

Wildlife Monitoring Program, November 2019 to September 2022

Kyalla 117 N2 Lease Pad

30-May-2023
Tamboran Wildlife Monitoring Program

Wildlife Monitoring Program, November 2019 to September 2022

Kyalla 117 N2 Lease Pad

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Table of Contents

Executive Summary	i
1.0 Introduction	1
1.1 Background	1
1.2 Project location	1
1.3 Project equipment	1
1.4 Objectives	1
2.0 Existing environment	3
2.1 Fauna and habitat	3
2.2 Threatened fauna	3
3.0 Methods	5
3.1 Motion-activated cameras	5
3.2 Camera location	5
4.0 Results	7
4.1 North-east boundary fauna	7
4.2 Centre-east boundary fauna	10
4.3 South-east boundary Fauna	11
4.4 South-west boundary fauna	14
4.5 Centre-west boundary fauna	17
4.6 North-west boundary fauna	19
4.7 Drill sump	22
4.8 Freshwater sump	24
4.9 Kyalla gate fauna	26
5.0 Discussion	28
6.0 References	30
Appendix A	
EPBC and TPWC listed Threatened Species and Likelihood of Occurrence	A
Appendix B	
Fauna Recorded at Kyalla 117 N2	B
2019 - 2022	B
Figure 1	2
Figure 2	6
Figure 2	6
Plate 1	8
Plate 2	8
Plate 3	9
Plate 4	9
Plate 5	10
Plate 6	12
Plate 7	12
Plate 8	13
Plate 9	15
Plate 10	15
Plate 11	16
Plate 12	17
Plate 13	18
Plate 14	20
Plate 15	20
Plate 16	21
Plate 17	22
Plate 18	23
Plate 19	23

Plate 20	Diamond Dove (<i>Geopelia cuneata</i>)	24
Plate 21	Whiskered Tern (<i>Chlidonias hybrida</i>)	25
Plate 22	Flock of Budgerigars (<i>Melopsittacus undulatus</i>)	25
Plate 23	Dingo (<i>Canis lupus dingo</i>)	26
Plate 24	Apostlebirds (<i>Struthidea cinerea</i>)	27

Executive Summary

AECOM Australia Pty Ltd (AECOM) was commissioned by Tamboran B2 Pty Ltd (Tamboran) to undertake a wildlife monitoring program at the Kyalla 117 N2 exploration lease area using motion-activated cameras. The requirement for a wildlife monitoring program was triggered by concerns raised in public submissions that wildlife in the vicinity of drilling activities, including threatened birds, would be attracted to, and possibly drink from, ponds and sumps.

The use of motion-activated cameras is an ideal method to determine whether wildlife is visiting the exploration lease area, mainly focussing on the drill pad sumps as they provide effective 24-hour surveillance. Motion-activated cameras are an efficient and non-invasive tool that can be implemented for a range of wildlife management applications.

The wildlife monitoring program targeted Kyalla 117 N2 during the November 2019 to September 2022 exploration program within the Hayfield/Shenandoah Station pastoral lease.

The aim of the wildlife monitoring program (the program) is to provide a simple wildlife survey program to document the wildlife species that visit the Tamboran exploration lease area (monitoring sites).

The program used six motion-activated cameras at the Kyalla 117 N2 exploration lease area. These cameras changed positions at various stages throughout the monitoring program. Three cameras were located along the eastern perimeter, three cameras were located on the western perimeter, one camera was placed at the drilling sump, two were placed on a freshwater sump and one camera was placed at Kyalla gate near the Stuart Highway.

A total of 399 fauna sightings occurred during the monitoring period from the hundreds and thousands of wildlife monitoring photographs reviewed. Thirty-eight species were detected comprising 30 birds, five mammals, two reptiles and one amphibian.

One threatened species was potentially detected during the monitoring period, specifically a Yellow-spotted Monitor (*Varanus panoptes*). This species is listed as Vulnerable under the *Territory Parks and Wildlife Conservation Act* (TPWC Act). There is some uncertainty regarding whether the individual caught on camera is a Yellow-spotted Monitor or a Sand Monitor (*Varanus gouldii*). A photo of the individual was sent to reptile expert Steve Wilson, who suggested the species is most likely *Varanus panoptes*, but the photo does not provide enough detail to be certain.

The wildlife monitoring program provided an indication of fauna that visited the sumps and occur in the vicinity of the Kyalla 117 N2 exploration lease area.

1.0 Introduction

1.1 Background

AECOM Australia Pty Ltd (AECOM) were commissioned by Tamboran B2 Pty Ltd (Tamboran) to review results of the wildlife monitoring program at Tamboran's exploration lease area. This included analysis of several thousand of photos that were acquired from motion-activated cameras installed at strategic locations across the Kyalla 117 N2 lease area. The requirement for a wildlife monitoring program was triggered by concerns raised in public submissions that wildlife in the vicinity of drilling activities, including threatened birds, would be attracted to, and possibly drink from, ponds and sumps.

This report summarises the results of three years of fauna monitoring and is the fifth and final report of the monitoring program. Other reports that have been delivered as part of this program include:

- Wildlife Monitoring Program- Quarter 1: November 2019 – January 2020 quarterly report
- Wildlife Monitoring Program- Quarter 2: January – April 2020 quarterly report
- Wildlife Monitoring Program- Quarter 3: May – August 2020 quarterly report
- Wildlife Monitoring Program- Quarter 4: August – October 2020 quarterly report.

1.2 Project location

Tamboran conducted a series of activities to expand their exploration program in the Beetaloo Sub-basin and targeted the Kyalla 117 N2 site from November 2019 to September 2022 exploration program. This site is located within the Hayfield/Shenandoah Station pastoral lease. The location of exploration area where the wildlife monitoring program was undertaken is presented in Table 1 and Figure 1.

Table 1 Location of Wildlife Monitoring Program

Exploration Permit	Name	Station	Zone*	Easting	Northing
EP117	Kyalla 117 N2	Hayfield/Shenandoah	53	356175	8137500

1.3 Project equipment

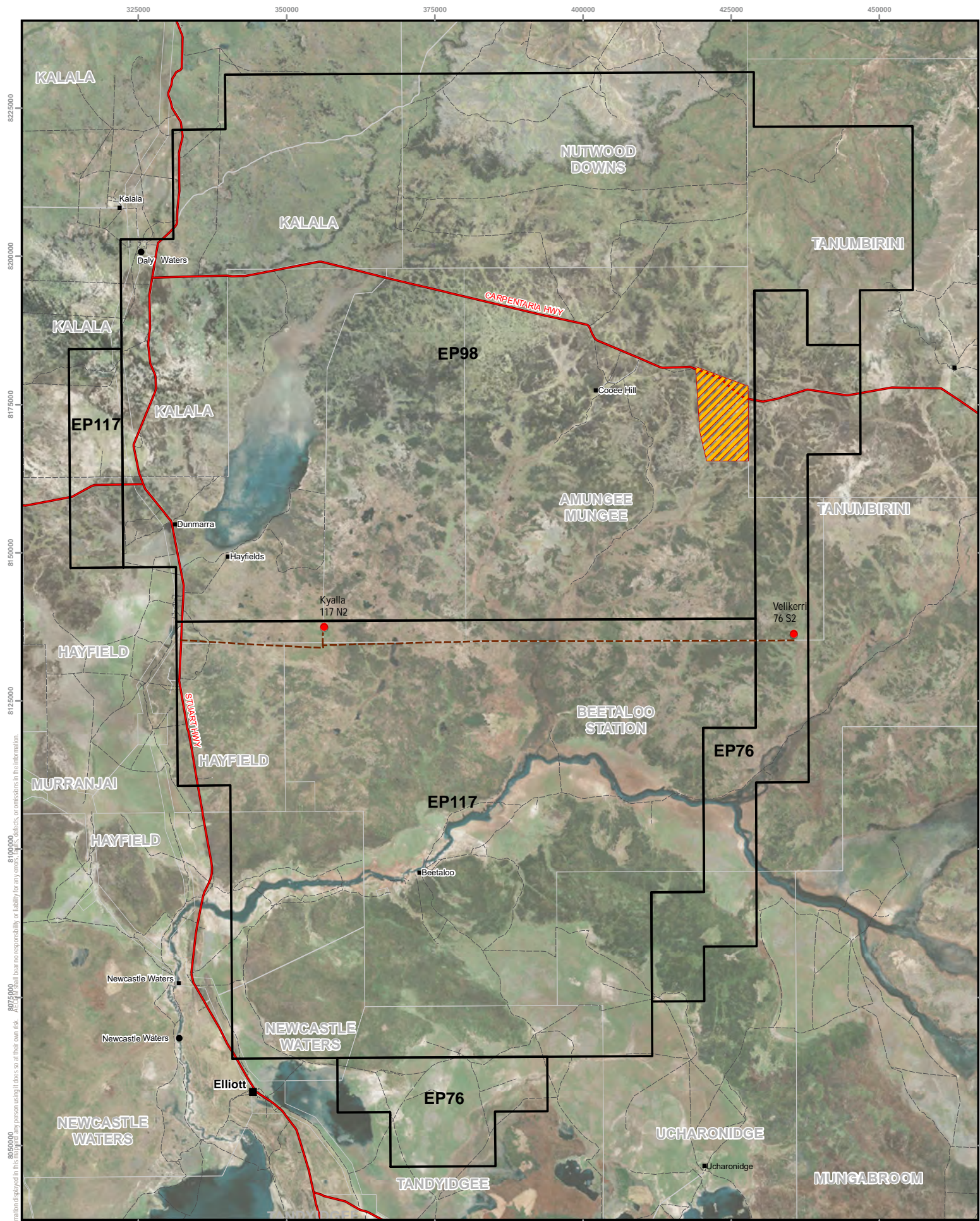
The following equipment was utilised for the program:

- 6 x Reconyx HF2X HyperFire 2 motion-activated cameras
- 6 x 32GB memory (SD) cards, plus 12 additional 32GB SD cards
- 6 sets of 12 Fujitsu rechargeable nickel-metal hydride (NiMh) batteries, plus additional 4 sets of 12 for monthly replacement
- 4 x 12 cell AA battery chargers.

1.4 Objectives

The aim of the wildlife monitoring program (the program) is to provide a simple wildlife survey program to document the wildlife species that visit the Tamboran exploration lease area (monitoring sites).

Six motion activated cameras were deployed at Kyalla 117 N2 during the November 2019 to September 2022 monitoring period.



0 5 10 20
Kilometers

1:570,000 (when printed at A3)

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LEGEND

● Drill pads	— Highway	□ Cadastre
■ Homestead	- - - Tracks	□ Permit Areas
● Place Name	- - - Access Routes	▨ Bullwaddy Conservation Reserve
■ Populated Place		

LOCATION

TAMBORAN B2 Pty Ltd
WILDLIFE MONITORING PROGRAM
Site Location

PROJECT ID: 60480548
CREATED BY: jace.emberg
LAST MODIFIED: 20-May-2019
VERSION: 1

Figure
1

2.0 Existing environment

2.1 Fauna and habitat

The exploration site is located within habitat that consists primarily of open *Eucalyptus/Corymbia* woodland with a tussock grass understorey. There are *Acacia shirleyi*/*Macropteranthes kekwickii* (Lancewood/Bullwaddy) communities around the exploration area and individuals of both species are dispersed throughout. Additional vegetation types in the wider landscape include grasslands/floodplains and acacia shrublands.

The monitoring sites have high native grass cover and include numerous grass species suitable for granivorous birds (seed eaters). Dense leaf litter and numerous logs provide suitable refuge and foraging sites for fauna such as reptiles.

Woodlands surrounding the lease pad has a high density of hollow-bearing trees that provide important habitat for many fauna species. Although most of the species found in this vegetation type are widespread in the tropical savannas of the Northern Territory, uncommon species such as the threatened Crested Shrike-tit (*Falcunculus frontatus whitei*) are known to occur in this habitat (DEE, 2014; Ward, 2008).

Bullwaddy and Lancewood groves have dense shady shrub layer under the canopy that provide habitat for ground-foraging birds and shelter for species such as the Near-Threatened (Territory Park and Wildlife Conservation (TPWC) Act) Spectacled Hare-Wallaby (*Lagorchestes conspicillatus leichardtii*) (PWCNT, 2005).

Savanna grasslands and open woodland that occur in the surrounding area provide suitable habitat for Near Threatened (TPWC Act) species such as Emu (*Dromaius novaehollandiae*) and Australian Bustard (*Ardeotis australis*). Drainage lines and seasonally inundated grasslands may also provide habitat for migratory species during the wet season and provide breeding habitat for amphibians.

2.2 Threatened fauna

A search of the Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters database of nationally significant fauna (PMST) and records from the NT Government Fauna Atlas database (NR Maps) was undertaken using a buffer of the project area. The search results indicate the potential presence of 19 fauna species listed as threatened under the EPBC Act and/or the TPWC Act. These included 10 birds, six mammals and three reptiles.

The likelihood assessment of species occurrence is based on the availability of suitable habitat within the permit area, previous records and species distribution. Many of the threatened and migratory fauna species indicated in databases as 'occurring' or 'likely to occur' have been assessed as 'unlikely to occur' within the proposed exploration lease areas. Areas in the proposed lease area have not been subject to intensive survey and some species are cryptic, a conservative approach has been taken to assess species presence. A description of each species, their distribution and habitat associations are outlined in Appendix A. This assessment aims to determine the likelihood of threatened species occurring in the vicinity of the monitoring sites and does not assess the likelihood that these species will visit the ponds and sumps that make up the exploration program.

Following a desktop assessment of land systems and vegetation communities, no core habitat for threatened fauna was determined to occur at the monitoring sites. However, some species may occur and are known to occur in the wider landscape. Threatened species that possibly occur include:

- Plains Death Adder *Acanthopsis hawkei* (Vulnerable EPBC ACT and TPWC Act)
- Gouldian Finch *Erythrura gouldiae* (Endangered EPBC Act, Vulnerable TPWC Act)
- Grey Falcon *Falco hypoleucos* (Vulnerable EPBC Act and TPWC Act)
- Crested Shrike-tit (northern) *Falcunculus frontatus whitei* (Vulnerable EPBC Act)
- Painted Honeyeater *Grantiella picta* (Vulnerable EPBC Act and TPWC Act)
- Pale Field-rat *Rattus tunneyi* (Vulnerable TPWC Act)

- Common Brushtail Possum (northern) *Trichosurus vulpecula arnhemensis* (Vulnerable EPBC Act)
- Yellow-spotted Monitor *Varanus panoptes* (Vulnerable TPWC Act).

Suitable habitat for the Plains Death Adder consists of flat, treeless, cracking-soil riverine floodplains (Cogger, 2000). A population of the species occur in the Barkly Tableland from the Northern Territory to central-western Queensland. In the Beetaloo Basin Records of the species occur close to Lake Woods, Lake Sylvester and Lake Tarrabool. The species may occur within the project area, particularly following heavy wet season rainfall.

Research has shown that critical components of suitable habitat for the Gouldian Finch include suitable nesting trees during the breeding season (*Eucalyptus tintinnans*, *E. brevifolia* or *E. leucophloia*), a water source and a diverse range of favoured annual and perennial grasses (Dostine & Franklin, 2002). No nesting habitat has been identified during previous surveys and it is unlikely this species breeds in close vicinity of the drill pads. During the wet season Gouldian Finches move from breeding habitat on hillsides with suitable trees down to lower lying areas where they forage on perennial grasses such as *Triodia* sp., *Alloterospis semialata*, and *Chrysopogon fallax* (Palmer *et al.*, 2012). Some of these perennial grasses were recorded during recent surveys so potential foraging habitat is present; however, few records occur in the vicinity of the sites, indicating it is not an important area for the species.

The Grey Falcon is a widespread species listed as Vulnerable in the NT, and possibly occurs in the project area. The species occurs in low densities throughout arid and semi-arid areas of Australia (Ward, 2012). Grey Falcons may visit monitoring sites to prey on birds if they are congregating at water sources.

The Painted Honeyeater (*Grantiella picta*) has been known to occur in region, however, given it does not breed in the NT it would only be present intermittently to forage. Suitable habitat for the species potentially occurs within the project area.

The Crested Shrike-tit lives in dry Eucalypt forests and woodland where it feeds on insects from the canopy and under bark (Ward, 2008). It has been recorded in wet Melaleuca open woodlands, woodlands dominated by Nutwood (*Terminalia arostrata*), Bloodwoods with flaky bark and ironwood (Ward, 2008). The stronghold of this species is north of the project area and only one old record exists near Borroloola.

The Pale Field-rat occurs in a wide range of habitats, including tall grasslands and woodlands (Cole & Woinarski, 2002). There are no recent records of the species within the region; however, this may reflect a lack of survey effort. Suitable habitat for the species occurs within the project area. The proposed area of impact is relatively small compared to available suitable habitat within the region.

Recent surveys have detected Common Brushtail Possum (*Trichosurus vulpecula arnhemensis*) on Kalala Station, located approximately north of project area (NTG Flora & Fauna, personal communication, 2022). Suitable woodland habitat is contiguous through the landscape; therefore, the species potentially occurs within the project area.

The Yellow-spotted Monitor occurs across northern Australia where it occupies a variety of habitats, including grasslands and woodlands (Ward *et al.*, 2012). Most records of this species are from the Top End, though it has been recorded in the Barkly Tablelands. A small population of the species may occur across the project area.

Species records can be limited in remote areas and the precautionary principle has been applied. There are some species that have been assessed as possibly occurring even though their primary habitat is not found within the proposed sites or access tracks. These include species that are associated with ephemeral wetlands and low-lying areas that may be present intermittently in the wet season.

The likelihood of threatened species being attracted to, and drinking from, pond and sump water sources at the monitoring sites is determined as low.

3.0 Methods

3.1 Motion-activated cameras

The use of motion-activated cameras is an ideal method to determine whether wildlife are visiting the exploration area, focussing on the drill pad and associated sumps they provide effective 24-hour surveillance. Motion-activated cameras are an efficient and non-invasive tool that can be implemented for a range of wildlife management applications. They provide an effective means of collecting data over long timeframes (weeks or months) with minimal output of labour and interference to wildlife (Gillespie *et al.*, 2015).

This program uses passive surveillance methods to document what wildlife species (if any) are visiting the sump and pond water sources at the Kyalla 117 N2 exploration lease area. Specifications for this camera are detailed below in Table 2.

Table 2 Reconnyx HF2X Hyperfire 2 specifications

Reconnyx HF2X Hyperfire 2	
Trigger speed	0.25 seconds
Passive Infrared Sensor range	45 meters
Image type	Colour (day and night)
Operating temperature range	-40 to 60°C

3.2 Camera location


The program for the 2019-2022 monitoring period used six motion-activated cameras at the Kyalla 117 N2 exploration lease area. These cameras changed positions at various stages throughout the monitoring program. Three cameras were located along the eastern perimeter, three cameras were located on the western perimeter, one camera was placed at the drilling sump, two were placed on a freshwater sump and one camera was placed at Kyalla gate near the Stuart Highway.

The layout of the location of the six motion-activated cameras at Kyalla 117 N2 is described in Table 3 and displayed below in Figure 2.

Table 3 Camera locations

Camera Location	Zone	Easting	Northing	Camera #	Direction Facing	Period
North-east boundary	53	356489	8137645	1	south	Nov 2019 – Oct 2022
Centre-east boundary	53	356466	8137479	2	north, south	Feb-Oct 2020
South-east boundary	53	356476	8137374	3	north, west	Nov 2019 – Jan 2022
South-west boundary	53	356312	8137383	4	east	Nov 2019 – Jul 2022
Centre-west boundary	53	356317	8137468	5	south	Nov 2019 – Jul 2020
North-west boundary	53	356324	8137555	6	south	Nov 2019 – Apr 2022
Drill sump	53	356370	8137400	5	north	Jan-Apr 2022
Freshwater sump	53	356440	8137422	2	south	Oct-Nov 2020
Freshwater sump	53	356419	8137406	5	east	Oct-Nov 2020
Kyalla gate	53	332992	8135055	2	west	Jan-Jul 2021





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Projection: GDA94 MGA Zone 53

0 25 50 100 150

Meters

1:2,500 (when printed at A3)

Legend

- Lease Pad Layout
- - - Access Tracks
- Camera
- Camera direction

LOCATION



Data sources:
Co-ordinate system: GDA_1994_MGA_Zone_53
Permit Area, Cadastre - NT Gov 2019.
Places, Vegetation - Aust Gov 2019

Tamboran B2 Pty Ltd
WILDLIFE MONITORING PROGRAM

Kyalla 117 N2
Camera layout and direction

PROJECT ID	60623736
CREATED BY	william.riddell
LAST MODIFIED	15-May-2023
VERSION	1

Figure 2

4.0 Results

A total of 399 fauna sightings occurred during the monitoring period. Thirty-eight species were detected comprising 30 birds, five mammals, two reptiles and one amphibian. Fauna sightings were distributed across the Kyalla 117 N2 exploration lease area as follows:

- 200 sightings along the south-east boundary
- 55 sightings along the north-east boundary
- 40 sightings along the south-west boundary
- 32 sightings along the north-west boundary
- 27 sightings along the centre-east boundary
- 16 sightings at the freshwater sump
- 11 sightings along the centre-west boundary
- 10 sightings at the Kyalla gate
- 8 sightings at the drill sump

4.1 North-east boundary fauna

A total of 55 fauna sighting occurred at the north-east boundary. These sightings are summarised below in Table 4 and displayed in Plate 1 to Plate 4.

Table 4 Fauna sighted at the north-east boundary

Scientific name	Common name	Number of sightings	Date/s	Number
<i>Accipiter fasciatus</i>	Brown Goshawk	1	11/10/2022	1
<i>Artamus leucorhynchus</i>	White-breasted Woodswallow	1	17/03/2020	1
<i>Artamus minor</i>	Little Woodswallow	1	24/08/2022	1
<i>Calyptorhynchus banksii</i>	Red-tailed Black Cockatoo	3	23/09/2021 – 24/09/2021	2 - ~20
<i>Chlamydera nuchalis</i>	Greater Bowerbird	1	18/03/2020	1
<i>Corvus orru</i>	Torresian Crow	11	9/09/2021 - 28/09/2021	1
<i>Eolophus roseicapilla</i>	Galah	3	25/09/2021 – 27/09/2021	2 - 3
<i>Geopelia humeralis</i>	Bar-shouldered Dove	1	17/03/2020	1
<i>Grallina cyanoleuca</i>	Magpie Lark	1	25/09/2021	2
<i>Macropus agilis</i>	Agile Wallaby	11	25/09/2021 – 21/06/2022	1 - 2
<i>Milvus migrans</i>	Black Kite	1	18/09/2021	1
<i>Nymphicus hollandicus</i>	Cockatiels	12	23/09/2021 – 28/09/2021	~5 - ~20
<i>Ocyphaps lophotes</i>	Crested Pigeon	8	18/03/2020 – 28/09/2021	1 - ~20



Plate 1 Agile Wallabies (*Macropus agilis*) fighting



Plate 2 Black Kite (*Milvus migrans*)



Plate 3 Brown Goshawk (*Accipiter fasciatus*) with small bird prey



Plate 4 Torresian Crow (*Corvus orru*)

4.2 Centre-east boundary fauna

A total of 27 fauna sightings have been recorded at the centre-east boundary. These sightings are summarised below in Table 5 and displayed in Plate 5.

Table 5 Fauna at centre-east boundary

Scientific name	Common name	Number of sightings	Date	Number
Birds				
<i>Corvus orru</i>	Torresian Crow	1	29/02/2020	1
<i>Eolophus roseicapilla</i>	Galah	9	29/06/2020 – 2/08/2020	5 - ~30
<i>Melopsittacus undulatus</i>	Budgerigar	2	12/09/2020 – 28/09/2020	~50
<i>Ocyphaps lophotes</i>	Crested Pigeon	1	22/03/2020	1
Mammals				
<i>Macropus agilis</i>	Agile Wallaby	11	5/03/2020 – 16/10/2020	1
<i>Onychogalea unguifera</i>	Northern Nailtail Wallaby	3	17/03/2020 – 30/03/2020	1



Plate 5 Northern Nailtail Wallaby (*Onychogalea unguifera*)

4.3 South-east boundary Fauna

A total of 200 fauna sighting occurred at the south-east boundary. These sightings are summarised below in Table 6 and displayed in Plate 6, Plate 7 and Plate 8.

Table 6 Fauna sighted at the south-east boundary

Scientific name	Common name	Number of sightings	Date	Number
Birds				
<i>Accipiter fasciatus</i>	Brown Goshawk	1	6/01/2022	1
<i>Artamus leucorhynchus</i>	White-breasted Woodswallow	4	16/02/2020 - 14/11/2021	1
<i>Artamus minor</i>	Little Woodswallow	6	6/09/2021 - 4/11/2021	1 - 5
<i>Burhinus grallarius</i>	Bush Stone-Curlew	1	13/02/2020	1
<i>Chlamydera nuchalis</i>	Great Bowerbird	1	4/01/2022	1
<i>Corvus orru</i>	Torresian Crow	16	1/01/2020 - 18/01/2022	1 - 2
<i>Cracticus nigrogularis</i>	Pied Butcherbird	1	24/10/2021	1
<i>Egretta novaehollandiae</i>	White-faced Heron	1	22/01/2020	1
<i>Eolophus roseicapilla</i>	Galah	5	24/10/2021	1
<i>Grallina cyanoleuca</i>	Magpie Lark	4	12/11/2021 - 6/01/2022	1 - 3
<i>Melopsittacus undulatus</i>	Budgerigar	3	18/7/2020 – 30/07/2020	100+
<i>Merops ornatus</i>	Rainbow Bee-eater	1	18/12/2019	
<i>Milvus migrans</i>	Black Kite	1	30/12/2021	
<i>Ocyphaps lophotes</i>	Crested Pigeon	5	24/10/2021	1
<i>Podargus strigoides</i>	Tawny Frogmouth	1	12/11/2021	1
<i>Rhipidura leucophrys</i>	Willie Wagtail	1	12/11/2021	2
<i>Vanellus miles</i>	Masked Lapwing	1	4/02/2020	1
Mammals				
<i>Canis lupus dingo</i>	Dingo	1	6/11/2021	1
<i>Felis catus</i>	Feral Cat	3	7/12/2021 - 19/12/2021	1
<i>Macropus agilis</i>	Agile Wallaby	141	2/01/2020 - 20/01/2022	1 - 3
<i>Onychogalea unguifera</i>	Northern Nailtail Wallaby	1	21/12/2021	1



Plate 6 Feral Cat (*Felis catus*)



Plate 7 Agile Wallabies (*Macropus agilis*)



Plate 8 Crested Pigeon (*Ocyphaps lophotes*) (left) and Pied Butcherbird (*Cracticus nigrogularis*) (right)

4.4 South-west boundary fauna

A total of 40 fauna sighting occurred at the south-west boundary. These sightings are summarised below in Table 7 and displayed in Plate 9, Plate 10 and Plate 11.

Table 7 Fauna sighted at the south-west boundary

Scientific name	Common name	Number of sightings	Date/s	Number
Birds				
<i>Ardeotis australis</i>	Australian Bustard	1	30/12/2019	1
<i>Calyptorhynchus banksii</i>	Red-tailed Black Cockatoo	3	26/12/2020 – 26/01/2021	3 - 13
<i>Corvus orru</i>	Torresian Crow	1	29/02/2021	1
<i>Geopelia cuneata</i>	Diamond Dove	1	17/02/2021	1
<i>Geopelia humeralis</i>	Bar-shouldered Dove	3	23/01/2021 – 28/02/2021	1
<i>Grallina cyanoleuca</i>	Magpie Lark	2	2/02/2022 – 17/02/2021	1
<i>Merops ornatus</i>	Rainbow Bee-eater	1	18/02/2021	1
<i>Milvus migrans</i>	Black Kite	2	8/02/2021 - 3/03/2021	1
<i>Philemon citreogularis</i>	Little Friarbird	1	8/02/2021	1
<i>Podargus strigoides</i>	Tawny Frogmouth	1	31/01/2022	1
<i>Vanellus miles</i>	Masked Lapwing	2	19/12/2020	1
Mammals				
<i>Macropus agilis</i>	Agile Wallaby	11	3/02/2022 - 7/05/2022	1 - 2
<i>Macropus robustus</i>	Common Wallaroo	2	16/05/2022 - 5/07/2022	1 - 2
<i>Onychogalea unguifera</i>	Northern Nailtail Wallaby	8	4/03/2020 – 5/04/2020	1 - 2
Reptiles				
<i>Varanus gouldii</i>	Sand Goanna	1	12/01/2020	1



Plate 9 Australian Bustard (*Ardeotis australis*)



Plate 10 Common Wallaroo (*Macropus robustus*)



Plate 11 Masked Lapwing (*Vanellus miles*)

4.5 Centre-west boundary fauna

A total of 11 fauna sightings were recorded at the centre-west boundary. These sightings are summarised below in Table 8 and shown in Plate 12 and Plate 13.

Table 8 Fauna sighted at the centre-west boundary

Scientific name	Common name	Number of sightings	Date/s	Number
Birds				
<i>Corvus orru</i>	Torresian Crow	3	24/12/2019 – 18/07/2020	1
<i>Eolophus roseicapilla</i>	Galah	4	14/7/2020 – 29/07/2020	~30 - ~40
<i>Todiramphus sanctus</i>	Sacred Kingfisher	1	28/12/2019	1
Mammals				
<i>Macropus agilis</i>	Agile Wallaby	3	2/02/2020 – 6/02/2020	



Plate 12 Torresian Crow (*Corvus orru*)



Plate 13 Galahs (*Eolophus roseicapilla*)

4.6 North-west boundary fauna

A total of 32 fauna sightings were recorded at the north-west boundary. These sightings are summarised in Table 9 and displayed in Plate 14, Plate 15 and Plate 16.

Table 9 Fauna sighted at the north-west boundary

Scientific name	Common name	Number of sightings	Date/s	Number
Birds				
<i>Artamus cinereus</i>	Black-faced Woodswallow	2	4/09/2021 - 5/09/2021	1
<i>Artamus minor</i>	Little Woodswallow	1	31/03/2022	1
<i>Corvus orru</i>	Torresian Crow	2	4/09/2021	1
<i>Eolophus roseicapilla</i>	Galah	1	17/06/2020	~30
<i>Grallina cyanoleuca</i>	Magpie Lark	4	5/09/2021 - 6/09/2021	1
<i>Milvus migrans</i>	Black Kite	2	5/09/2021 - 6/09/2021	1 - 4
<i>Ocyphaps lophotes</i>	Crested Pigeon	2	6/09/2021 - 10/03/2022	1
Amphibians				
<i>Rhinella marina</i>	Cane Toad	1	4/09/2021	1
Mammals				
<i>Canis lupus dingo</i>	Dingo	1	11/06/2020	1
<i>Macropus agilis</i>	Agile Wallaby	11	7/09/2021 - 2/04/2022	1
<i>Macropus robustus</i>	Common Wallaroo	1	28/02/2022	1
<i>Onychogalea unguifera</i>	Northern Nailtail Wallaby	1	13/03/2020	1
Reptiles				
<i>Varanus panoptes?</i>	Yellow-spotted Monitor	2	8/02/2020 – 5/03/2020	1
	Unidentified snake	1	3/09/2021	1



Plate 14 Black-faced Woodswallow (*Artamus cinereus*)



Plate 15 Magpie Lark (*Grallina cyanoleuca*)



Plate 16 Yellow-spotted Monitor (*Varanus panoptes?*), possible *Varanus gouldii*

4.7 Drill sump

Eight fauna sightings were recorded at the drill sump. These sightings are summarised in Table 10 below and displayed in Plate 17, Plate 18 and Plate 19.

Table 10 Fauna sighted at the sump

Scientific name	Common Name	Number of Sightings	Date/s	Number
<i>Ardea intermedia</i>	Intermediate Egret	1	7/04/2022	4
<i>Corvus orru</i>	Torresian Crow	1	11/07/2022	1
<i>Haliastur sphenurus</i>	Whistling Kite	1	14/07/2022	1
<i>Macropus agilis</i>	Agile Wallaby	1	22/03/2022	1
<i>Milvus migrans</i>	Black Kite	2	9/03/2022 - 31/08/2022	1
<i>Philemon citreogularis</i>	Little Friarbird	1	27/02/2022	1
<i>Rhipidura leucophrys</i>	Willie Wagtail	1	6/02/2022	1



Plate 17 Little Friarbird (*Philemon citreogularis*)



Plate 18 Willie Wagtail (*Rhipidura leucophrys*)



Plate 19 Intermediate Egrets (*Ardea intermedia*)

4.8 Freshwater sump

A total of 16 fauna sightings were recorded at the freshwater sump. Cameras were only set up at this location during September and October of 2020. Fauna sightings at the freshwater sump are summarised below in Table 11 below and displayed in Plate 20, Plate 21 and Plate 22.

Table 11 Fauna sighted at the freshwater sump

Scientific name	Common Name	Number of Sightings	Date/s	Number
Birds				
<i>Chlidonias hybrida</i>	Whiskered Tern	4	28/09/2020 – 29/09/2020	1
<i>Corvus orru</i>	Torresian Crow	1	10/10/2020	1
<i>Eurystomus orientalis</i>	Dollarbird	2	29/09/2020 – 10/10/2020	1
<i>Geopelia cuneata</i>	Diamond Dove	2	21/09/2020 – 27/09/2020	1
<i>Melopsittacus undulatus</i>	Budgerigar	6	12/09/2020 – 12/10/2020	~20 - ~50
<i>Ocyphaps lophotes</i>	Crested Pigeon	1	17/09/2020	1



Plate 20 Diamond Dove (*Geopelia cuneata*)



Plate 21 Whiskered Tern (*Chlidonias hybrida*)



Plate 22 Flock of Budgerigars (*Melopsittacus undulatus*)

4.9 Kyalla gate fauna

Ten fauna sightings were recorded at the Kyalla gate near the Stuart Highway. These sightings are summarised in Table 12 below and displayed in Plate 23 and Plate 24.

Table 12 Fauna sighted at the sump

Scientific name	Common name	Number of sightings	Date/s	Number
Birds				
<i>Struthidea cinerea</i>	Apostlebird	1	4/09/2021	2
Mammals				
<i>Canis lupus dingo</i>	Dingo	5	4/09/2021 - 20/03/2022	1 - 2
<i>Macropus agilis</i>	Agile Wallaby	4	4/09/2021 - 31/03/2022	1



Plate 23 Dingo (*Canis lupus dingo*)



Plate 24 Apostlebirds (*Struthidea cinerea*)

5.0 Discussion

A total of 38 fauna species were recorded at the Kyalla 117 N2 exploration lease pad from November 2019 to September 2022. The list of species detected during the monitoring period is shown in Appendix B.

Of the hundreds of thousands of photos reviewed over the three-year monitoring program, only 399 individual fauna records were made.

One threatened species was potentially detected during the monitoring period, specifically a Yellow-spotted Monitor (*Varanus panoptes*). This species was detected along the north-west boundary on 8 February and 5 March in 2020. There is some uncertainty regarding whether the individual caught on camera is a Yellow-spotted Monitor or a Sand Monitor (*Varanus gouldii*). The species look similar, and their range covers the Beetaloo Sub-basin. Yellow-spotted Monitor has variation in skin pattern across a vast range from northern Western Australia to the south-east interior of Queensland. The photo displayed in Plate 16 was sent to reptile expert Steve Wilson (co-author of *A complete guide to reptiles of Australia* (Wilson & Swan, 2003)) for verification of species. Steve suggested the species is most likely *Varanus panoptes* due to the robust build and compressed tail, but the photo does not provide enough detail to be certain.

Yellow-spotted Monitor is listed as Vulnerable under the TPWC Act. Populations of the species have decreased significantly since the arrival of cane toads in the Top End of the Northern Territory (Ward *et al.*, 2012).

The following species detected during the monitoring period are listed as Near Threatened under the TPWC Act:

- Australian Bustard (*Ardeotis australis*)
- Bush Stone-curlew (*Burhinus grallarius*)
- Northern Nailtail Wallaby (*Onychogalea unguifera*).

Species are listed as Near Threatened when they are not classified by legislation as threatened but is close to being or is likely to be in a threatened category in the future (NTG, 2020). There is no requirement under legislation to manage or monitor these species.

The following species detected during the monitoring period are listed as Marine species under the EPBC Act:

- Brown Goshawk (*Accipiter fasciatus*)
- Intermediate Egret (*Ardea intermedia*)
- Whiskered Tern (*Chlidonias hybrida*)
- Dollarbird (*Eurystomus orientalis*)
- Magpie Lark (*Grallina cyanoleuca*)
- Whistling Kite (*Haliastur sphenurus*)
- Rainbow Bee-eater (*Merops ornatus*)
- Sacred Kingfisher (*Todiramphus sanctus*).

The following introduced species were detected during the monitoring period:

- Feral cat (*Felis catus*)
- Cane toad (*Rhinella marina*).

Predation by feral cats (DoE, 2015b) and *The biological effects, including lethal toxic ingestion, caused by Cane Toads* (DoE, 2015c) are both listed as a key threatening process under the EPBC Act. Feral cats and cane toads are both known to have had deleterious impacts to native Australian fauna. Threat Abatement Plans have been developed for both species.

Overall, the three-year wildlife monitoring program completed by Tamboran has provided an indication of the type and number of fauna that visited the Kyalla 117 N2 exploration lease pad. From the wildlife monitoring program, there was no negative impact evident to the wildlife encountered at the exploration area.

6.0 References

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Appendix A

EPBC and TPWC listed
Threatened Species and
Likelihood of Occurrence

Appendix A EPBC and TPWC listed Threatened Species and Likelihood of Occurrence

Table 13 EPBC and TPWC Listed Threatened Species and Likelihood of Occurrence

Species	Status		Distribution	Habitat	Likelihood
	EPBC	TPWC			
Birds					
Curlew Sandpiper <i>Calidris ferruginea</i>	Marine Migratory	VU	In the NT this species occurs around Darwin, north to Melville Island and Cobourg Peninsula, and east and south-east to Gove. It has been recorded inland from Victoria River Downs and around Alice Springs (Higgins & Davies, 1996).	Coastal habitats, inland it has been found around lakes, dams and ephemeral/permanent waterholes.	Unlikely No suitable habitat within project area
Red Goshawk <i>Erythrotriorchis radiatus</i>	VU	VU	Found across most of Northern Australia, in the NT most records are from the Top End but there are records from central Australia (Pizzey & Knight, 2012).	Red Goshawks occupy a range of habitats, often at ecotones, including coastal and sub-coastal tall open forest, tropical savannahs crossed by wooded or forested watercourses. In the NT, it inhabits tall open forest/woodland as well as tall riparian woodland (Aumann & Baker-Gabb, 1991).	Unlikely No records and no suitable breeding habitat within the project area
Gouldian Finch <i>Erythrura gouldiae</i>	EN	VU	Formerly widespread across northern Australia. In the NT they are found in the Top End south past Daly Waters (Palmer <i>et al.</i> , 2012).	Gouldian Finches occupy different habitat types in the breeding and non-breeding season. Breeding habitat consists of hillsides with suitable nesting trees. Outside of the breeding season they are found in lowland drainages to feed on suitable perennial grasses (Dostine & Franklin, 2002).	Possible The closest record occurs 60 km north of the project area. Suitable foraging habitat is present
Grey Falcon <i>Falco hypoleucos</i>	VU	VU	This species has a widespread distribution and records occur throughout the NT. However, most records are from arid and semi-arid regions (Pizzey & Knight, 2012).	Grey Falcon is typically found on inland drainage systems in lightly treed lowland plains, pastoral lands, timbered watercourses and, occasionally, the driest deserts (DEPWS, 2021a).	Possible The species may forage within the project area but is unlikely to breed

Species	Status		Distribution	Habitat	Likelihood
	EPBC	TPWC			
Crested Shrike-tit (northern) <i>Falcunculus frontatus whitei</i>	VU	NT	This species has been recorded from widely scattered localities from near Timber Creek to the east Gulf Country, north to Kakadu National Park and in north-eastern Arnhem Land (DEPWS, 2021b).	Occupies wet and semi-arid melaleuca and eucalypt open woodlands. May be associated with bloodwoods with flaky bark and ironwood (Ward, 2008).	Possible No records in the vicinity of the project area. Sub-optimal habitat is present. Call-playback surveys failed to detect the species
Painted Honeyeater <i>Grantiella picta</i>	VU	VU	This species is migratory based on seasonal variation in occurrence. They breed on the inland slopes of the Great Dividing Range. After the breeding season they sometimes occur in the north-eastern NT, south of the Roper River (Garnett & Baker, 2021).	Painted Honeyeater inhabits woodlands dominated by Acacia and/or Eucalyptus species and open forests but prefers habitats with abundant mature trees that host mistletoes. The species specialises on the fruit of mistletoes although it may also forage on nectar and insects (Garnett <i>et al.</i> , 2011).	Possible No recent records occur close to the project area; however suitable habitat is present
Night Parrot <i>Pezoporus occidentalis</i>	EN	EN	Night Parrot was once widespread across arid and semi-arid regions. Recent confirmed records of the species come from widely separated locations in western Queensland and Western Australia (DEPWS, 2021c).	This species occupies spinifex grasslands in stony or sandy areas, in ephemeral herblands, samphire and chenopod shrublands on floodplains (DEPWS, 2021c).	Unlikely Suitable habitat does not occur within the project area. No recent records occur within the area
Princess Parrot <i>Polytelis alexandrae</i>	VU	VU	The Princess Parrot has an irregular distribution in arid Australia, including within the southern Tanami desert in the NT (DEPWS, 2021d).	This species occupies swales between sand dunes and occasionally occurs on the slopes and crests of dunes, in habitat consisting of shrubs such as <i>Eremophila</i> spp., <i>Grevillea</i> spp., and <i>Hakea</i> spp. (DEPWS, 2021d).	Unlikely Suitable habitat does not occur within the project area. No recent records occur within the area

Species	Status		Distribution	Habitat	Likelihood
	EPBC	TPWC			
Australian Painted Snipe <i>Rostratula australis</i>	CE	VU	Records of the species occur across the NT. More recent records come from McMinns Lagoon near Darwin, Yellow Waters in Kakadu, the Sturt Plateau, the Barkly and the Tanami (DEPWS, 2021e).	Australian Painted Snipe prefers a habitat of recently flooded temporary vegetated wetlands during the non-breeding period and brackish temporary freshwater wetlands with minimum vegetation during breeding periods. Birds usually forage in thick, low vegetated areas during the day (Curtis <i>et al</i> , 2012).	Unlikely Suitable habitat does not occur within the project area
Masked Owl (northern) <i>Tyto novaehollandiae kimberli</i>	VU	VU	The subspecies occurs in northern Australia, although its distribution is not well known. In the NT, occurs from Cobourg south to Katherine and the VRD and east to the McArthur River (DoE, 2014).	This species inhabits tall open eucalypt forest in the NT, especially those associated with <i>Eucalyptus miniata</i> and <i>E. tetradonta</i> (Woinarski, 2007). Also found in riparian and monsoonal forest and rainforest (DoE, 2014).	Unlikely No recent records occur close to the project area and suitable habitat is absent
Mammals					
Northern Quoll <i>Dasyurus hallucatus</i>	CE	EN	The species once occurred throughout most of Northern Australia although it is has declined across much of its range (Woinarski & Hill, 2012). In the NT it is found in the Top End as far southeast as Borroloola.	Northern Quolls do not have highly specific habitat requirements although the most suitable appear to be rocky habitats. They occur in a variety of habitats across their range, including open forest and woodland. Daytime den sites provide important shelter. Shelter sites include rocky outcrops, tree hollows, hollow logs, termite mounds, goanna burrows and human dwellings (Woinarski & Hill, 2012).	Unlikely No recent records, occur in the vicinity of the project area and habitat is sub-optimal
Ghost Bat <i>Macroderma gigas</i>	VU	NT	The species' range in northern Australia is from relatively arid conditions in the Pilbara region of Western Australia to humid rainforests of northern Queensland.	The distribution of Ghost Bats is influenced by the availability of suitable caves and mines for roost sites. The	Unlikely Suitable habitat does not occur

Species	Status		Distribution	Habitat	Likelihood
	EPBC	TPWC			
			A large colony occurs in a series of gold mine workings at Pine Creek, NT. This species has also been recorded throughout the mainland Top End north of approximately 17° latitude (DEPWS, 2021f).	species often roosts in a deep crack or cave during the day (DEPWS, 2021f).	within the project area
Greater Bilby <i>Macrotis lagotis</i>	VU	VU	This species occurs in south-western Queensland and in arid north-western Australia (Western Australia and Northern Territory). This species was previously widespread in arid and semi-arid Australia (Pavey, 2006). The most northern records are from Newcastle Waters and Wave Hill (Southgate & Paltridge, 1998).	In the NT, this species is found on sandy soils dominated by spinifex. Also hummock grassland associated with low lying drainage systems and alluvial areas (Pavey, 2006). Recent surveys in the Beetaloo region have recorded Greater Bilby in Eucalyptus and Corymbia woodlands mixed tussock and hummock grasses in sandy/loam soils (Davis <i>et al.</i> , 2021).	Unlikely No recent records, occur in the vicinity of the project area and suitable habitat is not present
Bare-rumped Sheath-Tailed Bat <i>Saccolaimus saccolaimus nudicluniatus</i>	CE	DD	Wide distribution from India through south-eastern Asia to the Solomon Islands, including north-eastern Queensland and the NT. Records of the species in the NT are sparsely scattered across the Top End (DEPWS, 2021g).	Previous specimens have been collected from Open <i>Pandanus</i> woodland fringing the sedgeland of the South Alligator River in Kakadu National Park, and from eucalypt woodlands and forests from coastal and adjacent inland areas (DEPWS, 2021g).	Unlikely No recent records, occur in the vicinity of the project area and habitat is not suitable
Common Brushtail Possum <i>Trichosurus vulpecula arnhemensis</i>	VU	NT	The Common Brushtail Possum (northern subspecies) occurs discontinuously from the Gulf of Carpentaria hinterland near Borroloola, NT westward to the Kimberley, WA (TSSC, 2020b).	The species occurs mainly in tall eucalypt open forests with large hollow-bearing trees, particularly where the understorey includes some shrubs that bear fleshy fruits (TSSC, 2020b).	Possible Recent records of the species occur at nearby Kalala Station and suitable habitat occurs within the project area
Pale Field-rat	-	VU	Pale Field-rat inhabits higher rainfall areas of northern and eastern Australia,	This species favours dense vegetation found along rivers where it occupies	Possible

Species	Status		Distribution	Habitat	Likelihood
	EPBC	TPWC			
<i>Rattus tunneyi</i>			including the Top End of the NT (Menkhorst & Knight, 2011).	burrows in loose colonies (Cole & Woinarski, 2002). Pale Field-rat occurs within a variety of habitats including woodlands if a dense understorey of grasses is present (Menkhorst & Knight, 2011)	One record from 1999 occurs approximately 55 km from the project area. Suitable habitat occurs within the project area
Reptiles					
Plains Death Adder <i>Acanthophis hawkei</i>	VU	VU	In the NT this species is found in the floodplains of the Adelaide, Mary and Alligator Rivers and the Barkly Tablelands (Ward & Phillips, 2012).	Plains Death Adder is found on flat cracking soils in treeless floodplains where it forages on frogs, reptiles and rats (Ward & Phillips, 2012).	Possible Moderately suitable habitat occurs within the project area. A record from 2019 occurs within 80 km north of the project area.
Gulf Snapping Turtle <i>Elseya lavarackorum</i>	-	EN	Gulf Snapping Turtle is restricted to rivers draining into the Gulf of Carpentaria, including the Calvert and Nicholson River systems (DEPWS, 2021h)	The species occurs in deep pools in the upper catchments of permanently flowing spring-fed river systems, particularly in areas with intact riparian vegetation (DEPWS, 2021h).	Unlikely No rivers or large permanent water bodies occur within the project area
Yellow-spotted Monitor <i>Varanus panoptes</i>	-	VU	Occurs across a broad geographic range across northern Australia. In the NT most records are from the Top End but occurs as far south as Renner Springs (Ward <i>et al.</i> , 2012).	Occupies a variety of habitats including coastal beaches, floodplains, grasslands and woodlands (Ward <i>et al.</i> , 2012).	Possible 2017 records occur close to the project area and suitable habitat is present.

Appendix B

Fauna Recorded at Kyalla 117 N2 2019 - 2022

Table 14 Fauna recorded at Kyalla 117 N2 November 2019 to September 2022

Scientific Name	Common Name
Birds	
<i>Accipiter fasciatus</i>	Brown Goshawk
<i>Ardea intermedia</i>	Intermediate Egret
<i>Ardeotis australis</i>	Australian Bustard
<i>Artamus cinereus</i>	Black-faced Woodswallow
<i>Artamus leucorhynchus</i>	White-breasted Woodswallow
<i>Artamus minor</i>	Little Woodswallow
<i>Burhinus grallarius</i>	Bush Stone-Curlew
<i>Calyptorhynchus banksii</i>	Red-tailed Black Cockatoo
<i>Chlamydera nuchalis</i>	Great Bowerbird
<i>Chlidonias hybrida</i>	Whiskered Tern
<i>Corvus orru</i>	Torresian Crow
<i>Cracticus nigrogularis</i>	Pied Butcherbird
<i>Egretta novaehollandiae</i>	White-faced Heron
<i>Eolophus roseicapilla</i>	Galah
<i>Eurystomus orientalis</i>	Dollarbird
<i>Geopelia cuneata</i>	Diamond Dove
<i>Geopelia humeralis</i>	Bar-shouldered Dove
<i>Grallina cyanoleuca</i>	Magpie Lark
<i>Haliastur sphenurus</i>	Whistling Kite
<i>Melopsittacus undulatus</i>	Budgerigar
<i>Merops ornatus</i>	Rainbow Bee-eater
<i>Milvus migrans</i>	Black Kite
<i>Nymphicus hollandicus</i>	Cockatiels
<i>Ocyphaps lophotes</i>	Crested Pigeon
<i>Philemon citreogularis</i>	Little Friarbird
<i>Podargus strigoides</i>	Tawny Frogmouth
<i>Rhipidura leucophrys</i>	Willie Wagtail
<i>Struthidea cinerea</i>	Apostlebird
<i>Todiramphus sanctus</i>	Sacred Kingfisher
<i>Vanellus miles</i>	Masked Lapwing
Mammals	
<i>Canis lupus dingo</i>	Dingo
<i>Felis catus</i>	Feral Cat
<i>Macropus agilis</i>	Agile Wallaby
<i>Macropus robustus</i>	Common Wallaroo

Scientific Name	Common Name
<i>Onychogalea unguifera</i>	Northern Nailtail Wallaby
Reptiles	
<i>Varanus gouldiae</i>	Sand Monitor
<i>Varanus panoptes</i>	Yellow-spotted Monitor
	Unidentified snake
Amphibians	
<i>Rhinella marina</i>	Cane Toad