



# Brush-tailed Phascogale Monitoring 2022/2023

**Oxley Highway to Kempsey, Pacific Highway Upgrade**

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*Cover photograph:* Brush-tailed Phascogale captured at Site 2 control site during 2022/2023 summer surveys (left) and Brush-tailed Phascogale with young captured at Site 2 control site during 2022/2023 winter surveys (right).

## Executive summary

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### Context

This report documents findings for the 2022/2023 monitoring period, the final of three operational monitoring periods for the Brush-tailed Phascogale (*Phascogale tapoatafa*), as required for the Oxley Highway to Kempsey (OH2K) Pacific Highway Upgrade Project (the Project), and specified in the Oxley Highway to Kempsey (OH2K) Ecological Monitoring Program (EMP, TfNSW 2022).

### Aims

The aim of the Brush-tailed Phascogale monitoring program is to determine if mitigation measures are being used by the species and whether the Project is having a local negative impact on the species. The aims of this report are to summarise the methods and results of the 2022/2023 monitoring period and determine if performance measures are being met, as per the EMP.

### Methods

Four paired impact and control sites were monitored in winter (July/August) 2022 and summer (January/February) 2023. Each monitoring location was surveyed in accordance with the monitoring method and design specified in the EMP. Arboreal trapping was undertaken for four nights over approximately two hectares of habitat using 20 Elliot B traps baited with oats, honey and peanut butter. Hair tubes were also attached to trees in a grid formation baited with honey, peanut butter and oats and left for 14 consecutive nights.

### Key results

A total of five Brush-tailed Phascogales were recorded during the 2022/2023 surveys at Site 2 Control (four captures) and Site 3 Impact (one capture). Additional species captured included the Black Rat (*Rattus rattus*), Common Brushtail Possum (*Trichosurus vulpecula*) and Brown Antechinus (*Antechinus stuartii*).

Hair tube sample analysis indicated presence of two genera: the Brushtail Possum (*Trichosurus* sp.) and *Rattus* sp.

No Brush-tailed Phascogales have been identified occupying nest boxes established as part of associated ecological monitoring for the Project within the vicinity of the survey sites.

### Conclusion

Performance measures have been met. Surveys were undertaken before and after the Project's construction and at impact and reference sites. Presence of the Brush-tailed Phascogale has been demonstrated during Brush-tailed Phascogale monitoring.

### Management implications

It is not possible to establish a decline in presence of Brush-tailed Phascogales at the survey sites due to the absence of records from baseline data. The subsequent positive outcome of the detection of individuals at Site 3 impact site during 2019 and 2023 surveys, Site 2 control during 2022/2023 surveys and additional records would indicate that the species is present in the Project Area, albeit not all at the exact monitoring locations. As such, adaptive management actions or further monitoring beyond Year 8 (2022/2023) are not recommended.

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# 1. Introduction

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## 1.1 Context

The Oxley Highway to Kempsey (OH2K) section of the Pacific Highway Upgrade Project (the Project) was approved in 2012 subject to various Ministers Conditions of Approval (MCoA) and a Statement of Commitments (SoC). A subsequent approval with additional conditions of consent (CoA) was granted in 2014 by the then Commonwealth Department of Environment (DoE) for Matters of National Environmental Significance (MNES) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1995* (EPBC Act). The Ecological Monitoring Program (hereafter referred to as the EMP) (TfNSW 2022) combines these approval conditions and defines the mitigation and offsetting requirements for threatened species and ecological communities impacted by the Project. The Brush-tailed Phascogale (*Phascogale tapoatafa*) was one threatened species identified as requiring monitoring following the completion of the Projects' construction, during the operational phase of the Project.

### 1.1.1 Legal status

The Brush-tailed Phascogale is listed as vulnerable under the New South Wales *Biodiversity Conservation Act 2016* (BC Act). Monitoring of the species is required under the Project's approval conditions.

### 1.1.2 Monitoring framework

The design, methods and performance indicators that define the Brush-tailed Phascogale monitoring program are specified in the EMP.

The EMP requires monitoring to occur in summer prior to the commencement of construction and in winter and summer in Year 4, 6 and 8 of the Project (operational phase). To date, these monitoring events have been reported as follows:

- *Summer 2014*: Baseline report (Lewis 2014)
- *Winter and Summer 2018/2019*: (Niche 2019)
- *Winter and Summer 2020/2021*: (Niche 2021)
- *Winter and Summer 2022/2023*: Current Report

This report therefore represents the final of three reports required for the operational phase monitoring.

### 1.1.3 Baseline data

Baseline surveys were undertaken in summer prior to the commencement of construction by Lewis Ecological (Lewis 2014). No Brush-tailed Phascogales were recorded during baseline surveys.

### 1.1.4 Purpose of this report

This report details the findings of the final of three operational monitoring periods for the Brush-tailed Phascogale. The aims of this report are to summarise the methods and results of the 2022/2023 monitoring period and determine if performance measures are being met, as per the EMP.

## 1.2 Performance Measures

The EMP specifies the following performance measures for the Brush-tailed Phascogale:

- *Monitoring is undertaken before and after the construction of the upgrade.*
- *Monitoring is undertaken at impact and control sites.*

- *Presence of Brush-tailed Phascogales during Brush-tailed Phascogale monitoring and/or nest box monitoring.*

### **1.3 Monitoring Timing**

Monitoring is to be undertaken in winter and summer in Year 4, 6 and 8, during high movement periods for the species, between May and July and in mid-summer.

### **1.4 Reporting**

Annual reporting of monitoring results will include:

- Detailed description of monitoring methodology
- Results of the monitoring period
- Discussion of results, including how the results compare against performance measures, if any modifications to timing or frequency of monitoring periods or monitoring methodology are required and any other recommendations
- If contingency measures should be implemented.

All reports prepared under the EMP will be submitted to the NSW Department of Planning and Environment (DPE) and the NSW Environment Protection Authority (EPA).



## 2. Survey Methods

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### 2.1 Monitoring Sites

Monitoring areas were identified during baseline surveys within four broad areas containing Moist Slopes Forest and Dry Ridgetop Forest habitat, where the species was considered likely to occur (GHD 2010, GHD 2011). They include:

- Site 1: Cairncross State Forest
- Site 2: Ballengarra State Forest South
- Site 3: Ballengarra State Forest North
- Site 4: Maria River State Forest.

Each site consists of an impact site and a paired control site. Impact sites were established during baseline surveys, however control sites were not. Control sites were therefore selected prior to the 2018/2019 monitoring period and located a minimum distance of 500 metres to one kilometre, where access permitted, from the paired impact site within contiguous vegetation. Monitoring site locations are shown in Figure 1 and trap locations at each site are shown in Figure 2- Figure 5.

### 2.2 Methods

#### 2.2.1 Arboreal trapping

In accordance with the EMP, arboreal trapping was undertaken using a grid configuration of 20 tree-mounted Elliot B traps distributed over approximately two hectares of habitat for four consecutive nights at each control and impact site. At impact sites, 10 traps were deployed on either side of the carriageway. Traps were positioned on brackets and installed approximately two metres above the ground on a range of mature canopy tree species and baited with a mixture of oats, peanut butter and honey. The host tree was sprayed with a mixture of honey water above the trap as an additional attractant. Traps were checked each morning and bait was replaced as necessary.

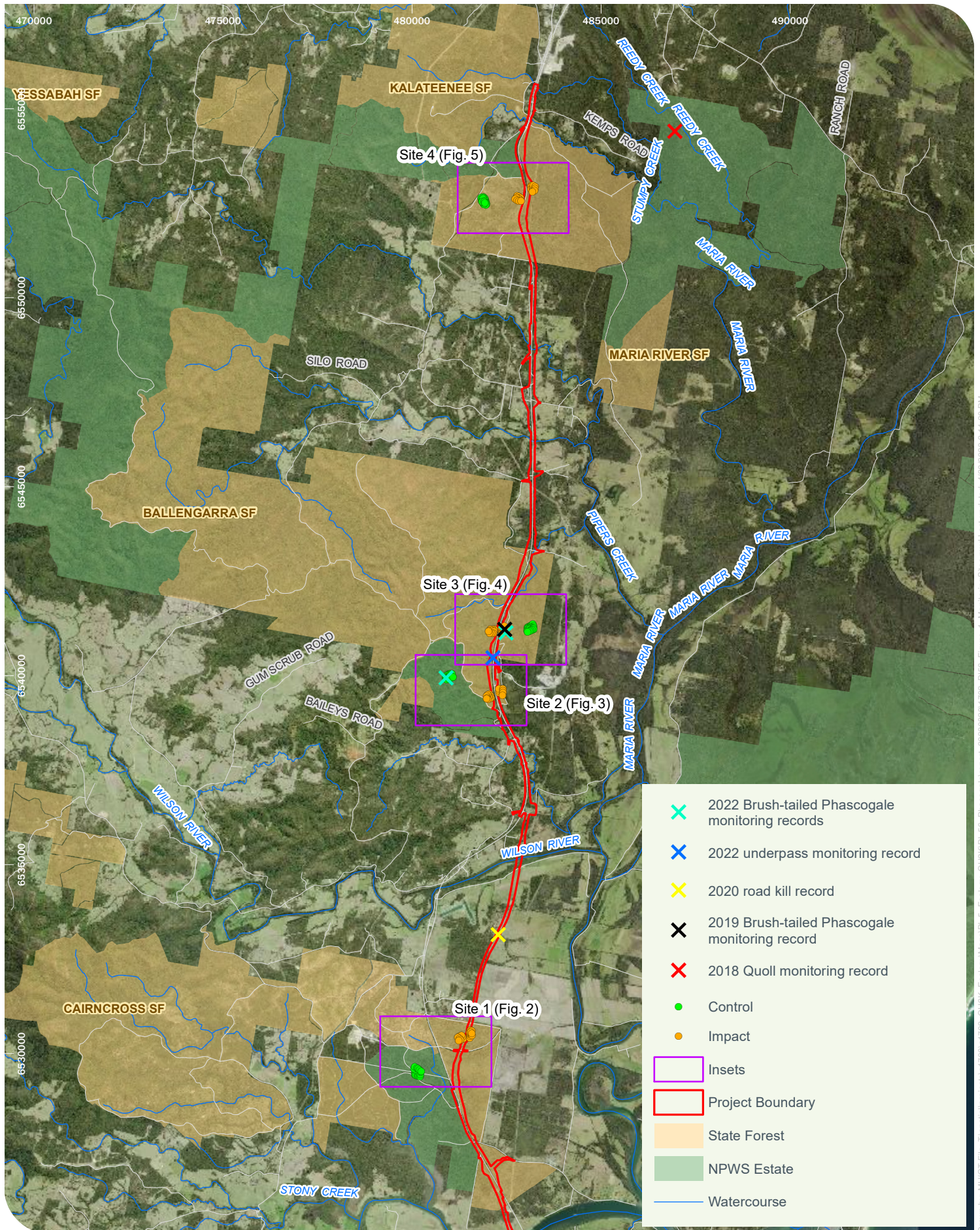
The following details were recorded for any captured fauna, where this could be determined with minimal animal handling:

- Trap location
- Sex
- Age class
- Mass
- Breeding condition.

#### 2.2.2 Hair tubes

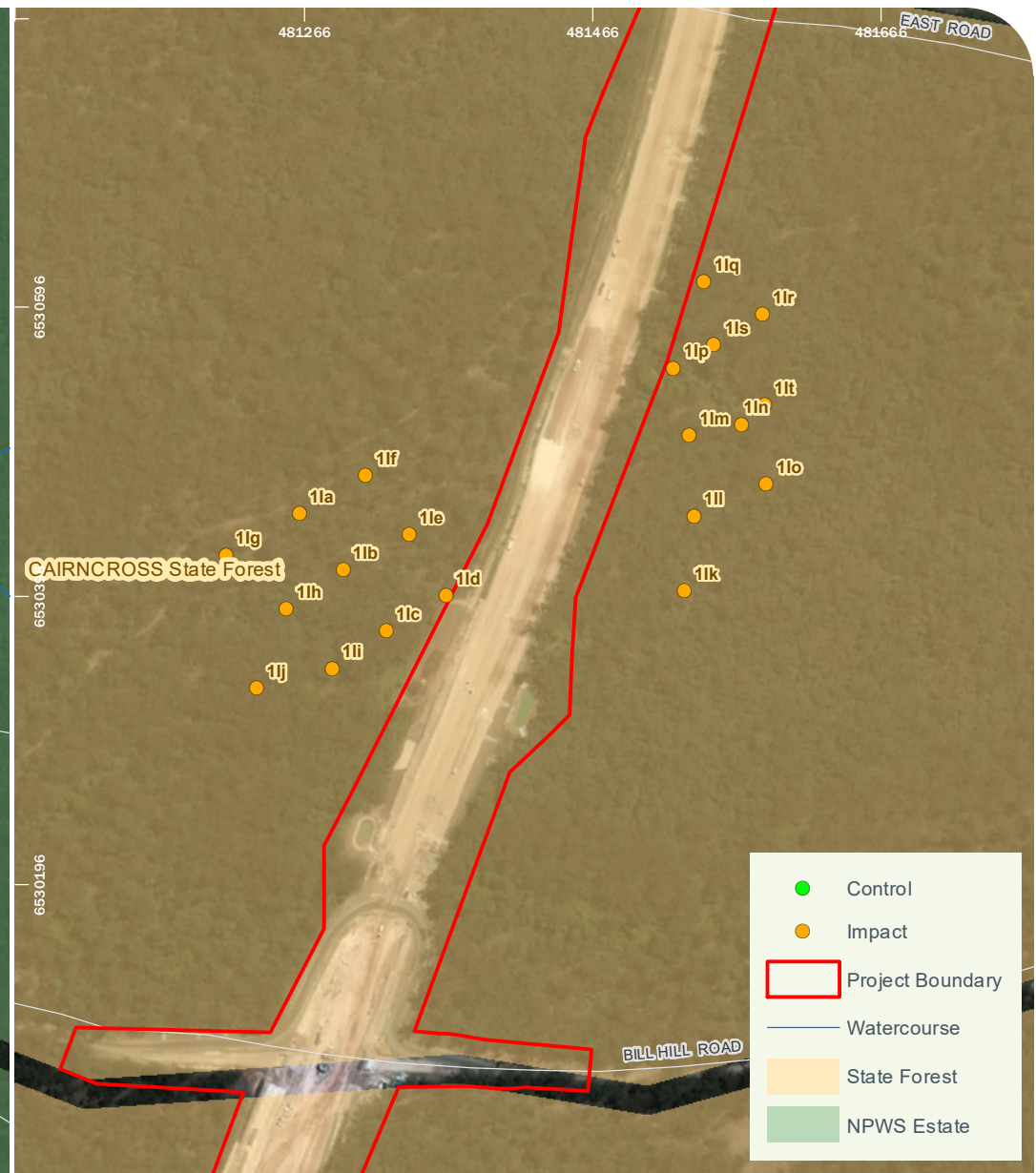
Hair tubes were attached to the same host trees used for arboreal trapping, therefore following the same grid configuration with 20 hair tubes over approximately two hectares of habitat. Hair tubes were baited with a mixture of oats, peanut butter and honey and left for 14 consecutive nights. Hair samples were sent to Robyn Carter (RC Hair ID) for analysis, and were identified to species level where possible.

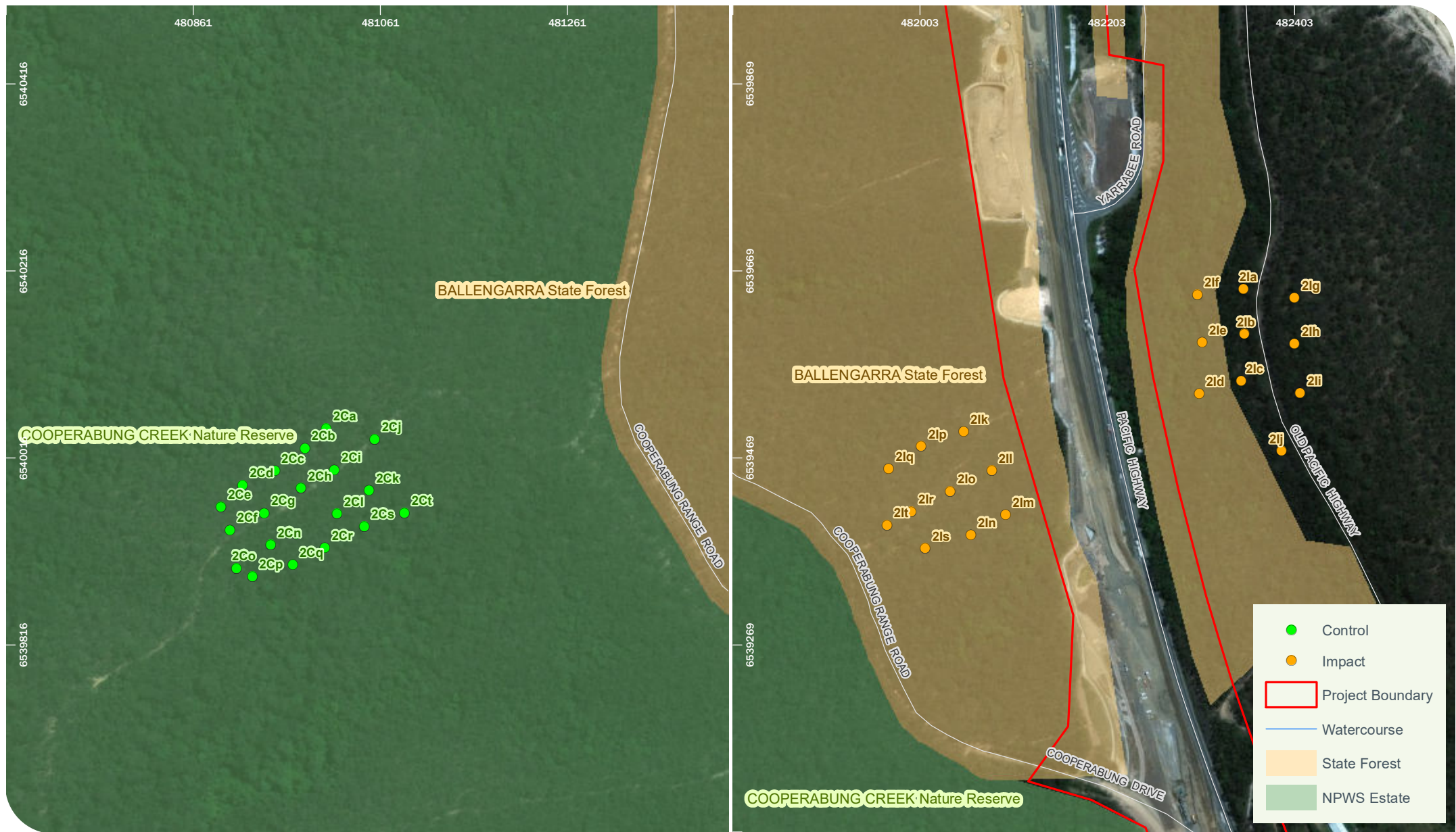




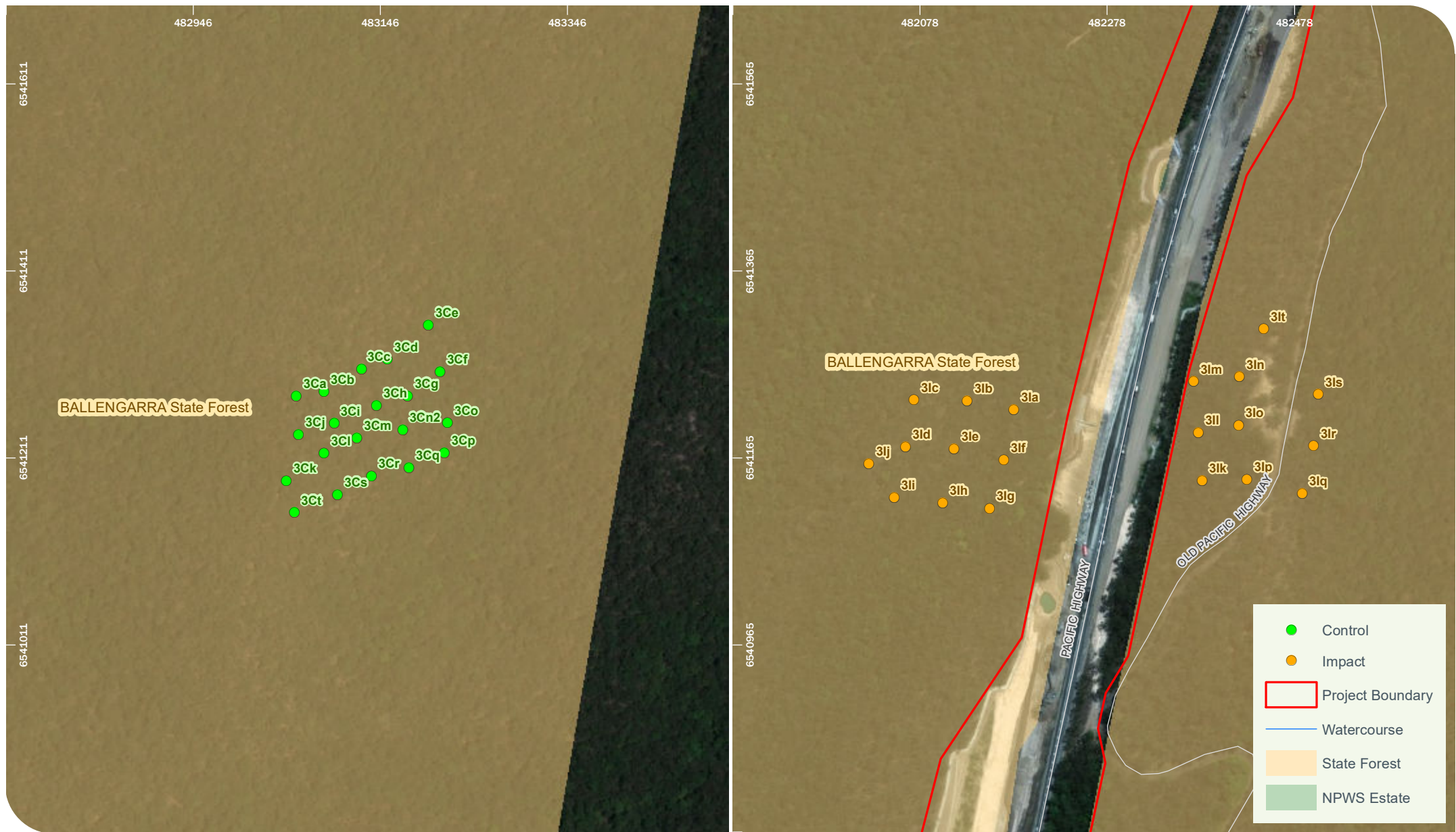
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## 3. Results

### 3.1 Timing and Conditions

Weather conditions (Port Macquarie Airport, station ID 060139) during the arboreal trapping surveys are provided in Table 1.

Arboreal trapping surveys were undertaken as follows:

- Winter: Sites 1 and 2 from 1-5 August 2022; Sites 3 and 4 from 11-15 July 2022.
- Summer: Sites 1 and 2 from 9-13 January 2023; Sites 3 and 4 from 31 January - 3 February 2023.

Hair tube surveys were undertaken as follows:

- Winter: Hair tubes were deployed on 2 August 2022 and 13 July 2022 and retrieved 18 August 2022 and 28 July 2022 for Sites 1 and 2 and Sites 3 and 4 respectively.
- Summer: Hair tubes were deployed on 2 February 2023 and 10 January 2023 for Sites 1 and 2 and Sites 3 and 4 respectively. Hair Tubes were retrieved on 31 January 2023 for Site 3, 1 March 2023 for Site 2 and 3 March 2021 for Site 4.

**Table 1: Arboreal trapping survey weather conditions 2022/2023**

Date range	Min temperature (°C)	Max temperature (°C)	24 hour rainfall (mm)
1/08/22 – 5/08/22	6.5	22.3	3.8
11/07/22 – 15/07/22	6.6	18.1	52.8
30/01/23 – 3/02/23	16.9	32.2	45.4
9/01/21 – 13/01/23	13.6	28.0	0

### 3.2 2022/2023 Monitoring Results

Field results for the 2022/2023 monitoring period are provided in Annex 1. The outcomes of the arboreal trapping and hair tube surveys are summarised below.

#### 3.2.1 Arboreal trapping

A summary of the species captured at each site is provided in Table 2. Arboreal trapping yielded low to moderate capture rates with a total of four different species detected. The target species Brush-tailed Phascogale was captured at Site 2 control in both winter (one capture) and summer (three captures) and Site 3 impact during summer (one capture) (Figure 1). The Brown Antechinus (*Antechinus stuartii*) was the most commonly captured species, with 12 and 32 individuals captured during winter and summer respectively, with recorded presence at all except one site (Site 4). The Common Brushtail Possum (*Trichosurus vulpecula*) and introduced Black Rat (*Rattus rattus*) were also captured.

**Table 2: Summary of species captured during 2022/2023 surveys**

Monitoring area	Site	Impact		Control	
		Winter	Summer	Winter	Summer
Cairncross State Forest	1	Brown Antechinus (6)	Brown Antechinus (6)	Brown Antechinus (1)	Brown Antechinus (9) Black Rat (2)
Ballengarra State Forest South	2	Brown Antechinus (3) Black Rat (1)	Brown Antechinus (7) Common Brush-tail Possum (1)	<b>Brush-tailed Phascogale</b> (1)	<b>Brush-tailed Phascogale</b> (3) Brown Antechinus (1)
Ballengarra State Forest North	3	No captures	<b>Brush-tailed Phascogale</b> (1) Black Rat (1)	Brown Antechinus (2) Common Brush-tail Possum (1) Black Rat (1)	Brown Antechinus (9) Black Rat (1)
Maria River State Forest	4	No captures	Common Brush-tail Possum (1)	No captures	No captures

(#) = number of individuals captured

### 3.2.2 Hair tubes

A complete list of hair tube results for the 2022/2023 monitoring period is provided in Annex 1 and a summary of the species detected is provided in Table 3. No Brush-tailed Phascogales were detected using hair tube sampling. From a total of 160 hair tubes deployed, 59 hair tubes (37%) contained hair samples in winter and 80 (50%) in summer. The Brushtail Possum (*Trichosurus* sp.) was the most commonly detected species identified from hair samples from all sites, accounting for 83 (50.7%) of the winter samples and 44 (80.5%) of the summer samples.

**Table 3: Hair tube analysis results 2022/2023**

Species	Site 1		Site 2		Site 3		Site 4	
	impact	control	impact	control	impact	control	impact	control
<i>Trichosurus</i> sp.	✓	✓	✓	✓	✓	✓	✓	✓
<i>Rattus rattus</i> (Black Rat)	✓	✓	✓	✓	✓	✓	✓	✓
<i>Rattus</i> sp.	✓		✓	✓	✓	✓	✓	✓
Unidentified Rodent	✓							✓

### 3.3 Additional data

Brush-tailed Phascogale record locations are shown in Figure 1. In addition to the 2022/203 monitoring data, additional data may be summarised as follows:

- One individual was captured at Site 3 impact site during the summer 2019 Brush-tailed Phascogale monitoring.
- The Brush-tailed Phascogale was recorded during Spotted-tailed Quoll monitoring in 2018 within Maria River National Park (east of Site 4 control)
- Recorded during underpass monitoring in summer 2022 passing under the highway between Site 2 and Site 3 impact sites.



- No Brush-tailed Phascogales have been recorded occupying nest boxes during the nest box monitoring program that forms part of the Project's ecological monitoring requirements. Nest boxes have to date been monitored on eight occasions; in winter 2016 and summer and winter of 2017, 2018 and 2020 and winter of 2022.
- A dead Brush-tailed Phascogale was observed on 8 April 2020 in the southbound left lane on a bridge known as Wilson's River Floodplain Bridge (approximately halfway between Sites 1 and 2, Niche 2020). Transport for NSW (TfNSW) was immediately notified of the event and vegetation control works were undertaken.

### 3.4 Cumulative result summary

Baseline survey records and records to date are provided in Table 4.

**Table 4: Cumulative results**

		Baseline	Operational	
Monitoring area	Site	Impact	Impact	Control
Cairncross State Forest	1	0	2020 road kill record approximately 2.2 km north.	0
Ballengarra State Forest South	2	0	0	Brush-tailed Phascogale (4)
Ballengarra State Forest North	3	0	Brush-tailed Phascogale (1)	0
Maria River State Forest	4	0	2018 Quoll monitoring record approximately 3 km east.	

## 4. Discussion

### 4.1 Performance Measures

A summary of survey results to date in relation to the performance measures is provided in Table 5.

**Table 5: Summary of performance measures**

Performance measure	Discussion
Monitoring is undertaken before and after construction of the upgrade.	<p><b>This performance measure has been met.</b></p> <p>Baseline monitoring was undertaken prior to construction (Lewis 2014) and after completion of the upgrade (during operational phase) in winter and summer 2018/2019 (Niche 2019), 2020/2021 (Niche 2021) and 2022/2023 (current report). 2022/2023 was the final year of monitoring (Year 8).</p>
Monitoring is undertaken at impact and control sites.	<p><b>This performance measure has been met.</b></p> <p>Control sites were not established/monitored during baseline surveys. Baseline impact sites were monitored and control sites were established and monitored during the 2018/2019, 2020/2021 and 2022/2023 monitoring periods.</p>
Presence of Brush-tailed phascogales during Brush-tailed Phascogale monitoring and/or nest box monitoring.	<p><b>This performance measure has been met.</b></p> <p>Presence of the Brush-tailed Phascogale has been demonstrated during Brush-tailed Phascogale monitoring.</p>

## 5. Recommendations

### 5.2 Contingency Measures and Recommendations

The EMP lists potential problems and contingency measures for various components of the monitoring program. Those that are considered relevant to the Brush-tailed Phascogale monitoring are listed and discussed in Table 6.

It is not possible to establish a decline in presence of Brush-tailed Phascogales at the survey sites due to the absence of records from baseline data. The subsequent positive outcome of the detection of one individual at Site 3 impact site during both the 2019 and 2022/2023 surveys, four individuals at Site 2 control site during 2022/2023 surveys and additional records would indicate that the species is present in the Project Area, albeit not all at the exact monitoring locations. As such, adaptive management actions or further monitoring beyond Year 8 (2022/2023) are not recommended.

**Table 6: Contingency measures**

Potential Problem	Contingency measure proposed in the EMP	Discussion of proposed measure
Decline in presence of target species recorded at Impact sites after the upgrade has been complete, compared to change in Control sites.	<p>The cause of decline in populations at impact sites will be investigated in consultation with EPA and DOTE within two weeks of results reported by ecologist.</p> <p>If the cause of decline is considered most likely attributed to the upgrade of the highway (and not another event such as bushfire), mitigation measures, such as the location and types of fauna crossings and fauna fencing will be reviewed within two months of the above consultation being completed.</p>	<p>Due to the absence of records from Brush-tailed Phascogale baseline data, it is not possible to determine a decline in presence of this species.</p> <p>One individual was recorded at Site 3 impact site during the 2018/2019 and 2022/2023 surveys. Four individuals were recorded at the Site 2 control site during 2022/2023 surveys.</p> <p><b>This contingency measure is not considered relevant.</b></p>

## References

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GHD (2010). Oxley Highway to Kempsey Upgrading the Pacific Highway Environmental Assessment. Report prepared by GHD on behalf of RTA, September 2010.

GHD (2011). Pacific Highway Upgrade - Oxley Highway to Kempsey. Supplementary Flora and Fauna Assessment. Report prepared by GHD on behalf of RTA, February 2011.

Lewis (2014). Oxley Highway to Kempsey. Pre-construction Baseline Monitoring: Winter-Summer. Prepared by Lewis Ecological.

Niche (2019). Brush-tailed Phascogale Monitoring 2018/2019. Oxley Highway to Kempsey, Pacific Highway Upgrade. Prepared for Roads and Maritime.

Niche (2020). Road Kill Monitoring 2019/2020. Oxley Highway to Kempsey, Pacific Highway Upgrade. Prepared for Transport for NSW.

Niche (2021). Brush-tailed Phascogale Monitoring 2020/2021. Oxley Highway to Kempsey, Pacific Highway Upgrade. Prepared for Roads and Maritime.

TfNSW (2022). Oxley Highway to Kempsey Pacific Highway Upgrade Ecological Monitoring Program. Transport for NSW Update to report prepared by SMEC Hyder Joint Venture, February 2022.

## Annex 1 – 2022/2023 field data

**Table 7: Arboreal trapping data**

Site	Season	Date	Imp/cont	SOC	Trap ID	Species	Sex	Age
1	Winter	5/08/2022	Control	W	S	Brown Antechinus	Unk	adult
1	Winter	2/08/2022	Impact	E	R	Brown Antechinus	Unk	adult
1	Winter	3/08/2022	Impact	E	C	Brown Antechinus	Unk	adult
1	Winter	5/08/2022	Impact	E	R	Brown Antechinus	Unk	adult
1	Winter	5/08/2022	Impact	E	S	Brown Antechinus	Unk	adult
1	Winter	5/08/2022	Impact	E	P	Brown Antechinus	Unk	adult
1	Winter	5/08/2022	Impact	E	M	Brown Antechinus	Unk	adult
1	Summer	1/02/2023	Control	W	J	Brown Antechinus	Unk	adult
1	Summer	1/02/2023	Control	W	E	Brown Antechinus	Unk	adult
1	Summer	1/02/2023	Control	W	S	Brown Antechinus	Unk	adult
1	Summer	2/02/2023	Control	W	O	Brown Antechinus	Unk	adult
1	Summer	3/02/2023	Control	E	A	Black Rat	Unk	adult
1	Summer	3/02/2023	Control	E	P	Brown Antechinus	Unk	adult
1	Summer	3/02/2023	Control	E	D	Brown Antechinus	Unk	adult
1	Summer	3/02/2023	Control	E	Q	Brown Antechinus	Unk	adult
1	Summer	3/02/2023	Control	E	N	Brown Antechinus	Unk	adult
1	Summer	3/02/2023	Control	E	J	Black Rat	Unk	adult
1	Summer	2/02/2023	Control	W	Q	Brown Antechinus	Unk	adult
1	Summer	31/01/2023	Impact	E	T	Brown Antechinus	Unk	adult
1	Summer	31/01/2023	Impact	E	Q	Brown Antechinus	Unk	adult
1	Summer	1/02/2023	Impact	W	A	Brown Antechinus	Unk	adult
1	Summer	1/02/2023	Impact	W	H	Brown Antechinus	Unk	adult
1	Summer	3/02/2023	Impact	W	A	Brown Antechinus	Unk	adult
1	Summer	3/02/2023	Impact	E	P	Brown Antechinus	Unk	adult
2	Winter	4/08/2022	Control	W	R	Brush-tailed Phascogale	F	Adult with young
2	Winter	3/08/2022	Impact	E	E	Black Rat	Unk	adult
2	Winter	4/08/2022	Impact	E	E	Brown Antechinus	Unk	adult
2	Winter	5/08/2022	Impact	E	F	Brown Antechinus	Unk	adult
2	Winter	5/08/2022	Impact	E	E	Brown Antechinus	Unk	adult
2	Summer	31/01/2023	Control	W	N	Brown Antechinus	Unk	adult
2	Summer	31/01/2023	Control	W	J	Brush-tailed Phascogale	F	adult
2	Summer	3/02/2023	Control	W	H	Brush-tailed Phascogale	F	adult
2	Summer	3/02/2023	Control	W	F	Brush-tailed Phascogale	F	adult
2	Summer	31/01/2023	Impact	W	P	Brown Antechinus	Unk	adult

Site	Season	Date	Imp/cont	SOC	Trap ID	Species	Sex	Age
2	Summer	1/02/2023	Impact	E	C	Brown Antechinus	Unk	adult
2	Summer	1/02/2023	Impact	E	E	Brown Antechinus	Unk	adult
2	Summer	2/02/2023	Impact	W	M	Brown Antechinus	Unk	adult
2	Summer	2/02/2023	Impact	E	C	Brown Antechinus	Unk	adult
2	Summer	3/02/2023	Impact	W	M	Brown Antechinus	Unk	adult
2	Summer	3/02/2023	Impact	W	K	Brown Antechinus	Unk	adult
2	Summer	4/02/2023	Impact	W	K	Common Brushtail Possum	Unk	adult
3	Winter	13/07/2022	Control	E	L	Common Brushtail Possum	Unk	adult
3	Winter	14/07/2022	Control	E	H	Brown Antechinus	Unk	adult
3	Winter	15/07/2022	Control	E	H	Brown Antechinus	Unk	adult
3	Winter	15/07/2022	Control	E	T	Black Rat	Unk	YA
3	Summer	11/01/2023	Control	E	A	Brown Antechinus	M	adult
3	Summer	11/01/2023	Control	E	D	Brown Antechinus	M	adult
3	Summer	11/01/2023	Control	E	H	Brown Antechinus	Unk	adult
3	Summer	12/01/2023	Control	E	D	Brown Antechinus	Unk	adult
3	Summer	12/01/2023	Control	E	G	Brown Antechinus	Unk	adult
3	Summer	12/01/2023	Control	E	Q	Brown Antechinus	Unk	adult
3	Summer	13/01/2023	Control	E	A	Brown Antechinus	Unk	adult
3	Summer	13/01/2023	Control	E	D	Brown Antechinus	Unk	adult
3	Summer	13/01/2023	Control	E	G	Brown Antechinus	Unk	adult
3	Summer	13/01/2023	Control	E	E	Black Rat	Unk	adult
3	Summer	11/01/2023	Impact	E	Q	Brush-tailed Phascogale	M	adult
3	Summer	13/01/2023	Impact	W	J	Black Rat	Unk	adult
4	Summer	13/01/2023	Impact	W	J	Common Brushtail Possum	Unk	adult

SOC = side of carriageway; E = east; W = west; M = male; F = female; YA = young adult; Unk = unknown

**Table 8: Hair tube field results**

Area	HT ID	Site	Site type	SOC	Winter deploy date	Winter retrieve date	Winter species ID	Summer deploy date	Summer retrieve date	Summer species ID
Cairncross State Forest	1Ca	1	Control	W	2/08/2022	18/08/2022	<i>Rattus</i> sp.	2/02/2023	3/03/2023	<i>Trichosurus</i> sp.
Cairncross State Forest	1Cb	1	Control	W	2/08/2022	18/08/2022	<i>Rattus</i> sp.	2/02/2023	3/03/2023	<i>Rattus</i> sp.
Cairncross State Forest	1Cc	1	Control	W	2/08/2022	18/08/2022	<i>Rattus</i> sp.	2/02/2023	3/03/2023	<i>Trichosurus</i> sp.
Cairncross State Forest	1Cd	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1Ce	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1Cf	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1Cg	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1Ch	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1Ci	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1Cj	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1Ck	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1Cl	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1Cm	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1Cn	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1Co	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1Cp	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1Cq	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1Cr	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1Cs	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1Ct	1	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1la	1	Impact	W	2/08/2022	18/08/2022	<i>Rattus</i> sp. <i>Trichosurus</i> sp.	2/02/2023	3/03/2023	<i>Trichosurus</i> sp.
Cairncross State Forest	1lb	1	Impact	W	2/08/2022	18/08/2022	Rodent	2/02/2023	3/03/2023	<i>Trichosurus</i> sp.
Cairncross State Forest	1lc	1	Impact	W	2/08/2022	18/08/2022	<i>Rattus rattus</i>	2/02/2023	3/03/2023	<i>Trichosurus</i> sp.



Area	HT ID	Site	Site type	SOC	Winter deploy date	Winter retrieve date	Winter species ID	Summer deploy date	Summer retrieve date	Summer species ID
Cairncross State Forest	1ld	1	Impact	W	2/08/2022	18/08/2022	<i>Rattus</i> sp.	2/02/2023	3/03/2023	<i>Trichosurus</i> sp.
Cairncross State Forest	1le	1	Impact	W	2/08/2022	18/08/2022	<i>Rattus</i> sp.	2/02/2023	3/03/2023	<i>Trichosurus</i> sp.
Cairncross State Forest	1lf	1	Impact	W	2/08/2022	18/08/2022	Rodent	2/02/2023	3/03/2023	<i>Trichosurus</i> sp.
Cairncross State Forest	1lg	1	Impact	W	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	3/03/2023	<i>Trichosurus</i> sp.
Cairncross State Forest	1lh	1	Impact	W	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	3/03/2023	<i>Trichosurus</i> sp.
Cairncross State Forest	1li	1	Impact	W	2/08/2022	18/08/2022	Rodent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1lj	1	Impact	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1lk	1	Impact	E	2/08/2022	18/08/2022	Rodent	2/02/2023	3/03/2023	<i>Trichosurus</i> sp.
Cairncross State Forest	1ll	1	Impact	E	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1lm	1	Impact	E	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1ln	1	Impact	E	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1lo	1	Impact	E	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1lp	1	Impact	E	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1lq	1	Impact	E	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1lr	1	Impact	E	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1ls	1	Impact	E	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Cairncross State Forest	1lt	1	Impact	E	2/08/2022	18/08/2022	no hair not sent	2/02/2023	3/03/2023	no hair not sent
Ballengarra State Forest South	2Ca	2	Control	W	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Cb	2	Control	W	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Cc	2	Control	W	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Cd	2	Control	W	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Ce	2	Control	W	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Cf	2	Control	W	2/08/2022	18/08/2022	<i>Rattus</i> sp.	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Cg	2	Control	W	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.

Area	HT ID	Site	Site type	SOC	Winter deploy date	Winter retrieve date	Winter species ID	Summer deploy date	Summer retrieve date	Summer species ID
Ballengarra State Forest South	2Ch	2	Control	W	2/08/2022	18/08/2022	<i>Rattus</i> sp.	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Ci	2	Control	W	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Cj	2	Control	W	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Ck	2	Control	W	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Cl	2	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Cm	2	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Cn	2	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	no hair not sent
Ballengarra State Forest South	2Co	2	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	no hair not sent
Ballengarra State Forest South	2Cp	2	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	no hair not sent
Ballengarra State Forest South	2Cq	2	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	no hair not sent
Ballengarra State Forest South	2Cr	2	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	no hair not sent
Ballengarra State Forest South	2Cs	2	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	no hair not sent
Ballengarra State Forest South	2Ct	2	Control	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	no hair not sent
Ballengarra State Forest South	2Ia	2	Impact	E	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Ib	2	Impact	E	2/08/2022	18/08/2022	Rodent	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Ic	2	Impact	E	2/08/2022	18/08/2022	<i>Rattus</i> sp.	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Id	2	Impact	E	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Ie	2	Impact	E	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2If	2	Impact	E	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	1/03/2023	<i>Rattus</i> sp.
Ballengarra State Forest South	2Ig	2	Impact	E	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Ih	2	Impact	E	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest South	2Ii	2	Impact	E	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	no hair not sent
Ballengarra State Forest South	2Ij	2	Impact	E	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	no hair not sent
Ballengarra State Forest South	2Ik	2	Impact	W	2/08/2022	18/08/2022	<i>Trichosurus</i> sp.	2/02/2023	1/03/2023	no hair not sent

Area	HT ID	Site	Site type	SOC	Winter deploy date	Winter retrieve date	Winter species ID	Summer deploy date	Summer retrieve date	Summer species ID
Ballengarra State Forest South	2Il	2	Impact	W	2/08/2022	18/08/2022	Rodent	2/02/2023	1/03/2023	<i>Trichosurus</i> sp. <i>Rattus</i> sp.
Ballengarra State Forest South	2Im	2	Impact	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	<i>Trichosurus</i> sp. <i>Rattus</i> sp.
Ballengarra State Forest South	2In	2	Impact	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	no hair not sent
Ballengarra State Forest South	2Io	2	Impact	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	no hair not sent
Ballengarra State Forest South	2Ip	2	Impact	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	no hair not sent
Ballengarra State Forest South	2Iq	2	Impact	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	no hair not sent
Ballengarra State Forest South	2Ir	2	Impact	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	no hair not sent
Ballengarra State Forest South	2Is	2	Impact	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	no hair not sent
Ballengarra State Forest South	2It	2	Impact	W	2/08/2022	18/08/2022	no hair not sent	2/02/2023	1/03/2023	no hair not sent
Ballengarra State Forest North	3Ca	3	Control	E	13/07/2022	28/07/2022	<i>Trichosurus</i> sp.	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest North	3Cb	3	Control	E	13/07/2022	28/07/2022	<i>Trichosurus</i> sp.	10/01/2023	1/02/2023	<i>Rattus</i> sp.
Ballengarra State Forest North	3Cc	3	Control	E	13/07/2022	28/07/2022	<i>Trichosurus</i> sp.	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest North	3Cd	3	Control	E	13/07/2022	28/07/2022	<i>Trichosurus</i> sp.	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Ce	3	Control	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Cf	3	Control	E	13/07/2022	28/07/2022	<i>Rattus</i> sp.	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Cg	3	Control	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Ch	3	Control	E	13/07/2022	28/07/2022	<i>Rattus</i> sp.	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Ci	3	Control	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Cj	3	Control	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Ck	3	Control	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Cl	3	Control	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest North	3Cm	3	Control	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest North	3Cn	3	Control	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.

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Ballengarra State Forest North	3Co	3	Control	E	13/07/2022	28/07/2022	<i>Rattus</i> sp. <i>Trichosurus</i> sp.	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest North	3Cp	3	Control	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest North	3Cq	3	Control	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest North	3Cr	3	Control	E	13/07/2022	28/07/2022	undiagnostic	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest North	3Cs	3	Control	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Ct	3	Control	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Ia	3	Impact	W	13/07/2022	28/07/2022	<i>Rattus</i> sp.	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest North	3Ib	3	Impact	W	13/07/2022	28/07/2022	Rodent	10/01/2023	1/02/2023	<i>Trichosurus</i> sp. <i>Rattus</i> sp.
Ballengarra State Forest North	3Ic	3	Impact	W	13/07/2022	28/07/2022	<i>Trichosurus</i> sp.	10/01/2023	1/02/2023	<i>Rattus</i> sp.
Ballengarra State Forest North	3Id	3	Impact	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Trichosurus</i> sp. <i>Rattus</i> sp.
Ballengarra State Forest North	3Ie	3	Impact	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Rattus</i> sp.
Ballengarra State Forest North	3If	3	Impact	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Ig	3	Impact	W	13/07/2022	28/07/2022	<i>Rattus</i> sp.	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Ih	3	Impact	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Ii	3	Impact	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Ij	3	Impact	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Ik	3	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest North	3Il	3	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Ballengarra State Forest North	3Im	3	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3In	3	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Io	3	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Ip	3	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent

Area	HT ID	Site	Site type	SOC	Winter deploy date	Winter retrieve date	Winter species ID	Summer deploy date	Summer retrieve date	Summer species ID
Ballengarra State Forest North	3Iq	3	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Ir	3	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3Is	3	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Ballengarra State Forest North	3It	3	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Ca	4	Control	W	13/07/2022	28/07/2022	<i>Rattus rattus</i>	10/01/2023	1/02/2023	Rodent
Maria River State Forest	4Cb	4	Control	W	13/07/2022	28/07/2022	Rodent	10/01/2023	1/02/2023	<i>Rattus rattus</i>
Maria River State Forest	4Cc	4	Control	W	13/07/2022	28/07/2022	Human	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Maria River State Forest	4Cd	4	Control	W	13/07/2022	28/07/2022	Possum	10/01/2023	1/02/2023	<i>Rattus</i> sp.
Maria River State Forest	4Ce	4	Control	W	13/07/2022	28/07/2022	<i>Rattus</i> sp.	10/01/2023	1/02/2023	<i>Rattus</i> sp.
Maria River State Forest	4Cf	4	Control	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Rattus rattus</i> <i>Trichosurus</i> sp.
Maria River State Forest	4Cg	4	Control	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Rattus rattus</i> Rodent
Maria River State Forest	4Ch	4	Control	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	Rodent <i>Rattus</i> sp.
Maria River State Forest	4Ci	4	Control	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Maria River State Forest	4Cj	4	Control	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Maria River State Forest	4Ck	4	Control	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Cl	4	Control	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Cm	4	Control	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Cn	4	Control	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Co	4	Control	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Cp	4	Control	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Cq	4	Control	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Cr	4	Control	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent

Area	HT ID	Site	Site type	SOC	Winter deploy date	Winter retrieve date	Winter species ID	Summer deploy date	Summer retrieve date	Summer species ID
Maria River State Forest	4Cs	4	Control	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Ct	4	Control	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Ia	4	Impact	W	13/07/2022	28/07/2022	<i>Trichosurus</i> sp.	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Maria River State Forest	4Ib	4	Impact	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Maria River State Forest	4Ic	4	Impact	W	13/07/2022	28/07/2022	<i>Trichosurus</i> sp.	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Maria River State Forest	4Id	4	Impact	W	13/07/2022	28/07/2022	<i>Trichosurus</i> sp.	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Maria River State Forest	4Ie	4	Impact	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Maria River State Forest	4If	4	Impact	W	13/07/2022	28/07/2022	<i>Trichosurus</i> sp.	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Maria River State Forest	4Ig	4	Impact	W	13/07/2022	28/07/2022	<i>Trichosurus</i> sp.	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Maria River State Forest	4Ih	4	Impact	W	13/07/2022	28/07/2022	Rodent <i>Trichosurus</i> sp.	10/01/2023	1/02/2023	<i>Rattus</i> sp. Rodent
Maria River State Forest	4Ii	4	Impact	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Maria River State Forest	4Ij	4	Impact	W	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	<i>Trichosurus</i> sp.
Maria River State Forest	4Ik	4	Impact	E	13/07/2022	28/07/2022	<i>Rattus rattus</i>	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Il	4	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Im	4	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4In	4	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Io	4	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Ip	4	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Iq	4	Impact	E	13/07/2022	28/07/2022	<i>Rattus</i> sp.	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Ir	4	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4Is	4	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent
Maria River State Forest	4It	4	Impact	E	13/07/2022	28/07/2022	no hair not sent	10/01/2023	1/02/2023	no hair not sent

SOC = side of carriageway; E = east; W = west

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## **Niche Environment and Heritage**

A specialist environmental and heritage consultancy.

### **Head Office**

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