats were identified. However, 34 habitat trees consisting of Flooded Gum, Tuart,

ID	Report	Survey location	Survey timing	Survey type	Significant fauna recorded during the survey	Fauna habitats recorded during the survey
		Survey Area			Vulnerable under the BC Act and EPBC Act	Marri and introduces eucalypts were identified.
Lit D	<i>Chuditch Pre-mine Survey, Myara</i> (Way, 2013)	43 km north of the Survey Area	March – April 2013	Targeted Chuditch Survey	<ul style="list-style-type: none"> <li>• Chuditch (<i>Dasyurus geoffroii fortis</i>) - Listed at Vulnerable under the BC Act and EPBC Act</li> </ul>	Two fauna habitats were identified: <ul style="list-style-type: none"> <li>• Jarrah forest</li> <li>• Drainage line</li> </ul>
Lit E	<i>Vertebrate Fauna Survey of Planned Mining Areas at Alcoa's Willowdale Larego Mining Region</i> (Environmental Management and Research Consultants, 2006)	43 km north of the Survey Area	1996-2006	Long Term Fauna Monitoring Program	<ul style="list-style-type: none"> <li>• Baudin's Cockatoo (<i>Zanda baudinii</i>) – Listed as Endangered under the BC Act and EPBC Act</li> <li>• Noisy Scrubbird (<i>Atrichornis clamosus</i>) – Listed as Endangered under the BC Act and EPBC Act</li> <li>• Quokka (<i>Setonix brachyurus</i>) – Listed as Vulnerable under the BC Act and EPBC Act</li> </ul>	No fauna habitats were recorded.
Lit F	<i>Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment for Huntly Mine - Myara North</i> (GHD, 2021b)	54 km north of Survey Area	August 2021	Targeted Forest Red-tailed Black Cockatoo, Carnaby's Cockatoo, Baudin's Cockatoo, Chuditch, Quokka, and other Priority species	<ul style="list-style-type: none"> <li>• Baudin's Cockatoo (<i>Zanda baudinii</i>) – Listed as Endangered under the BC Act and EPBC Act</li> <li>• Carnaby's Cockatoo (<i>Zanda laltrostris</i>) - Listed as Endangered under the BC Act and EPBC Act</li> <li>• Forest Red-tailed Cockatoo (<i>Calyptorhynchus banksii naso</i>) – Listed at</li> </ul>	Eight fauna habitats were identified: <ul style="list-style-type: none"> <li>• Jarrah-Marri forest</li> <li>• Bullich forest</li> <li>• Granite outcrop</li> <li>• Blackbutt forest</li> <li>• Flooded Gum woodland</li> <li>• Melaleuca dampland</li> <li>• Mine rehabilitation</li> <li>• Pine plantation</li> </ul>

ID	Report	Survey location	Survey timing	Survey type	Significant fauna recorded during the survey	Fauna habitats recorded during the survey
					<p>Vulnerable under the BC Act and EPBC Act</p> <ul style="list-style-type: none"> <li>• Quokka (<i>Setonix brachyurus</i>) – Listed as Vulnerable under the BC Act and EPBC Act</li> <li>• Chuditch (<i>Dasyurus geoffroii fortis</i>) - Listed at Vulnerable under the BC Act and EPBC Act</li> <li>• Peregrine Falcon (<i>Falco peregrinus</i>) – Listed as Special Protection under the BC Act</li> <li>• Brush-tailed Phascogale (<i>Phascogale tapoatafa wambenger</i>) – Listed as Conservation Dependent By DBCA</li> <li>• Masked Owl Southwest (<i>Tyto novaehollandiae</i>) – Listed as Priority 3 by the DBCA</li> <li>• Southern Death Adder (<i>Acanthophis antarcticus</i>) – Listed as Priority 3 by the DBCA</li> <li>• Rakali (<i>Hydromys chrysogaster</i>) – Listed as Priority 4 by the DBCA</li> </ul>	

ID	Report	Survey location	Survey timing	Survey type	Significant fauna recorded during the survey	Fauna habitats recorded during the survey
					<ul style="list-style-type: none"> <li>• Quenda (<i>Isoodon fusciventer</i>) - Listed as Priority 4 by the DBCA</li> <li>• Western Brush Wallaby (<i>Notamacropus irma</i>) - Listed as Priority 4 by the DBCA</li> <li>• Western False Pipistrelle (<i>Falsistrellus mackenziei</i>) - Listed as Priority 3 by the DBCA</li> </ul>	
Lit G	<p><i>Report for Rail Reserves in the Shire of Serpentine Jarrahdale - Spring Flora and Vegetation Survey and Fauna and Habitat Assessment</i> (GHD, 2012)</p>	60 km north of the Survey Area	November, 2011	Level 1 Fauna and Habitat Assessment	<ul style="list-style-type: none"> <li>• Forest Red-tailed Cockatoo (<i>Calyptorhynchus banksii naso</i>) – Listed at Vulnerable under the BC Act and EPBC Act</li> <li>• Baudin’s Cockatoo (<i>Zanda baudinii</i>) – Listed as Endangered under the BC Act and EPBC Act</li> <li>• Western Brush Wallaby (<i>Notamacropus irma</i>) - Listed as Priority 4 by the DBCA</li> <li>• Quenda (<i>Isoodon fusciventer</i>) - Listed as Priority 4 by the DBCA</li> <li>• Letter-winged kite (<i>Elanus scriptus</i>) – Listed as Priority 4 the DBCA</li> </ul>	<p>Five fauna habitats were identified:</p> <ul style="list-style-type: none"> <li>• Melaleuca wetlands</li> <li>• Swampland</li> <li>• Jarrah/Marri forest</li> <li>• <i>Banksia/Allocasuarina</i> woodlands</li> <li>• Dense shrublands on clay flats</li> </ul>



# Appendix C Licences and Permits

## Targeted Chuditch, Quokka, and Woylie Survey

Willowdale Mine – Larego Region

Alcoa of Australia Ltd

SLR Project No.: 675.VX5890.00001

17 June 2024



**Wildlife Conservation Act 1950**  
**REGULATION 17**

**Fauna taking (scientific or other purposes) licence (Fauna taking (scientific or other purposes) licence)**

**The undermentioned person may take fauna for research or other scientific purposes and where authorised, keep it in captivity, subject to the following and attached conditions, which may be added to, suspended or otherwise varied as considered fit.**

**Director General**

**Conditions**

- 1 The licensee must comply with the provisions of the Wildlife Conservation Act 1950, Wildlife Conservation Regulations 1970 and any Notices in force under this legislation.
- 2 The licensee shall take fauna only in the manner stated on the endorsed Regulation 17 licence application form and endorsed related correspondence.
- 3 Unless specifically authorised in the conditions of this Licence or otherwise in writing by the Director General, species of fauna declared as likely to become extinct, rare or otherwise in need of special protection shall not be taken.
- 4 Any by-catch of fauna, which is declared to be rare, likely to become extinct, or otherwise in need of special protection shall be released immediately at the point of capture. Where such fauna taken under this licence is injured or deceased, the licensee shall contact the Department's Wildlife Licensing Section for advice on disposal. Records must be kept of any such fauna so captured and details are to be included in the report required under further condition below.
- 5 Any interaction involving Gazetted Threatened Fauna that may be harmful to the fauna and/or invasive may require approval from the Commonwealth Department of the Environment ph 02 6274 1111. Interaction with such species is controlled by the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 and Environment Protection and Biodiversity Conservation Regulations 2000 as well as the Wildlife Conservation Act 1950 and Wildlife Conservation Regulations 1970.
- 6 No fauna shall be taken in areas where it would impinge on pre-existing scientific research programs.
- 7 Except in the case of approved lethal traps, the licensee shall ensure that measures are taken in the capture and handling of fauna to prevent injury or mortality resulting from that capture or handling. Where traps or other mechanical means or devices are used to capture fauna these shall be deployed so as to prevent exposure of trapped animals to ants and debilitating weather conditions and inspected at regular intervals throughout each day of their use. At the conclusion of research all markers used, and signs and structures erected by the licensee shall be removed and the environment returned to its original condition.
- 8 Not more than ten specimens of any one protected species of fauna shall be taken and removed from any location less than 20km apart. Where exceptional circumstances make it necessary to take a larger number of specimens from a particular location in order to obtain adequate statistical data, the collector must proceed with circumspection and justify their actions to the Director General in advance.
- 9 The licensee shall not release any fauna or their progeny in any area where it does not naturally occur, nor hand such fauna over to any other person or authority unless approved by the Director General, nor dispose of the remains of such fauna in any manner likely to confuse the natural or present day distribution of the species.
- 10 Bioprospecting involving the removal of sample aquatic and terrestrial organisms for chemical extraction and bioactivity screening shall not be conducted without specific written approval by the Director General.
- 11 No fauna is to be taken from any CALM land, as defined in the Conservation and Land Management Regulations 2002, without prior written approval of the Director General. No fauna is to be taken from any public land without the prior written approval of the Government Authority managing that land.
- 12 The licensee must not enter upon any private property or pastoral lease for the purposes of this licence, nor take any fauna from any private land or pastoral lease without the prior consent in writing of the owner or occupier. Similarly, in the case of Aboriginal lands, the licensee must not enter upon or take fauna from such lands without the written approval of the Department of Aboriginal Affairs and/or the relevant native title holders or applicants.
- 13 Copies of this licence and any written approval or consent required by conditions of this licence must be carried by the licensee and any person/s authorised under the licence at all times when conducting activities relevant to the licence

# DEPARTMENT OF PARKS AND WILDLIFE



Department of  
Parks and Wildlife



Enquiries: 17 DICK PERRY AVE, KENSINGTON, WESTERN AUSTRALIA  
Telephone: 08 9219 9000  
Facsimile: 08 9219 8242  
Web Site: <https://wildlifelicensing.dpaw.wa.gov.au>  
Correspondance: **Locked Bag 30**  
**Bentley Delivery Centre WA 6983**

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**NO.** 08-005511-1

and must be presented to an authorised officer of the Department upon request.

- 14 All holotypes and syntypes and a half share of paratypes of species or subspecies permitted to be permanently taken under this licence shall be donated to the Western Australian Museum. Duplicates (one pair in each case) of any species collected, which represents a significant extension of geographic range shall upon request be donated to the Western Australian Museum.
- 15 To prevent any unnecessary collecting in this State, all specimens and material taken and retained under the authority of this license shall, upon request, be loaned to the Western Australian Museum. Any unused portion or portions of any specimen collected under the authority of this license shall be offered to the Western Australian Museum for inclusion in its collection or made available to other scientific workers if so required.
- 16 Within one month of the expiration of this licence, the holder shall submit an electronic return into the department's Wildlife Licensing System, detailing the locality, site, geocode, date and number of each species of fauna captured, sighted or vouchered during the currency of the licence. A copy of any paper, report or thesis resulting from the research shall upon completion be lodged with the Director General.

## Purpose

TFA 2324-0024 & BA27000875

## Authorised Person

Surname	Given name(s)
Walker	Christina
Crossley	Lachlan
Girando	Simon
Geidans	Lukas
Li	Yanlin
Berry	Lewis
Lohr	Michael
Hickling	Alex
Fintan	Angel
Constanza	Lutz
Hill	Chloe

**Date of Issue** 10/07/2023  
**Valid From** 10/07/2023  
**Date of Expiry** 10/07/2023

**Licensee:** Mr Evan Nicholas Webb  
**Address** PO Box 14  
West Perth WA 6872  
Australia

Issued by a Wildlife Licensing Officer of the Department of Parks and Wildlife under delegation from the Minister for Environment pursuant to section 133(1) of the Conservation and Land Management Act 1984.



# Appendix D Fauna Desktop Assessment Results

## Targeted Chuditch, Quokka, and Woylie Survey

Willowdale Mine – Larego Region

Alcoa of Australia Ltd

SLR Project No.: 675.VX5890.00001

17 June 2024

**Conservation Status:**

State - Listed under Biodiversity Conservation Act 2016 or Department of Biodiversity, Conservation and Attractions Conservation,

Commonwealth - Listed under Environmental Protection and Biodiversity Conservation Act 1999.

CR - Critically Endangered, EN - Endangered, VU - Vulnerable, MI - Migratory, CD - Conservation Dependent fauna, OS - Other Specially Protected fauna, MA - Marine, P - Listed as Priority by DBCA.

**Database:**

NM - NatureMap, PMST - EPBC Protected Matters Search Tool, DBCA - DBCA Threatened and Priority Fauna database search, Field - Recorded during the current field survey.

**Literature:**

A - *Fauna Assessment Pinjarra - Williams Road (SLK 14 – 67)* (Harewood, 2017)

B - *Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment for Huntly Mine - Holyoake* (GHD, 2021a)

C - *Black Cockatoo Habitat Assessment – Pinjarra Racecourse* (Harewood, 2019)

D - *Chuditch Pre-mine Survey, Myara* (Way, 2013)

E - *Vertebrate Fauna Survey of Planned Mining Areas at Alcoa's Willowdale Larego Mining Region* (Environmental Management and Research Consultants, 2006)

F - *Terrestrial Fauna Survey and Black Cockatoo Habitat Assessment for Huntly Mine - Holyoake* (GHD, 2021a)

G - *Report for Rail Reserves in the Shire of Serpentine Jarrahdale - Spring Flora and Vegetation Survey and Fauna and Habitat Assessment* (GHD, 2012)

Family	Scientific name	Common name	Conservation status		Database			Field	Literature														
			State	Common wealth	NM	PMST	DBCA		A	B	C	D	E	F	G								
<b>Amphibia</b>																							
Limnodynastidae	<i>Heleioporus albopunctatus</i>	Western Spotted Frog													x								
	<i>Heleioporus eyrei</i>	Moaning Frog									x				x	x							
	<i>Heleioporus inornatus</i>	Whooping Frog						x							x								
Myobatrachidae	<i>Crinia georgiana</i>	Quacking Frog						x	x	x					x	x	x						
	<i>Crinia glauerti</i>	Clicking Frog						x	x	x					x		x						
	<i>Crinia insignifera</i>	Squelching Froglet							x														
	<i>Crinia pseudinsignifera</i>	Bleating Froglet							x	x					x	x							
	<i>Geocrinia leai</i>	Ticking Frog								x					x	x							
Pelodyadidae	<i>Litoria adelaidensis</i>	Slender Tree Frog							x	x					x	x							
	<i>Litoria moorei</i>	Motorbike Frog									x												

Family	Scientific name	Common name	Conservation status		Database			Field	Literature						
			State	Common wealth	NM	PMST	DBCA		A	B	C	D	E	F	G
<b>Birds</b>															
Acanthizidae	<i>Acanthiza apicalis</i>	Inland Thornbill, Broad-tailed Thornbill							x	x			x	x	
	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill							x	x			x	x	
	<i>Acanthiza inornata</i>	Western Thornbill							x				x	x	
	<i>Aphelocephala leucopsis</i>	Southern Whiteface		VU		x									
	<i>Gerygone fusca</i>	Western Gerygone						x	x				x		
	<i>Sericornis maculatus</i>	Spotted Scrubwren						x	x	x			x	x	
	<i>Smicronis brevirostris</i>	Weebill							x	x			x		x
Accipitridae	<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk								x			x		
	<i>Accipiter fasciatus</i>	Brown Goshawk		MA									x	x	
	<i>Aquila audax</i>	Wedge-tailed Eagle							x	x			x	x	x
	<i>Elanus scriptus</i>	Letter-winged Kite	P4												x
	<i>Haliastur sphenurus</i>	Whistling Kite		MA						x			x		x
	<i>Hieraaetus morphnoides</i>	Little Eagle											x		
	<i>Lophoictinia isura</i>	Square-tailed Kite											x		
	<i>Milvus migrans</i>	Black Kite													x
Aegothelidae	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar							x	x				x	
Alcedinidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra							x	x			x	x	x
	<i>Todiramphus sanctus</i>	Sacred Kingfisher		MA						x			x	x	x
Anatidae	<i>Anas superciliosa</i>	Pacific Black Duck							x	x			x	x	
	<i>Chenonetta jubata</i>	Australian Wood Duck, Wood Duck, Maned Duck							x	x				x	
	<i>Cygnus atratus</i>	Black Swan								x					
	<i>Oxyura australis</i>	Blue-billed Duck	P4		x		x								
	<i>Tadorna tadornoides</i>	Australian Shelduck, Mountain Duck							x				x		



Family	Scientific name	Common name	Conservation status		Database			Field	Literature							
			State	Common wealth	NM	PMST	DBCA		A	B	C	D	E	F	G	
	<i>Spilopelia senegalensis</i>	Laughing Turtle Dove														x
Corvidae	<i>Corvus bennetti</i>	Little Crow													x	
	<i>Corvus coronoides</i>	Australian Raven							x	x				x		x
Cuculidae	<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo		MA					x					x	x	
	<i>Chalcites basalis</i>	Horsfield's Bronze Cuckoo		MA						x				x		
	<i>Chalcites lucidus</i>	Shining Bronze Cuckoo		MA										x	x	
Dicaeidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird													x	
Estrilidae	<i>Stagonopleura oculata</i>	Red-eared Firetail												x	x	
Falconidae	<i>Falco cenchroides</i>	Nankeen Kestrel		MA												x
	<i>Falco hypoleucos</i>	Grey Falcon	VU	VU		x										
	<i>Falco peregrinus</i>	Peregrine Falcon	OS		x		x			x					x	
Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow		MA					x							
	<i>Petrochelidon ariel</i>	Fairy Martin								x					x	x
	<i>Petrochelidon nigricans</i>	Tree Martin		MA						x				x	x	
Laridae	<i>Hydroprogne caspia</i>	Caspian Tern	MI	MI, MA	x		x									
	<i>Sternula nereis nereis</i>	Fairy Tern	VU	VU		x										
Locustellidae	<i>Cincloramphus cruralis</i>	Brown Songlark								x					x	
	<i>Cincloramphus mathewsi</i>	Rufous Songlark								x						
Maluridae	<i>Malurus elegans</i>	Red-winged Fairywren						x		x				x	x	
	<i>Malurus leucopterus</i>	White-winged Fairywren								x						
	<i>Malurus pulcherrimus</i>	Blue-breasted Fairywren								x						
	<i>Malurus splendens</i>	Splendid Fairywren						x	x	x				x	x	x
	<i>Stipiturus malachurus</i>	Southern Emu-wren													x	
Megapodiidae	<i>Leipoa ocellata</i>	Malleefowl	VU	VU	x	x	x									
Meliphagidae	<i>Acanthorhynchus superciliosus</i>	Western Spinebill							x	x				x	x	
	<i>Anthochaera carunculata</i>	Red Wattlebird							x	x				x	x	x

Family	Scientific name	Common name	Conservation status		Database			Field	Literature						
			State	Common wealth	NM	PMST	DBCA		A	B	C	D	E	F	G
	<i>Anthochaera lunulata</i>	Western Little Wattlebird, Western Wattlebird							x	x			x	x	
	<i>Gavicalis virescens</i>	Singing Honeyeater											x	x	x
	<i>Lichmera indistincta</i>	Brown Honeyeater							x	x			x	x	x
	<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater								x			x	x	
	<i>Melithreptus chloropsis</i>	Western White-naped Honeyeater							x	x			x	x	
	<i>Phylidonyris niger</i>	White-cheeked Honeyeater								x			x		x
	<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater							x	x			x	x	x
	<i>Ptilotula ornata</i>	Yellow-plumed Honeyeater								x					
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater		MA						x			x	x	
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark		MA						x				x	x
	<i>Myiagra inquieta</i>	Restless Flycatcher								x			x	x	
Motacillidae	<i>Anthus australis australis</i>	Australian Pipit		MA									x		
	<i>Motacilla cinerea</i>	Grey Wagtail	MI	MI, MA		x									
Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella								x			x		
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrikethrush						x		x			x		
	<i>Pachycephala fuliginosa occidentalis</i>	Western Golden Whistler, Western Whistler							x	x			x	x	
	<i>Pachycephala rufiventris</i>	Rufous Whistler											x		x
Pandionidae	<i>Pandion haliaetus</i>	Osprey	MI	MI, MA	x	x	x								
Pardalotidae	<i>Pardalotus punctatus</i>	Spotted Pardalote							x				x	x	
	<i>Pardalotus striatus</i>	Striated Pardalote							x				x	x	



Family	Scientific name	Common name	Conservation status		Database			Field	Literature							
			State	Common wealth	NM	PMST	DBCA		A	B	C	D	E	F	G	
	<i>Calidris canutus</i>	Red Knot	EN	VU, MI, MA		x										
	<i>Calidris ferruginea</i>	Curlew Sandpiper	CR	CR, MI, MA		x										
	<i>Calidris melanotos</i>	Pectoral Sandpiper	MI	MI, MA		x										
	<i>Calidris ruficollis</i>	Red-necked Stint	MI	MI, MA	x		x									
	<i>Numenius madagascariensis</i>	Far Eastern Curlew, Eastern Curlew	CR	CR, MI, MA		x										
	<i>Tringa glareola</i>	Wood Sandpiper	MI	MI, MA	x		x									
	<i>Tringa nebularia</i>	Common Greenshank	MI	EN, MI, MA	x	x	x									
Strigidae	<i>Ninox boobook</i>	Boobook Owl		MA	x		x	x		x					x	
Threskiornithidae	<i>Plegadis falcinellus</i>	Glossy Ibis	MI	MI, MA	x		x									
	<i>Threskiornis spinicollis</i>	Straw-necked Ibis		MA											x	x
Turnicidae	<i>Turnix varius</i>	Painted Button-quail								x			x	x		
Tytonidae	<i>Tyto javanica</i>	Eastern Barn Owl								x						
	<i>Tyto novaehollandiae</i>	Australian Masked Owl, Masked Owl	P3		x		x								x	
Zosteropidae	<i>Zosterops lateralis</i>	Grey-breasted White-eye, Silvereye		MA					x	x			x	x		
<b>Mammalia</b>																
Burramyidae	<i>Cercartetus concinnus</i>	Western Pygmy-possum, Mundarda								x						
Canidae	<i>Canis familiaris</i> *	Dingo / Dog														x
	<i>Vulpes vulpes</i> *	Red Fox													x	x
Dasyuridae	<i>Antechinus flavipes leucogaster</i>	Yellow-footed Antechinus, Mardo						x		x					x	
	<i>Dasyurus geoffroii fortis</i>	Western Quoll, Chuditch	VU	VU	x	x	x	x		x		x		x		
	<i>Phascogale tapoatafa wambenger</i>	Wambenger Brush-tailed Phascogale	CD		x		x									
	<i>Sminthopsis gilberti</i>	Gilbert's Dunnart								x					x	
Felidae	<i>Felis catus</i> *	Cat						x	x	x					x	x

Family	Scientific name	Common name	Conservation status		Database			Field	Literature						
			State	Common wealth	NM	PMST	DBCA		A	B	C	D	E	F	G
Leporidae	<i>Oryctolagus cuniculus*</i>	Rabbit								x				x	x
Macropodidae	<i>Macropus fuliginosus melanops</i>	Western Grey Kangaroo						x	x	x				x	x
	<i>Notamacropus irma</i>	Western Brush Wallaby	P4		x		x	x	x	x				x	x
	<i>Setonix brachyurus</i>	Quokka	VU	VU	x	x	x			x				x	
Molossidae	<i>Austronomus australis</i>	White-striped Free-tailed Bat								x				x	
	<i>Ozimops kitcheneri</i>	Western Free-tailed Bat								x				x	
Muridae	<i>Hydromys chrysogaster</i>	Water Rat, Rakali	P4		x		x	x						x	
	<i>Mus musculus*</i>	House Mouse												x	
	<i>Rattus rattus*</i>	Black Rat						x		x				x	
Myrmecobiidae	<i>Myrmecobius fasciatus fasciatus</i>	Numbat, Walpurti	EN	EN	x	x	x								
Peramelidae	<i>Isoodon fusciventer</i>	Quenda	P4		x		x			x				x	x
Phalangeridae	<i>Trichosurus vulpecula hypoleucus</i>	Common Brushtail Possum, Koomal						x		x				x	
Potoroidae	<i>Bettongia penicillata ogilbyi</i>	Brush-tailed Bettong, Woylie	CR	EN	x	x	x								
Pseudocheiridae	<i>Pseudocheirus occidentalis</i>	Western Ringtail Possum	CR	CE	x	x	x								
Suidae	<i>Sus scrofa*</i>	Pig						x	x	x				x	
Tachyglossidae	<i>Tachyglossus aculeatus acanthion</i>	Short-beaked Echidna						x	x	x				x	
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat								x				x	
	<i>Chalinolobus morio</i>	Chocolate Wattled Bat								x				x	
	<i>Falsistrellus mackenziei</i>	Western False Pipiistrelle	P4		x		x			x				x	
	<i>Vespadelus regulus</i>	Southern Forest Bat								x				x	

Family	Scientific name	Common name	Conservation status		Database			Field	Literature															
			State	Common wealth	NM	PMST	DBCA		A	B	C	D	E	F	G									
<b>Reptiles</b>																								
Agamidae	<i>Ctenophorus ornatus</i>	Ornate Crevice Dragon												x	x									
	<i>Pogona minor</i>	Dwarf Bearded Dragon								x				x	x	x								
Carphodactylidae	<i>Underwoodisaurus milii</i>	Southern Barking Gecko								x				x										
Diplodactylidae	<i>Diplodactylus lateroides</i>	Speckled Stone Gecko													x									
	<i>Diplodactylus polyophthalmus</i>	Spotted Sandplain Gecko												x										
Elapidae	<i>Acanthophis antarcticus</i>	Southern Death Adder	P3												x									
	<i>Notechis scutatus</i>	Tiger Snake								x				x	x									
	<i>Pseudonaja affinis</i>	Dugite								x				x		x								
	<i>Suta nigriceps</i>	Mitchell's Short-tailed Snake								x					x									
Gekkonidae	<i>Christinus marmoratus</i>	Marbled Gecko													x									
Pygopodidae	<i>Aprasia pulchella</i>	Pretty Worm-lizard												x	x									
	<i>Delma fraseri</i>	Fraser's Delma								x														
Pythonidae	<i>Aspidites ramsayi</i>	Woma	P1		x		x																	
	<i>Morelia spilota</i>	Carpet Python								x				x	x									
Scincidae	<i>Acritoscincus trilineatus</i>	Western Three-lined Skink								x				x	x									
	<i>Cryptoblepharus buchananii</i>	Buchanan's Snake-eyed Skink													x	x								
	<i>Cryptoblepharus plagiocephalus</i>	Péron's Snake-eyed Skink												x										
	<i>Ctenotus delli</i>	Dell's Ctenotus	P4		x		x							x										
	<i>Ctenotus labillardieri</i>	Common Southwest Ctenotus								x				x	x									
	<i>Ctenotus ora</i>	Coastal Plains Skink	P3		x		x																	
	<i>Egernia kingii</i>	King's Skink												x	x									





# Appendix E Fauna Site Sheets

## Targeted Chuditch, Quokka, and Woylie Survey

Willowdale Mine – Larego Region

Alcoa of Australia Ltd

SLR Project No.: 675.VX5890.00001

17 June 2024

### 5870-CAM-01-LB

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-13		<b>Sample Type:</b> Basic Fauna	
<b>Zone:</b> 50	<b>Easting:</b> 413199	<b>Northing:</b> 6354177	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> Negligible	<b>Surface stone cover:</b> 0 - 5%		
<b>Soil type:</b> Sandy loam	<b>Surface stone size classes present:</b> Pebbles (<0.6 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Black, Grey			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Very good	<b>Water Source:</b> Absent		
<b>Fire History:</b> Burnt (1-5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Hummocks, Leaf litter, Peeling bark, Woody debris		
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 26-50%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open woodland (0.25-20%)	<i>Jarrah</i>	
<b>Mid stratum:</b> Mid (1-2 m)	Open shrubland and/or heathland (20-50%)		
<b>Ground stratum:</b> Mid (0.5-1 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Sedges</i>	



**Fulcrum photo ID** | 25fcd6ee-6219-42bf-b3be-55a6b20cf8de

### 5870-CAM-03-LB

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-13		<b>Sample Type:</b> Basic Fauna	
<b>Zone:</b> 50	<b>Easting:</b> 411051	<b>Northing:</b> 6356534	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> North	<b>Surface stone cover:</b> 5 - 25%		
<b>Soil type:</b> Sand	<b>Surface stone size classes present:</b> Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Brown, Grey			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Disturbed	<b>Water Source:</b> Absent		
<b>Fire History:</b> Little or no fire evidence (>5 years)	<b>Microhabitats:</b> Hollows - logs, Hummocks, Leaf litter, Peeling bark, Rock crevices, Woody debris		
<b>Disturbance:</b> Clearing			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 51-75%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open forest (50-80%)	<i>Jarrah and Stags</i>	
<b>Mid stratum:</b> Tall (>2 m)	Shrubland and/or heathland (50-80%)		
<b>Ground stratum:</b> Low (>0.5 m)	Hummock grassland (50-80%)	<i>Sedges</i>	



**Fulcrum photo ID** | fc74674b-03b7-4bd2-aa3a-62b70cf96373

### 5870-CAM-05-LB

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-13		<b>Sample Type:</b> Basic Fauna	
<b>Zone:</b> 50	<b>Easting:</b> 412964	<b>Northing:</b> 6354412	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Undulating plain	<b>Rock type/s:</b> None		
<b>Aspect:</b> Negligible	<b>Surface stone cover:</b> 0 - 5%		
<b>Soil type:</b> Sand	<b>Surface stone size classes present:</b>		
<b>Soil colour:</b> Black, Grey			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> High quality	<b>Water Source:</b> Present		
<b>Fire History:</b> Little or no fire evidence (>5 years)	<b>Microhabitats:</b> Hummocks, Leaf litter, Peeling bark, Woody debris		
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b>	<b>Ground Cover:</b> 26-50%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Woodland (20-50%)	<i>Jarrah</i>	
<b>Mid stratum:</b> Tall (>2 m)	Closed shrubland and/or heathland (>80%)		
<b>Ground stratum:</b> Mid (0.5-1 m)	Open rushland and/or sedgeland (20-50%)	<i>Sedges</i>	



Fulcrum photo ID 17faecb2-102a-4ec6-aca-702f8a4624d4

### 5870-CAM-09-LB

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-14		<b>Sample Type:</b> Basic Fauna	
<b>Zone:</b> 50	<b>Easting:</b> 413690	<b>Northing:</b> 6350349	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Undulating plain	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> Negligible	<b>Surface stone cover:</b> 0 - 5%		
<b>Soil type:</b> Sandy loam	<b>Surface stone size classes present:</b> Small Rocks (6 - 20 cm)		
<b>Soil colour:</b> Black			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> High quality	<b>Water Source:</b> Absent		
<b>Fire History:</b> Little or no fire evidence (>5 years)	<b>Microhabitats:</b> Exfoliating rock, Hollows - logs, Hummocks, Leaf litter, Peeling bark, Termite mounds		
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 26-50%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Woodland (20-50%)	<i>Jarrah</i>	
<b>Mid stratum:</b> Tall (>2 m)	Shrubland and/or heathland (50-80%)		
<b>Ground stratum:</b> Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Bankisa</i>	



Fulcrum photo ID a75fcc57-c7ba-4ed5-b253-c5ce5fb5a3b3

### 5870-CAM-10-LB

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-14		<b>Sample Type:</b> Basic Fauna	
<b>Zone:</b> 50	<b>Easting:</b> 413789	<b>Northing:</b> 6348987	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Upper slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> East	<b>Surface stone cover:</b> 0 - 5%		
<b>Soil type:</b> Sandy loam	<b>Surface stone size classes present:</b> Big Rocks (60 cm - 2 m), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm)		
<b>Soil colour:</b> Black, Brown			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Disturbed	<b>Water Source:</b> Absent		
<b>Fire History:</b> Little or no fire evidence (>5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Hummocks, Leaf litter, Peeling bark, Rock crevices, Woody debris		
<b>Disturbance:</b> Clearing			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 26-50%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Woodland (20-50%)	<i>Jarrah</i>	
<b>Mid stratum:</b> Mid (1-2 m)	Open shrubland and/or heathland (20-50%)		
<b>Ground stratum:</b> Low (>0.5 m)	Sparse hummock grassland (0.25-20%)	<i>Pea shrubs</i>	



**Fulcrum photo ID** b2e2a2fb-a23e-49c8-8755-c8e206abd71b

### 5870-CAM-12-LB

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-15		<b>Sample Type:</b> Basic Fauna	
<b>Zone:</b> 50	<b>Easting:</b> 414687	<b>Northing:</b> 6350647	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Upper slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> East	<b>Surface stone cover:</b> 0 - 5%		
<b>Soil type:</b> Sandy loam	<b>Surface stone size classes present:</b> Rocks (20 - 60 cm), Small Rocks (6 - 20 cm)		
<b>Soil colour:</b> Black, Brown			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> High quality	<b>Water Source:</b> Absent		
<b>Fire History:</b> Burnt (1-5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Hummocks, Leaf litter, Logs > 10 cm, Peeling bark, Rock crevices, Woody debris		
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b> Pig	<b>Ground Cover:</b> 11-25%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Woodland (20-50%)	<i>Jarrah</i>	
<b>Mid stratum:</b> Mid (1-2 m)	Shrubland and/or heathland (50-80%)		
<b>Ground stratum:</b> Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Grasses and sedges</i>	



**Fulcrum photo ID** 2bf75440-826d-4cfd-bdc9-34bab94dc7be-401e4b8f-802f-4e93-

### 5870-CAM-13-LB

<b>Project:</b>	5890				
<b>Date</b>	2023-10-13		<b>Sample Type</b>	Basic Fauna	
<b>Zone</b>	50	<b>Easting</b>	413084	<b>Northing</b>	6352726
<b>Landform and Soil</b>			<b>Rock</b>		
<b>Landform</b>	Undulating plain		<b>Rock type/s</b>	Laterite	
<b>Aspect</b>	Negligible		<b>Surface stone cover</b>	0 - 5%	
<b>Soil type</b>	Clay loam		<b>Surface stone size classes present</b>	Pebbles (<0.6 cm)	
<b>Soil colour</b>	Orange				
<b>Condition</b>			<b>Habitat Features</b>		
<b>Quality</b>	High quality		<b>Water Source</b>	Present	
<b>Fire History</b>	Little or no fire evidence (>5 years)		<b>Microhabitats</b>	Hollows - logs, Hollows - trees, Hummocks, Leaf litter, Peeling bark, Woody debris	
<b>Disturbance</b>	None observed				
<b>Introduced fauna</b>	None observed		<b>Ground Cover</b>	26-50%	
<b>Vegetation</b>					
<b>Upper stratum</b>	Mid (10-30 m)	Woodland (20-50%)		<i>Jarrah</i>	
<b>Mid stratum</b>	Tall (>2 m)	Closed shrubland and/or heathland (>80%)			
<b>Ground stratum</b>	Mid (0.5-1 m)	Open hummock grassland (20-50%)		<i>Sedges</i>	



Fulcrum photo ID 3ec77bc4-f51a-425c-8265-5a75050fb7de

### 5870-CAM-16-LB

<b>Project:</b>	5890				
<b>Date</b>	2023-10-14		<b>Sample Type</b>	Basic Fauna	
<b>Zone</b>	50	<b>Easting</b>	414500	<b>Northing</b>	6348638
<b>Landform and Soil</b>			<b>Rock</b>		
<b>Landform</b>	Mid slope		<b>Rock type/s</b>	Laterite	
<b>Aspect</b>	North		<b>Surface stone cover</b>	5 - 25%	
<b>Soil type</b>	Sandy loam		<b>Surface stone size classes present</b>	Pebbles (<0.6 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)	
<b>Soil colour</b>	Black, Brown				
<b>Condition</b>			<b>Habitat Features</b>		
<b>Quality</b>	High quality		<b>Water Source</b>	Absent	
<b>Fire History</b>	Little or no fire evidence (>5 years)		<b>Microhabitats</b>	Hollows - logs, Hollows - trees, Hummocks, Leaf litter, Peeling bark, Rock crevices, Woody debris	
<b>Disturbance</b>	None observed				
<b>Introduced fauna</b>	None observed		<b>Ground Cover</b>	26-50%	
<b>Vegetation</b>					
<b>Upper stratum</b>	Mid (10-30 m)	Open woodland (0.25-20%)		<i>Jarrah and Allocasuarina</i>	
<b>Mid stratum</b>	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)			
<b>Ground stratum</b>	Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)			



Fulcrum photo ID 75423b83-ef94-4eb4-9337-cd370848f0ea

### 5870-CAM-17-LB

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-14		<b>Sample Type:</b> Basic Fauna	
<b>Zone:</b> 50	<b>Easting:</b> 412681	<b>Northing:</b> 6352341	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope		<b>Rock type/s:</b> Laterite	
<b>Aspect:</b> South		<b>Surface stone cover:</b> 25 - 50%	
<b>Soil type:</b> Sandy loam		<b>Surface stone size classes present:</b> Pebbles (<0.6 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)	
<b>Soil colour:</b> Black			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Disturbed		<b>Water Source:</b> Absent	
<b>Fire History:</b> Little or no fire evidence (>5 years)		<b>Microhabitats:</b> Hollows - trees, Hummocks, Leaf litter, Peeling bark, Woody debris	
<b>Disturbance:</b> Clearing			
<b>Introduced fauna:</b> None observed		<b>Ground Cover:</b> 26-50%	
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open woodland (0.25-20%)	<i>Jarrah</i>	
<b>Mid stratum:</b> Mid (1-2 m)	Open mallee shrubland (20-50%)		
<b>Ground stratum:</b> Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Small herbs and sedges</i>	



**Fulcrum photo ID** ced6cc7a-b41f-4505-bd5d-74128d1fc492

### 5870-CAM-18-LB

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-15		<b>Sample Type:</b> Basic Fauna	
<b>Zone:</b> 50	<b>Easting:</b> 413797	<b>Northing:</b> 6355266	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Lower slope		<b>Rock type/s:</b> Laterite	
<b>Aspect:</b> South		<b>Surface stone cover:</b> 0 - 5%	
<b>Soil type:</b> Sandy loam		<b>Surface stone size classes present:</b> Small Rocks (6 - 20 cm), Stones (2 - 6 cm)	
<b>Soil colour:</b> Black, Brown			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Good		<b>Water Source:</b> Absent	
<b>Fire History:</b> Burnt (1-5 years)		<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Hummocks, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris	
<b>Disturbance:</b> Clearing			
<b>Introduced fauna:</b> None observed		<b>Ground Cover:</b> 11-25%	
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open woodland (0.25-20%)	<i>Jarrah</i>	
<b>Mid stratum:</b> Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)		
<b>Ground stratum:</b> Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Grasses</i>	



**Fulcrum photo ID** 5afb0ba5-ce56-49ee-8750-62b00bf22720

### 5870-CAM-19-LB

<b>Project:</b>	5890		
<b>Date</b>	2023-10-14	<b>Sample Type</b>	Basic Fauna
<b>Zone</b>	50	<b>Easting</b>	412917
		<b>Northing</b>	6349007
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform</b>	Upper slope	<b>Rock type/s</b>	Laterite
<b>Aspect</b>	Negligible	<b>Surface stone cover</b>	0 - 5%
<b>Soil type</b>	Sandy loam	<b>Surface stone size classes present</b>	Pebbles (<0.6 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
<b>Soil colour</b>	Brown, Grey		
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality</b>	Disturbed	<b>Water Source</b>	Absent
<b>Fire History</b>	Little or no fire evidence (>5 years)	<b>Microhabitats</b>	Hollows - logs, Hollows - trees, Hummocks, Leaf litter, Logs > 10 cm, Peeling bark, Termite mounds
<b>Disturbance</b>	Vehicle tracks		
<b>Introduced fauna</b>	None observed	<b>Ground Cover</b>	26-50%
<b>Vegetation</b>			
<b>Upper stratum</b>	Mid (10-30 m)	Woodland (20-50%)	<i>Jarrah</i>
<b>Mid stratum</b>	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	
<b>Ground stratum</b>	Low (>0.5 m)	Sparse hummock grassland (0.25-20%)	<i>Grasses and sedges</i>



Fulcrum photo ID | 0e367c3b-216d-4f82-b937-7c26c7fa729e

### 5870-CAM-23-LB

<b>Project:</b>	5890		
<b>Date</b>	2023-10-13	<b>Sample Type</b>	Basic Fauna
<b>Zone</b>	50	<b>Easting</b>	410877
		<b>Northing</b>	6355590
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform</b>	Undulating plain	<b>Rock type/s</b>	Laterite
<b>Aspect</b>	Negligible	<b>Surface stone cover</b>	0 - 5%
<b>Soil type</b>	Sandy loam	<b>Surface stone size classes present</b>	Rocks (20 - 60 cm), Small Stones (0.6 - 2 cm)
<b>Soil colour</b>	Black, Brown		
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality</b>	Disturbed	<b>Water Source</b>	Absent
<b>Fire History</b>	Little or no fire evidence (>5 years)	<b>Microhabitats</b>	Hollows - logs, Hummocks, Leaf litter, Peeling bark, Rock crevices, Woody debris
<b>Disturbance</b>	Dieback		
<b>Introduced fauna</b>	None observed	<b>Ground Cover</b>	51-75%
<b>Vegetation</b>			
<b>Upper stratum</b>	Mid (10-30 m)	Woodland (20-50%)	<i>Jarrah</i>
<b>Mid stratum</b>	Tall (>2 m)	Shrubland and/or heathland (50-80%)	
<b>Ground stratum</b>	Mid (0.5-1 m)	Open rushland and/or sedgeland (20-50%)	



Fulcrum photo ID | ad36fe10-d6cb-4c62-8e0a-bce88bd7e601

### 5870-CAM-24-LB

<b>Project:</b>	5890				
<b>Date</b>	2023-10-13		<b>Sample Type</b>	Basic Fauna	
<b>Zone</b>	50	<b>Easting</b>	410946	<b>Northing</b>	6355236
<b>Landform and Soil</b>			<b>Rock</b>		
<b>Landform</b>	Undulating plain		<b>Rock type/s</b>	Laterite	
<b>Aspect</b>	Negligible		<b>Surface stone cover</b>	0 - 5%	
<b>Soil type</b>	Sandy loam		<b>Surface stone size classes present</b>	Pebbles (<0.6 cm), Small Stones (0.6 - 2 cm)	
<b>Soil colour</b>	Black, Brown				
<b>Condition</b>			<b>Habitat Features</b>		
<b>Quality</b>	Disturbed		<b>Water Source</b>	Absent	
<b>Fire History</b>	Little or no fire evidence (>5 years)		<b>Microhabitats</b>	Hollows - logs, Hummocks, Leaf litter, Peeling bark, Woody debris	
<b>Disturbance</b>	Dieback				
<b>Introduced fauna</b>			<b>Ground Cover</b>	26-50%	
<b>Vegetation</b>					
<b>Upper stratum</b>	Mid (10-30 m)	Open woodland (0.25-20%)		<i>Jarrah</i>	
<b>Mid stratum</b>	Tall (>2 m)	Shrubland and/or heathland (50-80%)			
<b>Ground stratum</b>	Mid (0.5-1 m)	Sparse rushland and/or sedgeland (0.25-20%)		<i>Sedges</i>	



Fulcrum photo ID c1050e10-ed05-42dd-b784-19e8fdb020af

### 5870-CAM-26-LB

<b>Project:</b>	5890				
<b>Date</b>	2023-10-13		<b>Sample Type</b>	Basic Fauna	
<b>Zone</b>	50	<b>Easting</b>	412702	<b>Northing</b>	6355307
<b>Landform and Soil</b>			<b>Rock</b>		
<b>Landform</b>	Undulating plain		<b>Rock type/s</b>	Laterite	
<b>Aspect</b>	Negligible		<b>Surface stone cover</b>	0 - 5%	
<b>Soil type</b>	Sand		<b>Surface stone size classes present</b>	Pebbles (<0.6 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)	
<b>Soil colour</b>	Grey				
<b>Condition</b>			<b>Habitat Features</b>		
<b>Quality</b>	Very good		<b>Water Source</b>	Absent	
<b>Fire History</b>	Burnt (1-5 years)		<b>Microhabitats</b>	Hollows - logs, Hummocks, Leaf litter, Peeling bark, Rock crevices, Woody debris	
<b>Disturbance</b>	Dieback				
<b>Introduced fauna</b>	None observed		<b>Ground Cover</b>	26-50%	
<b>Vegetation</b>					
<b>Upper stratum</b>	Tall (>30 m)	Woodland (20-50%)		<i>Jarrah</i>	
<b>Mid stratum</b>	Tall (>2 m)	Shrubland and/or heathland (50-80%)			
<b>Ground stratum</b>	Low (>0.5 m)	Open rushland and/or sedgeland (20-50%)		<i>Sedges</i>	



Fulcrum photo ID acb1d6d1-b690-4e55-b626-a5af26e4195e

### 5870-CAM-27-LB

<b>Project:</b>	5890				
<b>Date</b>	2023-10-14		<b>Sample Type</b>	Basic Fauna	
<b>Zone</b>	50	<b>Easting</b>	415029	<b>Northing</b>	6349231
<b>Landform and Soil</b>			<b>Rock</b>		
<b>Landform</b>	Undulating plain		<b>Rock type/s</b>	Laterite	
<b>Aspect</b>	Negligible		<b>Surface stone cover</b>	0 - 5%	
<b>Soil type</b>	Sandy loam		<b>Surface stone size classes present</b>	Pebbles (<0.6 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)	
<b>Soil colour</b>	Black, Brown				
<b>Condition</b>			<b>Habitat Features</b>		
<b>Quality</b>	High quality		<b>Water Source</b>	Absent	
<b>Fire History</b>	Little or no fire evidence (>5 years)		<b>Microhabitats</b>	Hollows - logs, Hollows - trees, Hummocks, Leaf litter, Peeling bark, Woody debris	
<b>Disturbance</b>	None observed				
<b>Introduced fauna</b>	None observed		<b>Ground Cover</b>	26-50%	
<b>Vegetation</b>					
<b>Upper stratum</b>	Mid (10-30 m)	Woodland (20-50%)		<i>Jarrah</i>	
<b>Mid stratum</b>	Tall (>2 m)	Open shrubland and/or heathland (20-50%)			
<b>Ground stratum</b>	Low (>0.5 m)	Sparse hummock grassland (0.25-20%)		<i>Xanthorrhoea</i>	



Fulcrum photo ID c9935215-218e-4b14-a67f-d49c7360b426

### 5870-CAM-28-LB

<b>Project:</b>	5890				
<b>Date</b>	2023-10-13		<b>Sample Type</b>	Basic Fauna	
<b>Zone</b>	50	<b>Easting</b>	412768	<b>Northing</b>	6354897
<b>Landform and Soil</b>			<b>Rock</b>		
<b>Landform</b>	Undulating plain		<b>Rock type/s</b>	Laterite	
<b>Aspect</b>	Negligible		<b>Surface stone cover</b>	0 - 5%	
<b>Soil type</b>	Sand		<b>Surface stone size classes present</b>	Pebbles (<0.6 cm), Small Stones (0.6 - 2 cm)	
<b>Soil colour</b>	Grey				
<b>Condition</b>			<b>Habitat Features</b>		
<b>Quality</b>	High quality		<b>Water Source</b>	Absent	
<b>Fire History</b>	Burnt (1-5 years)		<b>Microhabitats</b>	Hollows - logs, Hollows - trees, Hummocks, Leaf litter, Peeling bark, Woody debris	
<b>Disturbance</b>	Dieback				
<b>Introduced fauna</b>	None observed		<b>Ground Cover</b>	26-50%	
<b>Vegetation</b>					
<b>Upper stratum</b>	Mid (10-30 m)	Open woodland (0.25-20%)		<i>Jarrah</i>	
<b>Mid stratum</b>	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)			
<b>Ground stratum</b>	Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)			



Fulcrum photo ID 9922c67a-b31b-43a8-80b5-171f605037b6

### 5870-CAM-28-LB

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-13		<b>Sample Type:</b> Basic Fauna	
<b>Zone:</b> 50	<b>Easting:</b> 412768	<b>Northing:</b> 6354897	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Undulating plain	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> Negligible	<b>Surface stone cover:</b> 0 - 5%		
<b>Soil type:</b> Sand	<b>Surface stone size classes present:</b> Pebbles (<0.6 cm), Small Stones (0.6 - 2 cm)		
<b>Soil colour:</b> Grey			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> High quality	<b>Water Source:</b> Absent		
<b>Fire History:</b> Burnt (1-5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Hummocks, Leaf litter, Peeling bark, Woody debris		
<b>Disturbance:</b> Dieback			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 26-50%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open woodland (0.25-20%)	<i>Jarrah</i>	
<b>Mid stratum:</b> Mid (1-2 m)	Open shrubland and/or heathland (20-50%)		
<b>Ground stratum:</b> Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)		



Fulcrum photo ID 9922c67a-b31b-43a8-80b5-171f605037b6

### 5870-CAM-30-LB

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-15		<b>Sample Type:</b> Basic Fauna	
<b>Zone:</b> 50	<b>Easting:</b> 414174	<b>Northing:</b> 6352804	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> Southeast	<b>Surface stone cover:</b> 5 - 25%		
<b>Soil type:</b> Sandy loam	<b>Surface stone size classes present:</b> Pebbles (<0.6 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Black, Brown			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> High quality	<b>Water Source:</b> Absent		
<b>Fire History:</b> Burnt (1-5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Hummocks, Leaf litter, Peeling bark, Woody debris		
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 26-50%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open woodland (0.25-20%)	<i>Jarrah</i>	
<b>Mid stratum:</b> Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)		
<b>Ground stratum:</b> Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Sedges and grasses</i>	



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### 5870-CAM-31-LB

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-13		<b>Sample Type:</b> Basic Fauna	
<b>Zone:</b> 50	<b>Easting:</b> 411808	<b>Northing:</b> 6355031	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Undulating plain	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> Negligible	<b>Surface stone cover:</b> 0 - 5%		
<b>Soil type:</b> Sandy loam	<b>Surface stone size classes present:</b> Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Stones (0.6 - 2 cm)		
<b>Soil colour:</b> Grey			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Disturbed	<b>Water Source:</b> Absent		
<b>Fire History:</b> Little or no fire evidence (>5 years)	<b>Microhabitats:</b> Hollows - logs, Hummocks, Leaf litter, Peeling bark, Rock crevices, Woody debris		
<b>Disturbance:</b> Dieback			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 26-50%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Woodland (20-50%)	<i>Jarrah</i>	
<b>Mid stratum:</b> Tall (>2 m)	Shrubland and/or heathland (50-80%)		
<b>Ground stratum:</b> Mid (0.5-1 m)	Rushland and/or sedgeland (50-80%)		



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### 5870-CAM-32-LB

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-13		<b>Sample Type:</b> Basic Fauna	
<b>Zone:</b> 50	<b>Easting:</b> 413233	<b>Northing:</b> 6354593	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Undulating plain	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> Negligible	<b>Surface stone cover:</b> 0 - 5%		
<b>Soil type:</b> Sandy loam	<b>Surface stone size classes present:</b> Small Rocks (6 - 20 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Black			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Disturbed	<b>Water Source:</b> Absent		
<b>Fire History:</b> Burnt (1-5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Hummocks, Leaf litter, Peeling bark, Rock crevices, Woody debris		
<b>Disturbance:</b> Dieback			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 26-50%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open woodland (0.25-20%)	<i>Jarrah</i>	
<b>Mid stratum:</b> Mid (1-2 m)	Open shrubland and/or heathland (20-50%)		
<b>Ground stratum:</b> Mid (0.5-1 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Sedges</i>	



Fulcrum photo ID 9f907646-156e-4f71-bfeb-f9479c1f5d67

### 5870-CAM-34-LB

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-14		<b>Sample Type:</b> Basic Fauna	
<b>Zone:</b> 50	<b>Easting:</b> 412410	<b>Northing:</b> 6352719	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> South	<b>Surface stone cover:</b> 5 - 25%		
<b>Soil type:</b> Sandy loam	<b>Surface stone size classes present:</b> Pebbles (<0.6 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Brown, Grey, Orange			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Disturbed	<b>Water Source:</b> Absent		
<b>Fire History:</b> Little or no fire evidence (>5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Leaf litter, Peeling bark, Woody debris		
<b>Disturbance:</b> Clearing			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 26-50%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open woodland (0.25-20%)	<i>Jarrah and She-oak</i>	
<b>Mid stratum:</b> Mid (1-2 m)	Open shrubland and/or heathland (20-50%)		
<b>Ground stratum:</b> Mid (0.5-1 m)	Open rushland and/or sedgeland (20-50%)	<i>Herbs</i>	



**Fulcrum photo ID** 4511c0c9-29f2-4b05-8348-b92cb4a1981c

### 5870-CAM-35-LB

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-15		<b>Sample Type:</b> Basic Fauna	
<b>Zone:</b> 50	<b>Easting:</b> 414772	<b>Northing:</b> 6352745	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> Negligible	<b>Surface stone cover:</b> 25 - 50%		
<b>Soil type:</b> Sandy loam	<b>Surface stone size classes present:</b> Rocks (20 - 60 cm), Small Rocks (6 - 20 cm)		
<b>Soil colour:</b> Black			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> High quality	<b>Water Source:</b> Absent		
<b>Fire History:</b> Burnt (1-5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Hummocks, Leaf litter, Logs > 10 cm, Peeling bark, Rock crevices, Woody debris		
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 11-25%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open woodland (0.25-20%)	<i>Jarrah</i>	
<b>Mid stratum:</b> Low (0.5-1 m)	Open shrubland and/or heathland (20-50%)	<i>Jarrah</i>	
<b>Ground stratum:</b> Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Sedges and grasses</i>	



**Fulcrum photo ID** 93f2c84d-146f-4179-94a7-40fbd1de8faa

### 5870-CAM-36-LB

Project:		5890	
Date		2023-10-14	
Sample Type		Basic Fauna	
Zone	50	Easting	412422
Northing		6350668	
Landform and Soil		Rock	
Landform	Undulating plain	Rock type/s	None
Aspect	Negligible	Surface stone cover	0 - 5%
Soil type	Sand	Surface stone size classes present	
Soil colour	Brown, Grey		
Condition		Habitat Features	
Quality	Disturbed	Water Source	Absent
Fire History	Burnt (1-5 years)	Microhabitats	Hollows - logs, Hollows - trees, Hummocks, Leaf litter, Peeling bark, Woody debris
Disturbance	Clearing, Vehicle tracks	Ground Cover	26-50%
Introduced fauna	None observed		
Vegetation			
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	<i>Jarrah</i>
Mid stratum	Mid (1-2 m)	Shrubland and/or heathland (50-80%)	
Ground stratum	Tall (1-2 m)	Sparse hummock grassland (0.25-20%)	<i>Herbs</i>



Fulcrum photo ID 62a285cc-eb8a-4bcc-915d-c73916b8fd40

### 5890-CAM-02-EW

Project:		5890	
Date		2023-10-15	
Sample Type		Terrestrial vertebrate fauna	
Zone	50	Easting	414503
Northing		6351029	
Landform and Soil		Rock	
Landform	Mid slope	Rock type/s	Laterite
Aspect	Southeast	Surface stone cover	25 - 50%
Soil type	Sandy loam	Surface stone size classes present	Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Brown		
Condition		Habitat Features	
Quality	Good	Water Source	Absent
Fire History	Little or no fire evidence (>5 years)	Microhabitats	Leaf litter, Logs > 10 cm, Peeling bark, Rock crevices, Woody debris
Disturbance	Logging, Vehicle tracks	Ground Cover	51-75%
Introduced fauna	None observed		
Vegetation			
Upper stratum	Mid (10-30 m)	Woodland (20-50%)	<i>Marri, Allocasuarina, Jarrah, Banksia sessilis</i>
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	<i>Bossiaea, Calytrix</i>
Ground stratum	Low (>0.5 m)	Sparse hummock grassland (0.25-20%)	<i>Sedge, herbs</i>



Fulcrum photo ID e4640a26-5456-4f3c-871d-2aba6ad8168c-5fd61c25-6187-

### 5890-CAM-04-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-14		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 413062	<b>Northing:</b> 6352206	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> East	<b>Surface stone cover:</b> 0 - 5%		
<b>Soil type:</b> Sandy loam	<b>Surface stone size classes present:</b> Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Brown, Grey			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Very good	<b>Water Source:</b> Absent		
<b>Fire History:</b> Little or no fire evidence (>5 years)	<b>Microhabitats:</b> Leaf litter, Logs > 10 cm, Peeling bark, Woody debris		
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b> Pig	<b>Ground Cover:</b> 76-100%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Woodland (20-50%)		
<b>Mid stratum:</b> Tall (>2 m)	Closed shrubland and/or heathland (>80%)	<i>Bossiaea, Acacia pulchella, Bracken</i>	
<b>Ground stratum:</b> Absent			



Fulcrum photo ID fa21d811-6c98-4246-a483-4b88583654fe

### 5890-CAM-06-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-13		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 410950	<b>Northing:</b> 6354138	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> Negligible	<b>Surface stone cover:</b> 50 - 75%		
<b>Soil type:</b> Sandy loam	<b>Surface stone size classes present:</b> Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Brown, Orange			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> High quality	<b>Water Source:</b> Absent		
<b>Fire History:</b> Burnt (1-5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris		
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 26-50%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open woodland (0.25-20%)	<i>Marrri, Jarrah, Allocasuarina</i>	
<b>Mid stratum:</b> Low (0.5-1 m)	Open shrubland and/or heathland (20-50%)	<i>Calytrix, Bossiaea</i>	
<b>Ground stratum:</b> Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)		



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### 5890-CAM-07-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-15		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 411296	<b>Northing:</b> 6350882	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Drainage line		<b>Rock type/s:</b> None	
<b>Aspect:</b> Northeast		<b>Surface stone cover:</b>	
<b>Soil type:</b> Clay loam		<b>Surface stone size classes present:</b>	
<b>Soil colour:</b> Black, Brown			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Very good		<b>Water Source:</b> Present	
<b>Fire History:</b> Little or no fire evidence (>5 years)		<b>Microhabitats:</b> Leaf litter, Logs > 10 cm, Peeling bark, Termite mounds, Woody debris	
<b>Disturbance:</b> Pig rooting			
<b>Introduced fauna:</b> Pig		<b>Ground Cover:</b> 76-100%	
<b>Vegetation</b>			
<b>Upper stratum:</b>	Mid (10-30 m)	Woodland (20-50%)	<i>Eucalyptus globulus, E. patens</i>
<b>Mid stratum:</b>	Tall (>2 m)	Closed shrubland and/or heathland (>80%)	<i>Myrtaceae, Bossiaea</i>
<b>Ground stratum:</b>	Tall (1-2 m)	Open rushland and/or sedgeland (20-50%)	<i>Sedge</i>



### 5890-CAM-08-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-14		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 411907	<b>Northing:</b> 6352650	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Drainage line		<b>Rock type/s:</b> Laterite	
<b>Aspect:</b> West		<b>Surface stone cover:</b> 0 - 5%	
<b>Soil type:</b> Loam		<b>Surface stone size classes present:</b> Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)	
<b>Soil colour:</b> Brown			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> High quality		<b>Water Source:</b> Present	
<b>Fire History:</b> Little or no fire evidence (>5 years)		<b>Microhabitats:</b> Leaf litter, Logs > 10 cm, Peeling bark, Woody debris	
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b> None observed		<b>Ground Cover:</b> 76-100%	
<b>Vegetation</b>			
<b>Upper stratum:</b>	Mid (10-30 m)	Woodland (20-50%)	<i>Eucalyptus patens</i>
<b>Mid stratum:</b>	Tall (>2 m)	Closed shrubland and/or heathland (>80%)	<i>Bossiaea, Myrtaceae</i>
<b>Ground stratum:</b>	Tall (1-2 m)	Sparse rushland and/or sedgeland (0.25-20%)	



### 5890-CAM-11-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-14		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 411883	<b>Northing:</b> 6352707	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> Southeast	<b>Surface stone cover:</b> 0 - 5%		
<b>Soil type:</b> Loam	<b>Surface stone size classes present:</b> Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Brown			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Very good	<b>Water Source:</b> Absent		
<b>Fire History:</b> Little or no fire evidence (>5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris		
<b>Disturbance:</b> Logging			
<b>Introduced fauna:</b> Pig	<b>Ground Cover:</b> 76-100%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open forest (50-80%)	<i>Jarrah, Marri</i>	
<b>Mid stratum:</b> Mid (1-2 m)	Shrubland and/or heathland (50-80%)	<i>Bossiaea, Macrozamia, Bracken, Tetratheca</i>	
<b>Ground stratum:</b> Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Sedge, Tetratheca</i>	



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### 5890-CAM-14-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-13		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 415154	<b>Northing:</b> 6353208	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> West	<b>Surface stone cover:</b> 0 - 5%		
<b>Soil type:</b> Sandy loam	<b>Surface stone size classes present:</b> Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Brown, Orange			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Very good	<b>Water Source:</b> Absent		
<b>Fire History:</b> Little or no fire evidence (>5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris		
<b>Disturbance:</b> Logging			
<b>Introduced fauna:</b> Potential pig sign	<b>Ground Cover:</b> 76-100%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open forest (50-80%)	<i>Jarrah, Marri, Banksia grandis</i>	
<b>Mid stratum:</b> Tall (>2 m)	Open shrubland and/or heathland (20-50%)	<i>Bossiaea</i>	
<b>Ground stratum:</b> Mid (0.5-1 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Sedge, Bracken, Tetratheca</i>	



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### 5890-CAM-15-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-13		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 412292	<b>Northing:</b> 6350989	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> Southwest	<b>Surface stone cover:</b> 5 - 25%		
<b>Soil type:</b> Loam	<b>Surface stone size classes present:</b> Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Black, Brown			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Very good	<b>Water Source:</b> Absent		
<b>Fire History:</b> Little or no fire evidence (>5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris		
<b>Disturbance:</b> Logging			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 51-75%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Woodland (20-50%)	<i>Marri, Jarrah</i>	
<b>Mid stratum:</b> Tall (>2 m)	Open shrubland and/or heathland (20-50%)	<i>Bossiaea, Bracken</i>	
<b>Ground stratum:</b> Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Sedges, Tetratheca, Bracken</i>	



### 5890-CAM-20-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-13		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 410834	<b>Northing:</b> 6352823	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Drainage line	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> Northeast	<b>Surface stone cover:</b> 0 - 5%		
<b>Soil type:</b> Loam	<b>Surface stone size classes present:</b> Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Brown			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> High quality	<b>Water Source:</b> Present		
<b>Fire History:</b> Burnt (1-5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris		
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b> Potential old pig sign	<b>Ground Cover:</b> 51-75%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open forest (50-80%)	<i>Jarrah, Marri</i>	
<b>Mid stratum:</b> Tall (>2 m)	Shrubland and/or heathland (50-80%)	<i>Bossiaea, Bracken</i>	
<b>Ground stratum:</b> Mid (0.5-1 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Sedge, Tetratheca</i>	



### 5890-CAM-21-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-13		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 411613	<b>Northing:</b> 6353040	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Drainage line		<b>Rock type/s:</b> Laterite	
<b>Aspect:</b> Southeast		<b>Surface stone cover:</b> 5 - 25%	
<b>Soil type:</b> Sandy loam		<b>Surface stone size classes present:</b> Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)	
<b>Soil colour:</b> Brown, Orange			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> High quality		<b>Water Source:</b> Present	
<b>Fire History:</b> Burnt (1-5 years)		<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris	
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b> None observed		<b>Ground Cover:</b>	
<b>Vegetation</b>			
<b>Upper stratum:</b>	Mid (10-30 m)	Woodland (20-50%)	<i>Marri, Jarrah</i>
<b>Mid stratum:</b>	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	<i>Bossiaea, Xanthorrhoea, Macrozamia</i>
<b>Ground stratum:</b>	Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)	



### 5890-CAM-22-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-13		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 414325	<b>Northing:</b> 6354625	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope		<b>Rock type/s:</b> Laterite	
<b>Aspect:</b> East		<b>Surface stone cover:</b> 25 - 50%	
<b>Soil type:</b> Sandy loam		<b>Surface stone size classes present:</b> Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)	
<b>Soil colour:</b> Brown			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> High quality		<b>Water Source:</b> Absent	
<b>Fire History:</b> Burnt (1-5 years)		<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris	
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b> None observed		<b>Ground Cover:</b> 51-75%	
<b>Vegetation</b>			
<b>Upper stratum:</b>	Mid (10-30 m)	Woodland (20-50%)	<i>Jarrah, Marri</i>
<b>Mid stratum:</b>	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	<i>Bossiaea, Bracken</i>
<b>Ground stratum:</b>	Low (>0.5 m)	Sparse forbland (0.25-20%)	<i>Stylidium, Boronia, Orchid</i>



### 5890-CAM-29-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-14		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 412681	<b>Northing:</b> 6351901	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> Northeast	<b>Surface stone cover:</b> 0 - 5%		
<b>Soil type:</b> Loam	<b>Surface stone size classes present:</b> Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Brown			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Very good	<b>Water Source:</b> Absent		
<b>Fire History:</b> Little or no fire evidence (>5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris		
<b>Disturbance:</b> Logging			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 76-100%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open forest (50-80%)	<i>Jarrah, Marri</i>	
<b>Mid stratum:</b> Mid (1-2 m)	Shrubland and/or heathland (50-80%)	<i>Bossiaea, Bracken</i>	
<b>Ground stratum:</b> Mid (0.5-1 m)	Sparse rushland and/or sedgeland (0.25-20%)		



### 5890-CAM-33-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-14		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 412669	<b>Northing:</b> 6350011	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> Southwest	<b>Surface stone cover:</b> 5 - 25%		
<b>Soil type:</b> Loam	<b>Surface stone size classes present:</b> Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Brown			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Very good	<b>Water Source:</b> Absent		
<b>Fire History:</b> Little or no fire evidence (>5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris		
<b>Disturbance:</b> Logging			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b>		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Woodland (20-50%)	<i>Jarrah, Marri</i>	
<b>Mid stratum:</b> Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	<i>Bossiaea, Bracken</i>	
<b>Ground stratum:</b> Low (>0.5 m)	Sparse forbland (0.25-20%)		



### 5890-CAM-37-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-13		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b>	<b>Easting:</b>	<b>Northing:</b>	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> South	<b>Surface stone cover:</b> 0 - 5%		
<b>Soil type:</b> Sandy loam	<b>Surface stone size classes present:</b> Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Brown, Orange			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> High quality	<b>Water Source:</b> Absent		
<b>Fire History:</b> Burnt (1-5 years)	<b>Microhabitats:</b> Burrows, Hollows - logs, Hollows - trees, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris		
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b>		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open forest (50-80%)	<i>Jarrah, Marri</i>	
<b>Mid stratum:</b> Tall (>2 m)	Closed shrubland and/or heathland (>80%)	<i>Bossiaea, Grevillea, Bracken</i>	
<b>Ground stratum:</b> Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Sedges, Tetraheca</i>	



### 5890-CAM-38-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-15		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 411260	<b>Northing:</b> 6349796	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Drainage line	<b>Rock type/s:</b> None		
<b>Aspect:</b> East	<b>Surface stone cover:</b>		
<b>Soil type:</b> Loam	<b>Surface stone size classes present:</b>		
<b>Soil colour:</b> Brown			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> High quality	<b>Water Source:</b> Absent		
<b>Fire History:</b> Little or no fire evidence (>5 years)	<b>Microhabitats:</b> Leaf litter, Logs > 10 cm, Peeling bark, Woody debris		
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 76-100%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Woodland (20-50%)	<i>Eucalyptus globulus</i>	
<b>Mid stratum:</b> Tall (>2 m)	Closed shrubland and/or heathland (>80%)	<i>Myrtaceae, Bossiaea, Bracken, Lasiopetalum</i>	
<b>Ground stratum:</b> Absent			



### 5890-CAM-39-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-13		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 412821	<b>Northing:</b> 6350751	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> Northeast	<b>Surface stone cover:</b> 5 - 25%		
<b>Soil type:</b> Sandy loam	<b>Surface stone size classes present:</b> Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Brown, Orange			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> High quality	<b>Water Source:</b> Absent		
<b>Fire History:</b> Burnt (1-5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris		
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b>		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Woodland (20-50%)	<i>Jarrah, Marri</i>	
<b>Mid stratum:</b> Tall (>2 m)	Open shrubland and/or heathland (20-50%)	<i>Bossiaea</i>	
<b>Ground stratum:</b> Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Sedge, Tetratheca</i>	



### 5890-CAM-40-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-13		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 412711	<b>Northing:</b> 6353618	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> East	<b>Surface stone cover:</b> 0 - 5%		
<b>Soil type:</b> Sandy loam	<b>Surface stone size classes present:</b> Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Brown, Orange			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Very good	<b>Water Source:</b> Absent		
<b>Fire History:</b> Little or no fire evidence (>5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris		
<b>Disturbance:</b> Logging			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 76-100%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Woodland (20-50%)	<i>Jarrah, Marri, Banksia grandis</i>	
<b>Mid stratum:</b> Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	<i>Bossiaea</i>	
<b>Ground stratum:</b> Mid (0.5-1 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Sedge, Xanthorrhoea</i>	



### 5890-CAM-41-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-13		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 413985	<b>Northing:</b> 6352460	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> Northwest	<b>Surface stone cover:</b> 25 - 50%		
<b>Soil type:</b> Loam	<b>Surface stone size classes present:</b> Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Brown, Orange			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Very good	<b>Water Source:</b> Absent		
<b>Fire History:</b> Little or no fire evidence (>5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris		
<b>Disturbance:</b> Logging			
<b>Introduced fauna:</b> Pig	<b>Ground Cover:</b> 51-75%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open forest (50-80%)	<i>Jarrah, Marri, Allocasuarina</i>	
<b>Mid stratum:</b> Tall (>2 m)	Open shrubland and/or heathland (20-50%)	<i>Bossiaea, Banksia grandis</i>	
<b>Ground stratum:</b> Mid (0.5-1 m)	Sparse tussock grassland (0.25-20%)	<i>Sedge, Tetratheca</i>	



### 5890-CAM-42-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-14		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 413198	<b>Northing:</b> 6351627	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Drainage line	<b>Rock type/s:</b> None		
<b>Aspect:</b> Northwest	<b>Surface stone cover:</b>		
<b>Soil type:</b> Loam	<b>Surface stone size classes present:</b>		
<b>Soil colour:</b> Brown			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> High quality	<b>Water Source:</b> Present		
<b>Fire History:</b> Little or no fire evidence (>5 years)	<b>Microhabitats:</b> Leaf litter, Logs > 10 cm, Peeling bark, Woody debris		
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 76-100%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Open forest (50-80%)	<i>Eucalyptus patens</i>	
<b>Mid stratum:</b> Tall (>2 m)	Open shrubland and/or heathland (20-50%)	<i>Myrtaceae</i>	
<b>Ground stratum:</b> Tall (1-2 m)	Rushland and/or sedgeland (50-80%)	<i>Sedges, Xanthorrhoea, Lasiopetalum, Myrtaceae sp.</i>	



### 5890-CAM-43-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-15		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 411849	<b>Northing:</b> 6349686	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Mid slope	<b>Rock type/s:</b> Laterite		
<b>Aspect:</b> East	<b>Surface stone cover:</b> 25 - 50%		
<b>Soil type:</b> Loam	<b>Surface stone size classes present:</b> Big Rocks (60 cm - 2 m), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)		
<b>Soil colour:</b> Brown, Orange			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Very good	<b>Water Source:</b> Absent		
<b>Fire History:</b> Burnt (1-5 years)	<b>Microhabitats:</b> Hollows - logs, Hollows - trees, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris		
<b>Disturbance:</b> Logging			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 51-75%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Woodland (20-50%)	<i>Jarrah, Marri, Allocasuarina</i>	
<b>Mid stratum:</b> Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	<i>Bossiaea, Banksia grandis</i>	
<b>Ground stratum:</b> Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Sedge, prostrate Banksia</i>	



Fulcrum photo ID 29e3ad82-b578-4890-a888-795f7b238291

### 5890-CAM-44-EW

<b>Project:</b> 5890			
<b>Date:</b> 2023-10-15		<b>Sample Type:</b> Terrestrial vertebrate fauna	
<b>Zone:</b> 50	<b>Easting:</b> 414281	<b>Northing:</b> 6351283	
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform:</b> Drainage line	<b>Rock type/s:</b> None		
<b>Aspect:</b> Southeast	<b>Surface stone cover:</b>		
<b>Soil type:</b> Loam	<b>Surface stone size classes present:</b>		
<b>Soil colour:</b> Brown, Orange			
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality:</b> Very good	<b>Water Source:</b> Present		
<b>Fire History:</b> Burnt (1-5 years)	<b>Microhabitats:</b> Hollows - logs, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris		
<b>Disturbance:</b> None observed			
<b>Introduced fauna:</b> None observed	<b>Ground Cover:</b> 76-100%		
<b>Vegetation</b>			
<b>Upper stratum:</b> Mid (10-30 m)	Woodland (20-50%)	<i>Eucalyptus globulus, Marri, Jarrah</i>	
<b>Mid stratum:</b> Tall (>2 m)	Shrubland and/or heathland (50-80%)	<i>Bossiaea, Myrtaceae</i>	
<b>Ground stratum:</b> Low (>0.5 m)	Isolated forbs (<0.25%)		



Fulcrum photo ID a96eec49-0c3e-40ea-8620-d880c50c8fb7

## 5890-CAM-45-EW

<b>Project:</b>	5890		
<b>Date</b>	2023-10-14	<b>Sample Type</b>	Terrestrial vertebrate fauna
<b>Zone</b>	50	<b>Easting</b>	413041
		<b>Northing</b>	6349511
<b>Landform and Soil</b>		<b>Rock</b>	
<b>Landform</b>	Mid slope	<b>Rock type/s</b>	Laterite
<b>Aspect</b>	Northeast	<b>Surface stone cover</b>	0 - 5%
<b>Soil type</b>	Loam	<b>Surface stone size classes present</b>	Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
<b>Soil colour</b>	Brown		
<b>Condition</b>		<b>Habitat Features</b>	
<b>Quality</b>	Good	<b>Water Source</b>	Absent
<b>Fire History</b>	Little or no fire evidence (>5 years)	<b>Microhabitats</b>	Hollows - logs, Hollows - trees, Leaf litter, Logs > 10 cm, Peeling bark, Woody debris
<b>Disturbance</b>	Pig rooting		
<b>Introduced fauna</b>	Pig	<b>Ground Cover</b>	76-100%
<b>Vegetation</b>			
<b>Upper stratum</b>	Mid (10-30 m)	Open forest (50-80%)	<i>Jarrah, Marri</i>
<b>Mid stratum</b>	Mid (1-2 m)	Shrubland and/or heathland (50-80%)	<i>Bossiaea, Bracken, Grevillea</i>
<b>Ground stratum</b>	Low (>0.5 m)	Sparse rushland and/or sedgeland (0.25-20%)	<i>Sedge, Tetraetheca</i>





# **Appendix F      Significant Fauna Recorded During the Survey**

## **Targeted Chuditch, Quokka, and Woylie Survey**

**Willowdale Mine – Larego Region**

**Alcoa of Australia Ltd**

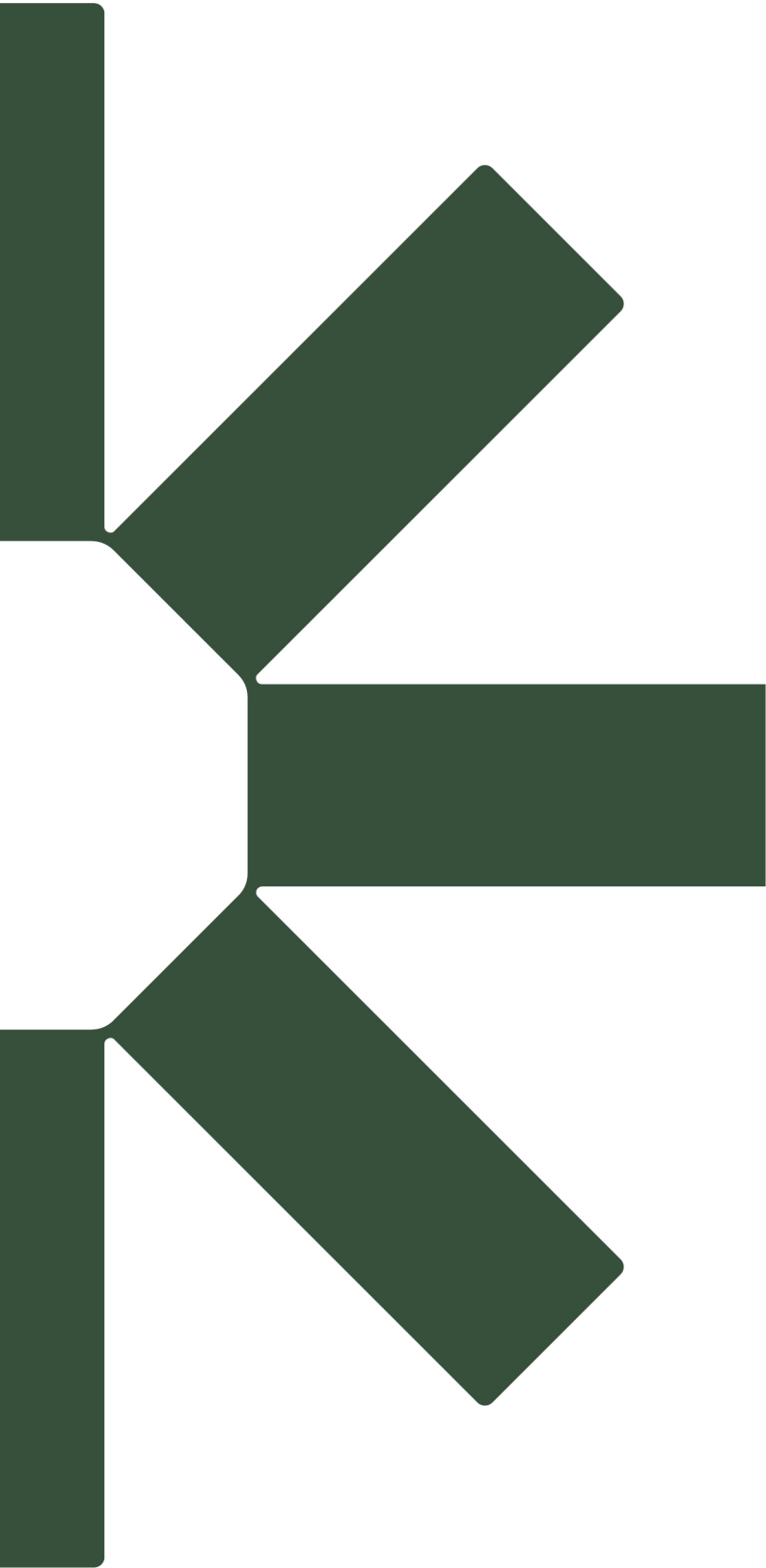
SLR Project No.: 675.VX5890.00001

17 June 2024

Scientific name	Common name	Conservation status		Abundance	Date	Latitude	Longitude	Record type
		State	Common wealth					
<i>Zanda baudinii</i>	Baudin's Cockatoo	EN	EN	1	13-10-2023	-32.9519	116.0652	Foraging evidence
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black Cockatoo	VU	VU	1	13-10-2023	-32.9519	116.0652	Foraging evidence
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black Cockatoo	VU	VU	1	14-10-2023	-32.9706	116.0709	Foraging evidence
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black Cockatoo	VU	VU	1	14-10-2023	-32.9606	116.0694	Sighting
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black Cockatoo	VU	VU	2	14-10-2023	-32.9597	116.0817	Feather
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black Cockatoo	VU	VU	3	14-10-2023	-32.9726	116.0779	Sighting - overhead
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black Cockatoo	VU	VU	6	15-10-2023	-32.9744	116.0845	Feather
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black Cockatoo	VU	VU	6	15-10-2023	-32.9609	116.0577	Sighting
<i>Dasyurus geoffroii</i>	Chuditch	VU	VU	1	18-10-2023	-32.9758	116.0861	Scat
<i>Hydromys chrysogaster</i>	Rakali	P4		1	19-10-2023	-32.9941	116.0524	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		1	14-10-2023	-32.9480	116.0893	Sighting
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		1	15-10-2023	-32.9828	116.0641	Sighting

Scientific name	Common name	Conservation status		Abundance	Date	Latitude	Longitude	Record type
		State	Common wealth					
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		1	18-10-2023	-32.9343	116.0467	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		1	18-10-2023	-32.9877	116.0565	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		1	19-10-2023	-32.9370	116.0662	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		1	20-10-2023	-32.9593	116.0459	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		1	20-10-2023	-32.9866	116.0502	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		1	23-10-2023	-32.9734	116.0827	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		1	23-10-2023	-32.9343	116.0467	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		1	24-10-2023	-32.9768	116.0507	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		1	26-10-2023	-32.9768	116.0507	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		1	26-10-2023	-32.9939	116.0679	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		1	27-10-2023	-32.9939	116.0679	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		1	27-10-2023	-32.9792	116.0870	Camera Trap

Scientific name	Common name	Conservation status		Abundance	Date	Latitude	Longitude	Record type
		State	Common wealth					
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		2	29-10-2023	-32.9973	116.0848	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		2	29-10-2023	-32.9939	116.0679	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		2	30-10-2023	-32.9451	116.0689	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		2	31-10-2023	-32.9973	116.0848	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		2	01-11-2023	-32.9768	116.0507	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		2	01-11-2023	-32.9562	116.0922	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		2	03-11-2023	-32.9734	116.0827	Camera Trap
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		1	07-11-2023	-32.9973	116.0848	Camera Trap



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