



Ashton Coal

2025 Fauna and Habitat Monitoring Program

FINAL

March 2026

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Prepared by
Umwelt (Australia) Pty Limited

On behalf of
Ashton Coal Operations Pty Ltd (ACOL)

Project Director: Shaun Corry
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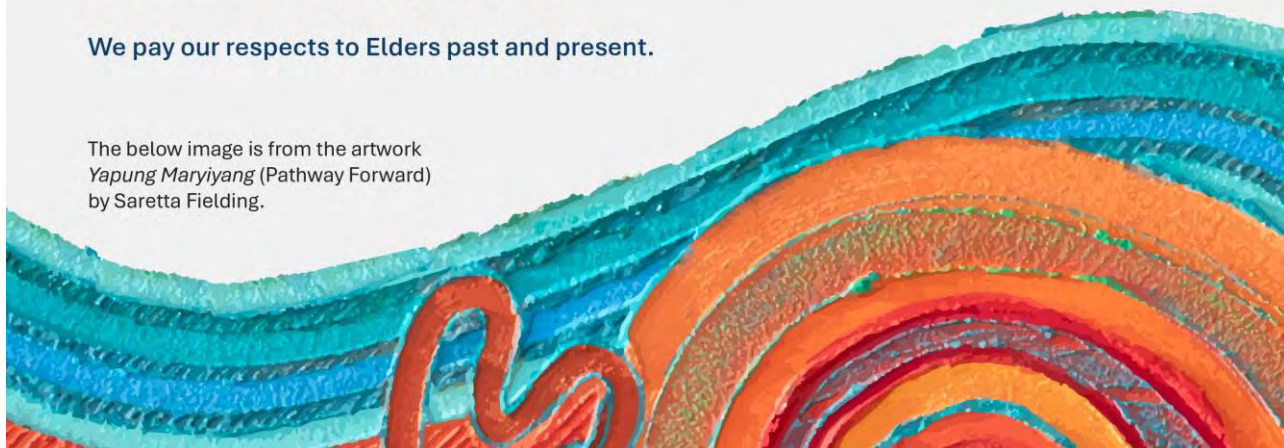
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We pay our respects to Elders past and present.

The below image is from the artwork *Yapung Maryiyang* (Pathway Forward) by Saretta Fielding.



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Executive Summary

Umwelt was engaged by Ashton Coal Operations Pty Ltd (ACOL) to undertake the 2025 bi-annual terrestrial fauna and habitat monitoring program for the Ashton Coal Project (ACP). Monitoring was completed in accordance with the Biodiversity Management Plan (BMP 2025) and relevant development consent conditions, including requirements relating to the Southern Woodland Voluntary Conservation Area (VCA) and the ACOL-operated Ravensworth Underground Mine (RUM). The 2025 surveys were undertaken between 30 June to 4 July (winter) and 17 to 21 November (spring) using a Before–After Control–Impact (BACI) design. This framework allows for comparison of ecological conditions between areas subject to underground mining influences (impact sites) and areas outside undermined zones (control sites). Additional reduced-effort surveys were completed within the North East Open Cut (NEOC) Rehabilitation area and the Bowmans Creek Diversion Revegetation area, with targeted bird and habitat monitoring also undertaken for the ACOL-operated RUM in accordance with the updated ACOL BMP (2025).

Prevailing weather conditions during the survey periods were suitable for fauna activity; however, prior drought conditions in the region continued to influence habitat quality and species detectability. This was most evident at Bowmans Creek, where long-term drought-related canopy dieback persists, reducing surface water availability and altering riparian habitat function. In contrast, Glennies Creek maintained permanent flows and high-quality riparian habitat, functioning as an important control site.

A total of 120 fauna species were recorded across the ACP during the 2025 monitoring program, including species detected in the NEOC Rehabilitation area, Bowmans Creek Diversion, and ACOL-operated RUM areas. Species richness remained higher at the impact sites (102 species) compared with control sites (76 species). This pattern is consistent with historical monitoring trends and suggests that mining activities did not result in measurable reductions in species diversity in 2025. These findings indicate that the existing habitat conditions across the ACP remain capable of supporting diverse fauna communities and that subsidence impacts have not adversely affected fauna assemblages.

The NEOC Rehabilitation area continued to show promising ecological progression, with 22 species recorded in 2025 consistent with 2024 and generally increasing relative to earlier monitoring years. The Bowmans Creek Diversion Revegetation area recorded 28 species, a result comparable to 2020–2022 and higher than 2023. While diversity in these reconstructed areas remains lower than in established woodland and riparian environments, this is expected given the younger age of vegetation communities and the reduced survey methodology applied. Nevertheless, both sites are tracking toward improved structural and habitat complexity, demonstrating ongoing progress toward reconstructed ecosystem goals.

Overall, the 2025 monitoring program indicates stable fauna diversity across the ACP, continued development of rehabilitated and revegetated areas, and no significant adverse effects from mining activities on fauna communities or habitat condition. Climatic variability, rather than mining activity, remains the dominant influence on habitat quality and fauna detectability, particularly in riparian systems. The results contribute valuable data to the long-term ecological record for the ACP and support adaptive management under the ACOL Biodiversity Management Plan.

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1.0 Introduction

Umwelt was engaged by Ashton Coal Operations Pty Ltd (ACOL) to undertake the 2025 bi-annual terrestrial fauna and habitat monitoring surveys within the Ashton Coal Project (ACP) site, including the southern woodland Voluntary Conservation Area (VCA), and ACOL-Operated RUM in accordance with the ACOL Biodiversity Management Plan (BMP) – Ashton Mine Complex, Version K (2025).

1.1 Background

The ACP is located within the Hunter Coalfields of the Upper Hunter Valley, New South Wales (NSW). The ACP is within the Camberwell village area, approximately 14 kilometres (km) north-west of Singleton (**Figure 1.1**). The project includes an underground coal mine, a Coal Handling and Preparation Plant, a rail siding, and an operationally complete open cut mine. Currently, the Ashton underground coal mine produces and exports approximately 3.2 million tonnes per annum (Mtpa) of predominantly semi-soft coking coal, which is primarily exported to Asia for steel production through the Port of Newcastle, NSW.

On 11 October 2002, development consent for the ACP was granted to ACOL when it was assessed as an integrated, State Significant Development pursuant to the provisions of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act). In 2010, the approval for a modification (DA 309-11-2001 MOD 6) to the existing development consent under section 75W of Part 3A of the EP&A Act was made by the Minister for Planning. A Conservation Agreement was made between ACOL and the NSW Minister for the Environment, which covers a 65.66 ha area in the south east of the ACP site (the Voluntary Conservation Area; VCA). The Conservation Agreement and ACP site environmental management plans comprise the Plan of Management for the VCA that is required by the development consent.

The bi-annual monitoring program is undertaken in accordance with the development consent and is proposed to continue until the completion of underground mining within the approved area. Monitoring has been undertaken following a Before-After Control-Impact (BACI) design, which measures the potential impact of a defined event by comparing measurements before and after the event. Furthermore, the monitoring results from the impacted areas are compared with those of the un-impacted areas, which are used as a control/reference sites to assess potential impacts.

Fauna monitoring was conducted in both control and impact sites across the ACP site in 2025 with a total of six transects sampled across control and impact sites; the control sites consisting of two in the northern woodland and one at Glennie's Creek. The impact sites are situated with two in the southern woodland, and one at Bowman's Creek (refer to **Figure 1.2**). Each of the impact sites are located above underground workings whereas the control sites are situated on land that is currently not subject to any undermining activities (refer to **Figure 1.2**).

In addition, reduced effort fauna surveys were conducted at one transect in the North East Open Cut (NEOC) rehabilitation area and a second transect located in the Bowmans Creek Diversion revegetation area (refer to **Figure 1.2**). These two transects were established in the 2018 survey period based on recommendations from the 2017 monitoring report in order to meet the 'reconstructed ecosystem' requirements outlined in the consent conditions of the approved Development Application. The 2025 monitoring period also marked the first inclusion of monitoring activities within the ACOL-operated RUM area, incorporating targeted bird and bat surveys as specified in the 2025 Biodiversity Management Plan (Revision K) (ACOL 2025).

Information from the monitoring program will be used to assess native flora and fauna, and effectiveness of management programs within the monitoring area. The aim of the monitoring program is to:

- Assess whether vegetation areas not affected by mining are maintained as viable habitats.
- Assess whether the management of mining-impacts within the study area provides habitat comparable to similar non-impact areas, and suitable for threatened species that may inhabit the area.
- Monitor impacts attributable to the development and assess the benefit of management measures.

This report details the results of fauna monitoring conducted at the ACP site during 2025 and identifies similarities and differences between the control and impacted areas that are the subject of the monitoring program.

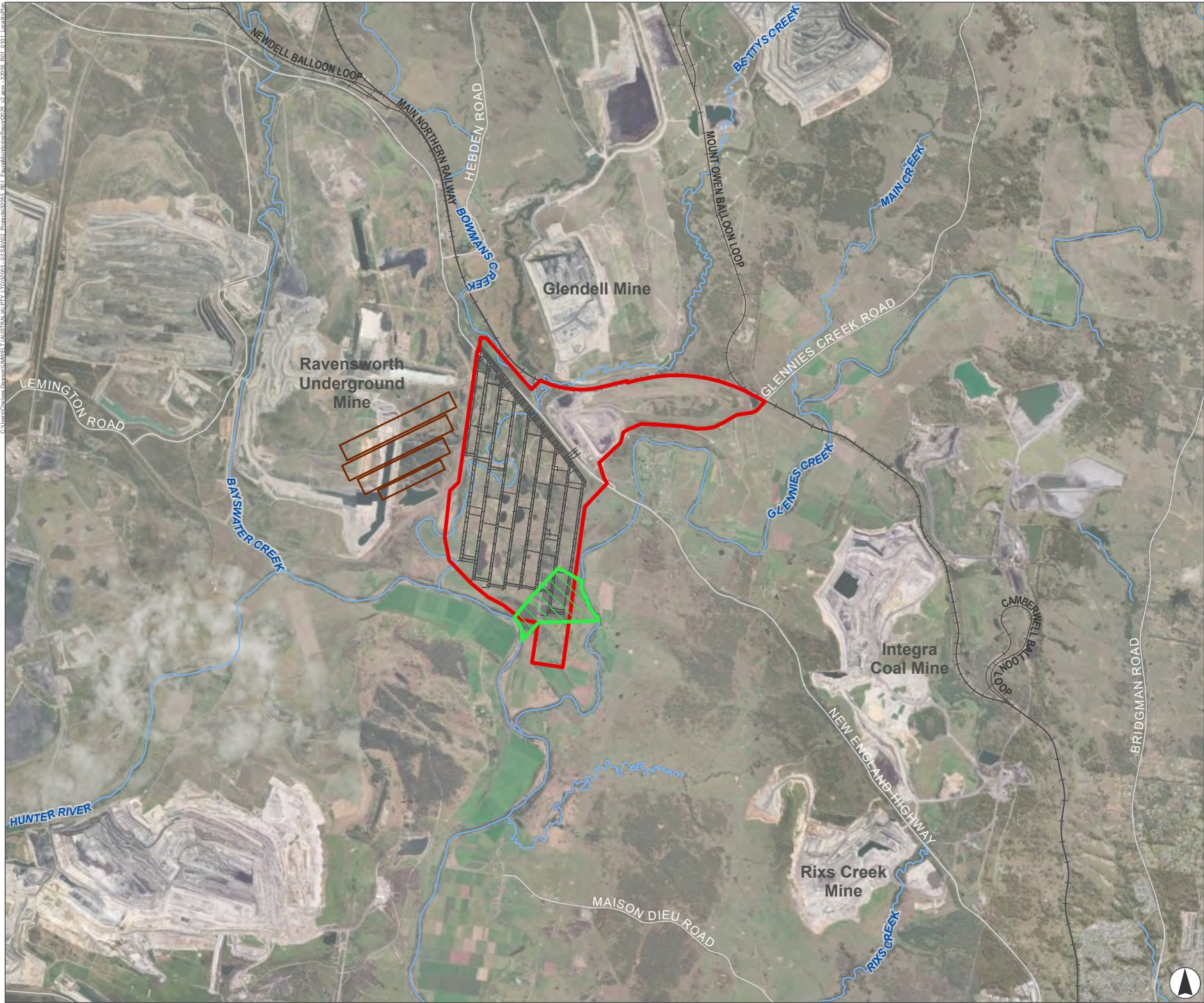
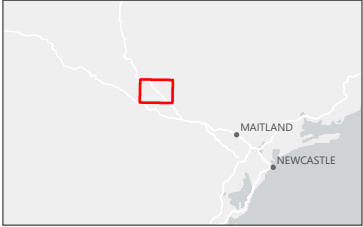


FIGURE 1.1

Locality Plan

Legend

-  VCA Boundary
-  Ashton Mining Lease Area
-  ACOL-Operated RUM
-  Longwall Panel
-  Road
-  Railway
-  Watercourse



Kilometres

Scale 1:80,000 at A4
GDA2020 MGA Zone 56



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FIGURE 1.2

Study Area

Legend

- Study Area
- VCA Boundary
- Ashton Mining Lease Area
- ACOL-Operated RUM
- Longwall Panel
- Road
- Railway
- Watercourse



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1.2 Monitoring History and Legislative Requirements

ACOL has conducted bi-annual fauna monitoring within the VCA since 2005. The monitoring from 2005 to 2009 focused on the Southern Woodland Remnant (VCA) only with surveys conducted in autumn and spring (ERM 2006–2009). Since 2010, the monitoring expanded to cover additional survey areas including the Northern Woodland and proposed South-eastern Open Cut areas (refer to **Figure 1.2**) and was undertaken in winter and summer (PEA 2010–2014). In 2010, the consent conditions were amended and consolidated to reflect the 10 modifications approved under the original Development Application (DA 309-11-2001). In June 2016, DA 309-11-2001 was modified (modification 5) to allow for integration with the buffer land south east of operations (previously referred to as the SEOC Project) (PA 08_0182). The Department of Planning and Environment (DPE) approved Modification 11 to the Ashton DA and Modification 10 to the Ravensworth Underground Mine (RUM) DA, allowing ACOL to integrate the two underground mines and extract previously approved but unmined coal from a portion of RUM. This portion of the RUM will now be managed as part of the Ashton Mine Complex (ACOL-operated RUM).

Although the biodiversity conditions were largely unchanged from the original consent conditions, the requirement for fauna monitoring was identified in Schedule 3 Condition 28 and specifically 28(iv) as listed below.

- Condition 28 – The Applicant must prepare a Biodiversity Management Plan for the Ashton Mine Complex to manage potential impacts of the development. The plan must include:
 - (iv) a program to monitor the effectiveness of measures proposed to manage impacts on fauna, and progress against performance and completion criteria.

The Ashton Coal Project FFMP (ACOL 2012) was prepared to address the conditions of DA 309-11-2001 (as amended). The FFMP was updated to reflect the administrative changes within the DA (as modified), whilst still meeting the requirements for the FFMP within the conditions of the development consent that applied prior to the approval of modification 5.

Following the 2024 monitoring program, the BMP was updated to align with the requirements of Modification 11 to the Ashton DA and Modification 10 to the RUM DA, facilitating the operational integration of the Ashton Underground Mine with the ACOL-operated RUM. The revised BMP (ACOL 2025) guided the current monitoring program, including the application of performance measures and indicators which are presented in Table 2 of the BMP (ACOL 2025) and referenced in **Table 1.1** below.

Table 1.1 Monitoring Requirements as per the Biodiversity Management Plan (BMP) (Version K) April 2025

Criteria	Performance Measure A	Indicator of Success B	Key Assessment Consideration C
Terrestrial Biodiversity / Habitat Values			
Southern woodland conservation area	Manage the VCA in accordance with the Biodiversity Offset Management Plan (BOMP), “Plan of Management Voluntary Conservation Area” and Conservation Agreement.	Specific management practices are incorporated into the site protocols and surveys to indicate that species diversity is comparable to pre-mining reference sites.	1) Does the monitoring and assessment indicate that a performance measure or Development Consent condition has been exceeded, or likely to be exceeded? 2) Does this exceedance increase the risk for any of the ecological issues (species, populations, communities or habitats) under investigation? 3) What is the nature of the risk? • habitat loss; • habitat connectivity/fragmentation; • structural diversity; • species diversity; • increased predation (feral animals); • competition for resources and weed invasion; and • increased fire frequencies. 4) What are the potential factors that may have contributed to the risk i.e. Subsidence, inadequate management measure? 5) What actions, if any are required, can be taken to mitigate and/or minimise the potential for future impacts and monitor the long-term impacts of the exceedance? 6) Does the monitoring and assessment indicate that a performance measure or Development Consent condition has been exceeded, or likely to be exceeded? 7) What is the nature of the exceedance? • habitat loss; • habitat connectivity/fragmentation; • structural diversity ;

Criteria	Performance Measure A	Indicator of Success B	Key Assessment Consideration C
			- species diversity; - seed bank and recruitment of juveniles; - key habitat elements (i.e. hollows, nesting habitat); - key abiotic resources (i.e. water availability); - increased predation (feral animals); or - competition for resources and weed invasion. 8) What are the potential factors that may have contributed to the risk, i.e. subsidence, inadequate management measure or climatic conditions? 9) What actions, if any are required, can be taken to mitigate and/or minimise the potential for future impacts and monitor the long-term impacts?
Threatened Species, Populations and Endangered Ecological Communities			
Threatened Species	Threatened fauna species and their habitats are not adversely impacted.	Terrestrial fauna and habitat monitoring shows that the numbers of threatened species and the health (including recruitment) of significant populations are not declining, and results are comparable or improved from baseline surveys.	1) Does the monitoring and assessment indicate that a performance measure or Development Consent condition has been exceeded, or likely to be exceeded? 2) Does this exceedence increase the risk for any threatened species, populations, communities or their habitats? 3) What is the nature of the risk? - habitat loss; - habitat connectivity/fragmentation; - home range size; - structural diversity/elements; - species diversity; - migration; - seed bank and recruitment of juveniles; - key habitat elements (i.e. hollows);
	Ensure that any threatened fauna or flora that have not been identified in the EIS, but which may inhabit the site, are identified as early as practicable.	Monitoring shows that individuals are progressively expanding into new home ranges.	
	Threatened species, threatened populations, or endangered ecological communities.	Monitoring shows that key habitat features (foraging, nesting, refuge habitat) and structural	

Criteria	Performance Measure A	Indicator of Success B	Key Assessment Consideration C
		complexity within remnant and rehabilitated/ compensatory habitat areas are not declining and results are comparable with the pre-mining surveys. New listings and new threatened species identified during the annual monitoring program are assessed for impacts and any management recommendations are incorporated into future relevant management plans. Central Hunter Grey Box—Ironbark Woodland or Central Hunter eucalypt forest and woodland are not adversely impacted.	• key abiotic resources (i.e. water availability); • increased predation (feral animals); • competition for resources and weed invasion; or • Increased fire frequencies. 4) What are the potential factors that may have contributed to the risk, i.e. subsidence, inadequate management measure or climatic conditions? 5) What actions, if any are required, can be taken to mitigate and/or minimise the potential for future impacts and monitor the long-term impacts?

2.0 Methods

2.1 Fauna Survey Methods

Fauna surveys were carried out to identify the fauna species and habitats occurring or considered to have the potential to occur across ACOL, with specific focus on threatened species, migratory species, endangered populations, and species of local or regional significance. In June/July 2025 and November 2025, Umwelt ecologists used a variety of survey techniques to target the full suite of vertebrate fauna species and ants at each of the established transects shown in **Figure 2.1**.

Each survey technique is described in detail in the following sections. Reference was made to the BMP (ACOL 2025) when conducting the field surveys, with appropriate survey methods selected that maximised the opportunities of identifying the diversity of fauna that occurs within the ACP site.

Legend

-  Nest Box Locations
-  Anabat Points
-  Frog Survey Dam
-  Remote Camera
-  Transect Line
-  Namara Dam Waterbird Survey
-  Longwall Panel
-  Road
-  Railway
-  Watercourse
-  Study Area
-  VCA Boundary
-  Ashton Mining Lease Area
-  ACOL-Operated RUM



Response	Proportion
Very satisfied	0.55
Not very satisfied	0.45

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2.1.1 Terrestrial Elliott Trapping

Terrestrial Elliott A traps were set approximately 10 m apart on the ground along each transect. All traps were baited with a mixture of rolled oats, peanut butter, honey, and vanilla essence. Traps were filled with a handful of leaf litter to provide insulation for captured animals and positioned to avoid overheating in early morning sunlight. Where possible, traps were placed amongst habitat features such as thickets, rocks, fallen timber and ground cover, and/or where previous evidence of animal activity was detected (i.e., tracks, scats, runways). A total of 60 Elliott A traps were set for eight nights, comprising 480 trap nights across the Control and Impact areas. No terrestrial Elliott trapping was conducted within the reduced survey transect of the NEOC Rehabilitation, Bowmans Creek Revegetation areas or ACOL-operated RUM.

2.1.2 Arboreal Elliott Trapping

Arboreal Elliott B traps were set approximately 10 m apart and were positioned on platforms attached to the trunks of large trees or tied to forks of small trees 2–3 m above the ground. All traps were baited with a mixture of rolled oats, peanut butter, honey, and vanilla essence. The trunk of the tree and entrance to the trap were sprayed with a honey and water mixture to attract arboreal mammals. Traps were filled with a handful of leaf litter to provide insulation for captured animals and positioned to avoid overheating in early morning sunlight. Where possible, traps were attached to large trees with hollows, or where evidence of animal activity was detected (i.e., tree scratching's, scats, etc.). A total of 60 arboreal Elliott B traps were set for eight nights, comprising 480 trap nights across the Control and Impact areas. No arboreal Elliott trapping was conducted within the reduced survey transects in the NEOC Rehabilitation or Bowmans Creek Revegetation areas.

2.1.3 Mark-Recapture

Previous monitoring surveys detected relatively high occurrences of the threatened brush-tailed phascogale (*Phascogale tapoatafa*) being captured in arboreal and terrestrial Elliott traps (Umwelt, 2016a, 2017b, 2018, 2019, 2020, 2021, 2022, 2023 and 2024). This species is generally regarded as trap shy, however, the high capture rates at the ACP site provides a unique opportunity to understand more about this population. During the 2025 surveys, consistent with the methods undertaken since 2017, each brush-tailed phascogale (*Phascogale tapoatafa*) that were captured in traps was marked with toluene-free nail polish, so that individuals could be identified during subsequent recaptures. Marking procedures followed the guidelines of DSEWPC (2011b) and Eyre et al. (1997). Identifying individuals within the survey period provides an indication of the number of brush-tailed phascogales (*Phascogale tapoatafa*) that occur at the site at the time of the surveys.

2.1.4 Hair Funnels

Faunatech hair funnels were set approximately 10 m apart along each transect within the Control, Impact, NEOC Rehabilitation and Bowmans Creek Revegetation areas. All hair funnel traps were baited with a mixture of rolled oats, peanut butter, honey, and vanilla essence. The position of hair funnel traps altered between terrestrial and arboreal for every 10 m. Terrestrial hair funnel traps were placed amongst habitat features, such as fallen timber and roots/trunk bases of trees. Arboreal hair funnel traps were placed 1.5 m above the ground on tree trunks or branches. A total of 80 hair funnel traps were left in position for 144 nights.

2.1.5 Diurnal Bird Surveys

Six 20-minute diurnal bird surveys were conducted at each Control and Impact transect and two 30-minute diurnal bird surveys were conducted at each of the reduced survey effort transects within the NEOC Rehabilitation and Bowmans Creek Diversion Revegetation areas. Bird surveys were undertaken on six separate days between 07:00 and 12:00 hours. Each survey consisted of walking slowly along a transect and identifying birds from characteristic calls and observation using binoculars (10 x 42 magnification). Opportunistic observations of bird species were recorded during all other aspects of the field survey with these observations being included in the overall fauna census data.

Diurnal bird surveys in ACOL-operated RUM areas comprise two 20-minute counts at Narama Dam to assess waterbird usage. In addition, two surveys are conducted in woodland habitats, applying the same methodology and specifically targeting threatened woodland bird species.

2.1.6 Diurnal Herpetological Surveys

Four 30-minute diurnal herpetological (reptile and amphibian) surveys were conducted at each transect within the Control and Impact areas and two 30-minute diurnal herpetofauna surveys were conducted at each reduced survey effort transect within the NEOC Rehabilitation, Bowmans Creek Diversion Revegetation areas and the ACOL-Operated RUM. Herpetofauna surveys were undertaken on four separate days between 12:00 and 16:00 hours. Surveys targeted areas of likely habitat along or in proximity to each transect. Likely habitat surveyed included beneath rocks and fallen timber, under tree bark and throughout ground litter.

2.1.7 Drift-line Herpetofauna Surveys

Five herpetofauna drift-lines were established at locations in proximity to transects for the Control and Impact areas (refer to **Figure 2.1**). These consisted of 50 m mesh fences with ten collapsible funnel traps (five on either side of the fence) placed at 10 m intervals along the fence (refer to **Photo 2.1** below).

Drift-line herpetofauna surveys were not conducted at the reduced survey effort transects in the NEOC Rehabilitation or Bowmans Creek Revegetation areas.



Photo 2.1 Drift Fence Setup with Funnel Traps

2.1.8 Nocturnal Spotlight Surveys

Two nocturnal spotlighting surveys were conducted at each transect within the Impact and Control areas. Surveys lasted for one hour and targeted nocturnal birds, mammals and herpetofauna. Spotlighting was conducted on foot along the length of the transect using Led Lender head torches (rated at 850 lumens). Spotlighting was conducted between 18:00 to 22:00 hours during winter and 20:00 to 01:00 hours during spring. For transects without any water, the closest dam was surveyed for amphibians both visually and by listening for their characteristic calls. Spotlighting surveys were also conducted at the reduced survey effort transect within the NEOC Rehabilitation area and ACOL-Operated RUM.

This is the fifth year that spotlighting surveys have been conducted in the NEOC Rehabilitation area. Spotlighting surveys were not conducted at the reduced survey effort transect within the Bowmans Creek Revegetation area.

2.1.9 Nocturnal Call-playback Surveys

Nocturnal call-playback surveys were undertaken at each transect within the Impact and Control areas. Call-playback sessions were conducted prior to spotlighting. Call-playback sessions commenced with a quiet listening period of approximately five minutes. Each species call was played using a 15-watt directional loud hailer for a minimum of four minutes followed by a listening period of two minutes before the beginning of the next species call. Call-playback sessions included the calls of:

- Squirrel glider (*Petaurus norfolcensis*)
- Koala (*Phascolarctos cinereus*)
- Powerful owl (*Ninox strenua*)
- Masked owl (*Tyto novaehollandiae*)
- Barking owl (*Ninox connivens*).

During 2025, nocturnal call-playback surveys were also conducted at the reduced survey effort transect within the NEOC Rehabilitation area. This is the fourth year that call-playback surveys have been conducted in the NEOC Rehabilitation area.

Call-playback surveys were not conducted at the reduced survey effort transect within the Bowmans Creek Revegetation area and ACOL-Operated RUM.

2.1.10 Microbat Echolocation Recording

Recordings of microchiropteran bat (microbat) echolocation calls were conducted over four nights for each transect within the Control, Impact, NEOC Rehabilitation, Bowmans Creek Revegetation areas as well as at Narama Dam in the ACOL-operated RUM, which set out two devices targeting Southern Myotis (*Myotis Macropus*).

Calls were recorded using an Anabat device. At the start of each transect, the Anabat was positioned at an approximate 30-degree angle 1–2 m above the ground. Each detector was positioned towards potential micro-bat flight paths to increase the likelihood of detecting micro-bat species. The echolocation calls of species were identified to one of three levels of confidence:

- confident
- probable
- possible.

All three levels of identification confidence were treated as positive identifications.

2.1.11 Ant Surveys

Ant surveys consisted of slowly walking along each transect and collecting a sample of individuals from each different family detected foraging and/or at nests. Collected ants were placed in vials of 70% ethanol for later identification following Shattuck, 1999 and AntWeb (2026).

2.1.12 Remote Camera Surveys

Remote camera surveys were undertaken for each transect. This process involved positioning one remote camera at the beginning and end of each transect. Cameras were mounted approximately one metre above the ground on a tree trunk and positioned towards a bait station consisting of tuna to increase the likelihood of detecting species. Cameras were set to take three photos in quick succession when movement was detected. The cameras were programmed to record movement on an ongoing basis until removed from the site. Each transect was monitored for a total of eight nights.

2.1.13 Targeted Onsite Threatened Fauna Surveys

A total of 32 threatened species listed under the NSW Biodiversity Conservation Act 2016 (NSW BC Act) and or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC ACT) have been recorded within the ACP since monitoring began in 2006 (ERM 2006–2009, PEA 2010–2014, Umwelt 2015–24).

Throughout the fauna surveys of the control, impact and rehabilitation areas, targeted searches were conducted for threatened fauna species that are known to occur in or near the ACP site or were considered likely to occur based on the species' known distribution and the presence of suitable habitat. These species have been identified in the Biodiversity Management Plan (2025) and/or from previous records and are listed in **Table 2.1**.

Table 2.1 Threatened Fauna Species Identified across Monitoring Surveys

Common Name	Scientific Name	Listing Status	
		NSW BC Act 2016	EPBC Act 1999
Barking owl	<i>Ninox connivens</i>	V	-
Black falcon	<i>Falco subniger</i>	V	-
Black-breasted buzzard	<i>Hamirostra melanosternon</i>	V	-
Brush-tailed phascogale	<i>Phascogale tapoatafa</i>	V	-
Diamond firetail	<i>Stagonopleura guttata</i>	V	-
Eastern Cave Bat	<i>Vespadelus troungtoni</i>	V	-
Eastern coastal freetail-bat	<i>Mormopterus norfolkensis</i>	V	-
Flame robin	<i>Petroica phoenicea</i>	V	-
Giant burrowing frog	<i>Heleioporus australiacus</i>	V	V
Greater broad-nosed bat	<i>Scoteanax rueppellii</i>	V	-
Green and golden bell frog	<i>Litoria aurea</i>	V	-
Grey-crowned babbler (eastern subspecies)	<i>Pomatostomus tempoeralis tempoeralis</i>	V	-
Grey-headed flying-fox	<i>Pteropus poliocephalus</i>	V	-
Hooded robin (southeastern subspecies)	<i>Melanodryas cucullata cucullata</i>	E	E
Large bent-winged bat	<i>Miniopterus orianae oceanensis</i>	V	-
Large-eared pied bat	<i>Chalinolobus dwyeri</i>	V	-
Latham's snipe	<i>Gallinago hardwickii</i>	V	V
Little bent-winged bat	<i>Miniopterus australis</i>	V	V
Little eagle	<i>Hieraaetus morphnoides</i>	V	V
Little lorikeet	<i>Glossopsitta pusilla</i>	V	-
Masked owl	<i>Tyto novaehollandiae</i>	V	-
Scarlet robin	<i>Petroica boodang</i>	V	-
Southern myotis	<i>Myotis Macropus</i>	V	-
Speckled warbler	<i>Pyrrholaemus sagittatus</i>	V	-
Spotted harrier	<i>Circus assimilis</i>	V	-
Spotted-tail quoll	<i>Dasyurus maculatus</i>	V	V
Square-tailed kite	<i>Lophoictinia isura</i>	V	E
Squirrel glider	<i>Petaurus norfolcensis</i>	V	-
Turquoise parrot	<i>Neophema pulchella</i>	V	-
White-bellied sea-eagle	<i>Haliaeetus leucogaster</i>	E	V
White-throated needletail	<i>Hirundapus caudacutus</i>	V	V
Yellow-bellied sheath-tail bat	<i>Saccolaimus flaviventris</i>	V	-

2.1.14 Nest Box Inspections

Bi-annual fauna monitoring also included the inspection of nest and roost boxes previously installed within the ACP site, to provide habitat for arboreal mammals and micro-bats. The contents of the nest boxes were inspected using a GoPro camera mounted on an inspection pole and viewed at ground level with the GoPro Quik mobile phone app. Access to nest boxes was gained through the hinged lids of the nest boxes (if still intact) by lifting the lids with the inspection pole. Nest boxes were checked for the presence of an animal or evidence of use such as scats and nests (e.g., glider leaf-ball nest, bird eggs, etc.). Nest boxes were inspected on the same day to avoid recording the same individual animal in a different nest box during a single survey period. Instances of non-target fauna species were recorded including the presence of invertebrates and their nests, as these can discourage the use of nest boxes by target species.

2.2 Data Analysis

Shannon-Wiener indices were calculated in order to compare the species diversity of species detected between the impact and control sites. These indices were calculated for each of the four

$$H'_{\max} = - \sum_{i=1}^S \frac{1}{S} \ln \frac{1}{S} = \ln S$$

main fauna groups (birds, mammals, reptiles and amphibians) using the following formula

$$H = -\sum p_i (\log_2 p_i)$$

Where p_i is the proportion of the total sample belonging to species i . In addition, the evenness of the community for each site was calculated and compared. Evenness is another measure of biodiversity, which quantifies how even a community is as a mathematical value and is comparable between the two sites. Evenness is calculated using the following formulas: Where H' is the number derived from the Shannon Wiener diversity index, and $H'_{\max}$ is the maximum value of H' , equal to:

Where S is the total number of species.

This calculates J' , a value between 0 and 1, where the higher the value indicates a lower variation in communities. The evenness was generated for both control and impact site for birds, mammals, reptiles, and amphibians separately.

Jaccard index of community similarity was calculated in order to compare the similarity and diversity of the two sites using the following formula:

$$C_j = \frac{a}{a + b + c}$$

Where a is the same number of species detected in both sites, b is the number of species recorded in site b but not site a , and c is the number of species recorded in site a but not b . This generates a proportion that is indicative of how similar each site is based on the species recorded there. This index was calculated for birds, mammals, reptiles, and amphibians.

Hutcheson t-test (Hutcheson 1970) was used to test significance of differences in species diversity among species groups between the control and impact areas and habitat types using the software PAST (PAleontological STatistics) version 3.17 (Hammer *et al.* 2001).

2.3 Limitations and Exclusions

Ecological surveys, and especially monitoring surveys, are subject to a range of inherent biases and limitations. The subsections below outline a range of limitations identified during the 2025 fauna monitoring surveys.

2.3.1 Timing

The 2025 fauna monitoring surveys were undertaken in June/July 2025 (winter) and November 2025 (spring) in order to capture the seasonal variation of fauna species (particularly birds). Previous surveys have been undertaken in a range of months and seasons as documented in **Table 2.2** below. Since 2015, surveys have been conducted in winter and spring, however in 2021 and 2023, surveys were conducted in winter and summer due to unsuitable weather conditions leading to site inaccessibility during spring.

Table 2.2 Timing of Previous Surveys

Company / Year	Month (Season) of First Monitoring Survey	Month (Season) of Second Monitoring Survey
ERM / 2005-06	May (autumn)	January (summer)
ERM / 2006	May (autumn)	November (spring)
ERM / 2007	May (autumn)	November (spring)
ERM / 2008	May (autumn)	November (spring)
ERM / 2009	May (autumn)	November (spring)
PEA / 2010	May / June (autumn / winter)	November (spring)
PEA / 2011	May (autumn)	-
PEA / 2012	January (summer)	June (winter)
PEA / 2013	May (autumn)	October (spring)
PEA / 2014	July (winter)	December (summer)
Umwelt / 2015	October (spring)	December (summer)
Umwelt / 2016	June (winter)	November (spring)
Umwelt / 2017	June (winter)	November (spring)
Umwelt / 2018	June (winter)	November (spring)
Umwelt / 2019	June (winter)	November (spring)
Umwelt / 2020	June (winter)	November (spring)
Umwelt / 2021-22	June (winter)	January (summer)
Umwelt / 2022	June (winter)	November (spring)
Umwelt / 2023-24	June (winter)	January (summer)
Umwelt / 2024	June (winter)	November (spring)
Umwelt / 2025	July (winter)	November (spring)

2.3.2 Local Weather Conditions

Local weather conditions can be used to assist in interpreting certain fauna results. **Table 2.3** provides the range of weather conditions recorded at the Ashton Meteorological Station and the Singleton Defence AWS weather station (station number 061430) leading up to and during the 2025 monitoring surveys.

The Combined Drought Indicator (CDI), developed by the NSW Department of Primary Industries, uses three indices (Rainfall Index, Plant Growth Index and Soil Water Index) to determine the drought category at any given time. The CDI classifies each parish in NSW into one of five drought categories:

- Non drought: At least one indicator is above the 50th percentile.
- Recovering phase: All indicators are below the 50th percentile but above the 30th percentile.
- Drought Affected: At least one indicator is below the 30th percentile.
- Drought: At least one indicator is below the 5th percentile.
- Intense Drought: All three indicators (rainfall, soil water, plant growth) are below the 5th percentile.

The Vane Parish, which represents the Camberwell area, was classified as “Non-Drought” by the Combined Drought Indicator (CDI) during the 2025 monitoring period, as shown in **Graph 2.1** (DPI 2025a). CDI data from January 2024 to December 2025 indicate that conditions began with intense drought in early 2024, shifted through drought-affected and recovering phases mid-year, and continued to fluctuate between recovering and drought states throughout 2025. These patterns reflect extended periods of water stress interrupted by brief recovery intervals. Prolonged drought reduces surface water and vegetation productivity, limiting key resources such as nectar, seeds and invertebrates, and can suppress detection rates for birds and mammals particularly species reliant on riparian habitats or dense understory. Conversely, recovery phases may support increased breeding and higher species richness. Incorporating drought trend data therefore aids interpretation of seasonal variability and supports adaptive management for habitat resilience.

Table 2.3 Temperature and Rainfall Data Leading up to and During the 2025 Monitoring

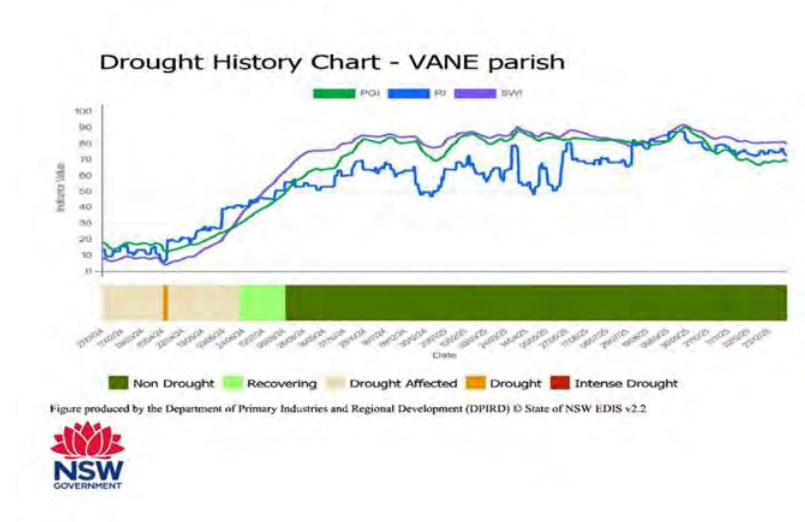
Weather Parameter	January	February	March	April	May	June	July	August	September	October	November
Ashton mean maximum temperature (°C)	30.9	30.7	28.1	25.1	19.7	17.4	17.3	18.0	24.3	28.9	31.7
*Maximum temperature (°C)	19.0	23.3	21.4	19.0	14.4	12.6	11.9	13.9	15.8	15.3	21.9
*Monthly mean maximum temperature (°C)	30.0	30.3	28.2	25.0	19.9	17.3	17.3	18.2	23.7	28.2	30.8
Ashton mean minimum temperature (°C)	15.9	16.2	17.0	12.8	10.2	5.7	6.8	7.5	16.3	11.5	13.4
*Minimum temperature (°C)	13.4	10.9	13.9	10.1	7.9	-0.1	0.3	3.9	5.1	7.9	8.1
*Monthly mean minimum temperature (°C)	18.2	17.9	18.7	14.1	12.0	6.1	6.8	8.5	10.1	13.6	15.5
Ashton rainfall data (mm)	79.4	39.2	4.1	8.8	239.4	20.2	39.8	146	46	37.8	32.8
*Total monthly rainfall (mm)	97.0	51.0	110.0	86.0	135.0	12.0	33.4	140.0	62.8	25.0	23.2

Notes:

Onsite data has been retrieved from the ACOL EPL Monitoring Station (11879)

* Data from Singleton Defence AWS weather station (061430), located approximately 26.2 km from Ashton, NSW.

Bolded cells indicate when the 2025 surveys were completed.



Graph 2.1 Vane Parish CDI

2.3.3 Survey Design

As part of the 2025 monitoring program, the layout of survey transects required amendment to reflect changes in land ownership and management by ACOL. In previous surveys, the South East Offset Corridor (SEOC) had functioned as a robust and spatially independent control area; however, because SEOC was no longer incorporated into the designated control sites, the BACI design required rebalancing to ensure an even distribution of transects across control and impact habitats. To achieve this, a new transect was established in the northern woodland control area, resulting in two woodland control transects positioned in proximity. Although this adjustment reduced spatial separation between control transects, it proved advantageous for the brush-tailed phascogale monitoring, as it facilitated strong capture-mark-recapture success and improved estimates of the local population. To maintain balance within the woodland impact habitat, a southern woodland impact transect was removed. The riparian impact and riparian control transects, however, remained unchanged from previous monitoring years. These adjustments resulted in a total of six transects in the 2025 BACI design, compared with eight transects used in earlier monitoring years.

The reduced survey effort had noticeable implications for amphibian and reptile detectability, as both groups are inherently difficult to survey reliably and exhibit strong temporal and environmental variability in detectability. Amphibian species diversity (Shannon–Wiener Index) was calculated to compare diversity between control and impact sites across habitat types; however, a Hutcheson t-test could not be performed due to insufficient species-level abundance data and extremely small sample size only two amphibian species were recorded within control habitats and three within impact habitats. In contrast, reptile data were sufficient to calculate a combined-habitat Shannon–Wiener Index, though interpretation remained constrained by the overall reduction in survey intensity.

2.3.4 Pit Fall vs Funnel Trapping

Previous surveys (prior to 2016) have used pitfall traps along a drift fence to survey reptile species. Given the intensive labour involved in digging buckets into the ground and the requirement for Ground Disturbance Permits (GDP) to be granted from the mine, the 2015 surveys utilised a new method of reptile trapping by positioning collapsible funnel traps along the drift line (Umwelt 2016a). This method is now widely adopted in the scientific community and government agencies as a suitable replacement for the conventional pit fall trap for capturing reptiles (DSEWPC 2011a) and was replicated during the 2025 surveys.

2.3.5 Repeatability of Previous Monitoring Surveys

Biodiversity monitoring measures change over time and therefore required repeatability in relation to survey design and clarity in the reporting process. This may conflict with a statistical approach in that most analyses rely on random sampling and heterogeneity of variance. Whilst the previous monitoring reports by PEA have attempted to provide both a repeatable sampling design and statistical analysis, the data collected in accordance with the prescribed methodology has inherent bias and limitations. Umwelt undertook the 2015 fauna monitoring generally in accordance with the methodology outlined in the FFMP, and the same methodology was utilised during the 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024 and 2025 surveys to enhance repeatability.

In the 2015 report it was recommended that additional monitoring sites be established at riparian zones within the ACP to enhance the detection of a wider range of species that occupy this habitat type. Based on this recommendation, two transects situated within riparian areas were established in 2016; each representing undermined and non-mined areas of the ACP for comparison. These transects were remonitored in 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024 and again in 2025 and were located adjacent to Bowmans Creek and Glennies Creek (refer to **Figure 2.1**).

In 2017, the monitoring report recommended initiating fauna monitoring within treed areas of the NEOC Rehabilitation and Bowmans Creek Diversion Revegetation sites to satisfy the 'reconstructed ecosystem' requirements outlined in the DA consent conditions. In response, two monitoring transects were established in 2018, one within the NEOC Rehabilitation area and one within the Bowmans Creek Diversion Revegetated area. These transects were subsequently resurveyed in 2025 (**Figure 2.1**). Monitoring methods applied a reduced survey effort, reflecting the relatively young age of the rehabilitated vegetation.

This year represented the first year of monitoring within the ACOL-operated RUM area. As such, survey locations were established, and GIS coordinates were recorded to mark the positions of all monitoring points. This included the establishment of waterbird survey points and acoustic monitoring stations at Narama Dam for the purposes of assessing waterbird species assemblages and detecting southern myotis (*Myotis Macropus*). Refer to **Figure 2.1** for mapped survey locations. These data have been incorporated into the ACP dataset and treated in the same manner as the reduced transects and are excluded from the BACI statistical analysis of control and impact sites. The establishment of these survey locations will also allow for consistent replication in future monitoring years.

2.3.6 Hair Funnel Traps

The hair funnel design by Faunatech no longer commercially manufacture the hair wafers, the survey program now relies on in-house fabrication, which introduces certain limitations. While the 2025 monitoring period yielded results and the independent expert analyst confirmed that the wafers were performing effectively, the shift to internal production may still influence overall detection success due to variability in materials, construction, and adhesive performance. Ethical considerations also constrain the design, particularly the requirement to ensure adhesives are not overly sticky, thereby avoiding the risk of capturing or harming non-target fauna such as reptiles and small vertebrates. These necessary adjustments can reduce sampling efficiency compared with earlier, commercially standardised products, and should be acknowledged when interpreting results.

3.0 Results

3.1 Prevailing Weather Conditions

The 2025 monitoring surveys were undertaken between the 30 June to 4 July (winter) and 17 to 21 November (spring). **Table 3.1** below outlines the prevailing weather conditions during the survey periods.

Table 3.1 Prevailing Weather Conditions During Survey Periods

Date	Minimum Temperature (°C)	Maximum Temperature (°C)	Total Rainfall (mm)
July–2025			
28/07/2025	10.2	15.7	0
29/07/2025	10	17.5	0
30/07/2025	8.6	10.4	9.4
31/07/2025	8.3	14.9	0.2
1/08/2025	5.6	14.1	0.6
November–2025			
17/11/2025	12.2	28.3	0
18/11/2025	12	30.6	0
19/11/2025	12.1	35.9	0
20/11/2025	8.2	38.1	2.8
21/11/2025	16.5	20.3	0.6

Data source: Onsite data has been retrieved from the ACOL EPL Monitoring Station (11879)

3.2 Fauna Habitat Descriptions

3.2.1 Riparian

The riparian transects provide a variety of habitat types including wet grassland, aquatic areas and fringing vegetation. River oak (*Casuarina glauca*) is the most dominant canopy species in this habitat type. The understory is disturbed with very little midstorey. The ground cover consists of weeping grass (*Microlaena stipoides*) and spiny-head mat-rush (*Lomandra longifolia*) as well as sedges fringing the banks, which included cattail (*Typha* sp.) and the introduced spiny rush (*Juncus acutus*) (refer to **Table 3.2**) for reference imagery.

Bowmans Creek (riparian impact site) retains a canopy dominated by river oak (*Casuarina glauca*), which historically has provided relatively stable habitat through both drought and high-rainfall periods. However, significant canopy dieback has occurred since the drought, and progressive removal of trees during block bank maintenance has further reduced habitat availability.

The 2025 survey recorded the riparian corridor in poor condition, with very few remaining trees suitable for small hollow-dependent mammals. This area does however contain several habitat features, such as large rocks and boulders, as well as fallen trees and logs which has increased the available habitat for several fauna species including small birds, amphibians, microbats and reptiles.

At the time of the 2025 monitoring period, the creek bed contained pools of water, though no flow through the stream was observed.

The riparian control site at Glennies Creek continues to be a permanent source of water and an important resource for species. Fringing reeds are used for shelter, nesting and foraging by waterbirds such as herons (*Egretta* sp.), and small birds including superb fairy wrens (*Malurus cyaneus*). Rocks and fallen timber in proximity to water provide shelter for frogs such as eastern dwarf tree frogs (*Litoria fallax*) and reptiles like red-bellied black snakes (*Pseudechis porphyriacus*). The tree species provide roosting or nesting habitat for species like common brushtail possums (*Trichosurus vulpecula*), wood ducks (*Chenonetta jubata*) and micro-bats. Generally, riparian areas act as important corridors connecting remnant habitats within the landscape.

3.2.2 Woodland

Woodland habitat within the ACP monitoring sites is comprised of areas of open and closed grassy woodland dominated by bullock (Allocasuarina luehmannii), narrow-leaved ironbark (Eucalyptus crebra), grey box (E. moluccana), with occasional broad-leaved ironbark (E. fibrosa) and yellow box (E. melliodora). The understory is sparse and generally consists of Acacia amblygona, white wattle (A. linifolia), Daviesia genistifolia, turkey bush (Eremophila deserti) and the introduced African boxthorn (Lycium ferocissimum) and Tiger pear (Opuntia aurantiaca) (refer to **Table 3.2**).

The tree species provide roosting and foraging habitat for a number of species. When in flower, the myrtaceous trees are likely to be used by nectarivorous birds such as honeyeaters and wattlebirds. Hollows present in the larger, mature trees provide roosting sites for arboreal hollow-dependant mammals, reptiles, and birds such as common brushtail possums (Trichosurus vulpecula), lace monitors (Varanus varius) and parrots. The bullock (Allocasuarina luehmannii) provides suitable nesting habitat for threatened grey-crowned babblers (Pomatostomus temporalis temporalis). This habitat contains fallen timber and wooden debris, which is suitable habitat for reptile species and foraging habitat for woodland birds. The shrubby midstorey provides roosting habitat for small birds including thornbills (Acanthiza sp.) and the threatened speckled warbler (Pyrrholaemus sagittatus). The ground cover including fallen timber and dense shrubs are utilised by small mammals including yellow-footed antechinus (Antechinus flavipes), reptiles and frogs as sheltering habitat.

3.2.3 Waterbodies and Narama Dam

As this monitoring program no longer includes habitat within the SEOC, the dams referenced within the ACP are those located adjacent to access tracks positioned over longwall mining areas. These sites are typically surveyed opportunistically while travelling to transects within the southern woodland. Observations made during the assessment frequently contribute to the broader bird assemblage that informs this report. The vegetation around these dams generally contain fringing reeds including cattail (Typha sp.) with aquatic vegetation like spikerushes (Eleocharis sp.) growing in the water (refer to **Table 3.2**).

Within these dams, reedy vegetation may be used by waterbirds such as herons (Egretta sp.) and reed warblers (Acrocephalus australis) for nesting. The aquatic reeds and vegetation also provide shelter for frogs and foraging habitat for eastern longnecked turtles (Chelodina longicollis).

The terrestrial area surrounding the dams consists of a mix of native and introduced paddock grasses and forbs. These open grassy areas are useful habitat foraging for frogs, reptiles and small birds like Australasian pipits (Anthus novaeseelandiae).

3.2.4 North-east Open Cut (NEOC) Rehabilitation Area

The trees over grass of the NEOC Rehabilitation area consists of planted narrow-leaved ironbark (*Eucalyptus crebra*), grey box (*Eucalyptus moluccana*) and spotted gum (*Corymbia maculata*). When in flower, the myrtaceous trees are likely to be used by nectarivorous birds such as honeyeaters and wattlebirds. Hollow-bearing trees occur within this area in the form of salvaged hollow-bearing trees that have been incorporated into the NEOC Rehabilitation area as habitat (refer to **Table 3.2**) for reference imagery. These would likely be used by hollow-bearing mammals such as common brushtail possums (*Trichosurus vulpecula*). Similarly, salvaged timber and dead trees have been arranged into log piles, which provide habitat for reptiles and small mammals, including the brush-tailed phascogale (*Phascogale tapoatafa*), a species recorded within the NEOC.

3.2.5 Bowmans Creek Diversion Revegetation Area

The Bowmans Creek Diversion Revegetation area has undergone revegetation works in order to reestablish vegetation communities in the form of river oak riparian woodland and river red gum – yellow box riparian woodland. Plantings of these communities were established within the Bowmans Creek Diversion revegetation area and included river oak (*Casuarina cunninghamiana*) and Eucalyptus and Corymbia species (refer to **Table 3.2**) for reference imagery. The midstorey provides foraging and roosting habitat for small birds including thornbills (*Acanthiza* sp.) and whistlers (*Pachycephala* sp.). Fringing reeds such as Typha sp., are used for shelter, nesting and foraging by waterbirds such as moorhens (*Gallinula* sp.), and small birds including superb fairy wrens (*Malurus cyaneus*). Rocks and fallen timber in proximity to water provide shelter for frogs such as common froglets (*Crinia signifera*) and reptiles like water skinks (*Eulamprus quoyii*).

The 2025 monitoring survey was the sixth subsequent year since fauna surveys commenced at this area, during this monitoring, the creek was experiencing water flows.

Table 3.2 **Habitat Types Among Sites**

Site	Habitat Types	Representative Photo
Control Sites	Woodland – Northern Woodland	 
	Riparian – Glennie’s Creek	 

Site	Habitat Types	Representative Photo
Impact Sites	Woodland – Southern Woodland	 
	Bowman's Creek	 

Site	Habitat Types	Representative Photo	
Rehabilitation/ Revegetation	North-east Open Cut (NEOC) Rehabilitation		
	Bowmans Creek Diversion Revegetation		

Site	Habitat Types	Representative Photo
ACOL-Operated RUM	Woodland habitat	 
	Narama Dam	 

3.3 Fauna Species Recorded

A total of 120 fauna species were recorded in the ACP site including the NEOC Rehabilitation area and Bowmans Creek Diversion Revegetation area and ACOL-operated RUM areas. An outline and discussion of the species recorded within each of the four major fauna groups is presented in the following sections. A list of all fauna species recorded within the ACP site during 2025 monitoring is presented in **Appendix 1** of this report.

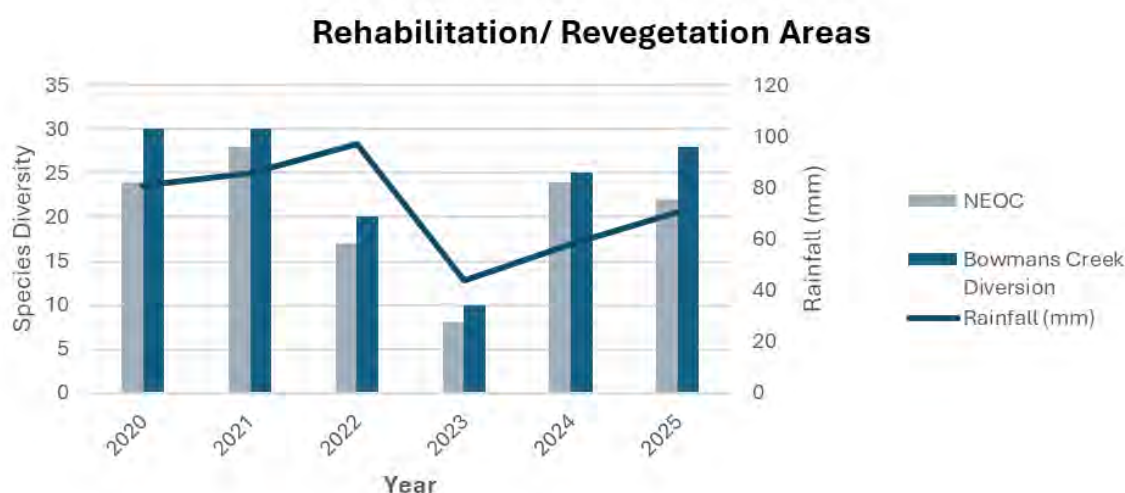
After pooling the monitoring results, the data indicates higher species diversity of the impact (102) areas compared with the control (76) areas. Based on this similarity, there is little indication from fauna results that mining is having an adverse impact on fauna species diversity in the ACP site.

Comparisons of species diversity across all years of monitoring were undertaken for each fauna group. Data on species composition was absent in the 2011 monitoring report (PEA 2011) and as such the results for that year were not used in the analysis. Additionally, the monitoring from 2006 to 2009 only sampled the VCA and therefore comparison against previous monitoring results for the Northern Woodland and buffer land southeast of operations study areas were pooled from 2010 to 2021 results.

Fauna monitoring surveys were conducted in the NEOC Rehabilitation and Bowmans Creek Diversion Revegetation areas for the first time in 2018. A total of 22 fauna species were recorded at the NEOC Rehabilitation area during 2025. This was consistent to the previous (2024) period and shows to be trending slightly upwards from 2023 and prior (2020–2021) monitoring periods (refer to **Graph 3.1**).

The number of species recorded at the Bowmans Creek Diversion Revegetation area during 2025 surveys (28 species) was also higher than the 2023 monitoring period and comparable with the 2020, 2021 and 2022 monitoring periods (refer to **Graph 3.1**). These differences over time are typical of natural fluctuations in ecosystems.

The fauna species diversity of these two areas are lower compared to both control and impact areas surveyed in the ACP site, however this is to be expected as these areas are relatively young with limited habitat and were surveyed using a reduced survey methodology.



Graph 3.1 Species Diversity Recorded at the NEOC Rehabilitation Area and Bowmans Creek Diversion Revegetation Area Over Time Compared with Mean Annual Rainfall (mm) Data

3.3.1 Mammals

A total of 40 species of mammal were recorded among the monitoring sites at the ACP. These species were detected using arboreal and terrestrial trapping, spotlighting, hair funnel, remote cameras, micro-bat echolocation call recording, as well as during general observations whilst on site. Thirteen families are represented with Vespertilionidae (evening microbats) recording seven species, Macropodidae (kangaroos and wallabies) recording three species and Molossidae (free-tailed bats) recording four species.

The brush-tailed phascogale (*Phascogale tapoatafa*) and the common brush tail possum (*Trichosurus vulpecula*) were the most common mammals captured in arboreal and terrestrial Elliot traps with occasional captures of introduced species such as the house mouse (*Mus musculus*), and black rat (*Rattus rattus*).

The brush-tailed phascogale (*Phascogale tapoatafa*) is listed as Vulnerable under the NSW BC Act and is known to occur in the ACP site based on previous monitoring results. Brush-tailed phascogales (*Phascogale tapoatafa*) were recorded across the ACP totalling 49 individuals, the Elliot trap results (terrestrial and arboreal) accounted for 28 of these records. The locations of brush-tailed phascogale captures and sightings are shown in **Figure 3.1**.

A total of 17 brush-tailed phascogales (*Phascogale tapoatafa*) were marked to distinguish individuals of these, 10 were recaptured. This species was also recorded on remote cameras on eight occasions across the 2025 monitoring period. The most frequent mammal species detected during nocturnal spotlighting surveys were common brushtail possums (*Trichosurus vulpecula*), followed by eastern grey kangaroos (*Macropus giganteus*), and red-necked wallaby (*Notamacropus rufogriseus*). The introduced brown hare (*Lepus capensis*) was also observed commonly.

Of the 80 hair funnels that were installed ACP site, 17 returned identifiable hair samples, the species able to be identified from hair analysis consisted of swamp wallaby (*Wallabia bicolor*) and goat (*Capra hircus*) in the southern woodland, in addition to brush-tailed phascogale (*Phascogale tapoatafa*) in the northern woodland and the NEOC. None of the hair funnels that were installed along Bowmans Creek returned identifiable hair samples.

Nine introduced mammal species were recorded at the ACP site. These include the black rat (*Rattus rattus*), european rabbit (*Oryctolagus cuniculus*), brown hare (*Lepus capensis*), red fox (*Vulpes vulpes*), cat (*Felis catus*), house mouse (*Mus musculus*), and pig (*Sus scrofa*). Remote cameras and spotlighting also recorded two introduced species absent from the 2024 monitoring dataset: goat (*Capra hircus*) and red deer (*Cervus elaphus*).

Fifteen microbat species were confidently identified as recorded within the ACP site from ultrasonic data, represented by four families including ten species from Vespertilionidae (evening bats), two species from Miniopteridae (bent-wing bats) and Molossidae (free-tailed bats) and one species from Emballonuridae (sheath-tailed bats).

Of the microbats species recorded, seven are listed as Vulnerable under the NSW BC Act and are not listed under the Commonwealth EPBC Act, these species are: eastern coastal free-tailed bat (*Micronomus norfolkensis*), little bent-winged bat (*Miniopterus australis*), large bent-winged bat (*Miniopterus orianae oceanensis*), southern myotis (*Myotis macropus*), eastern cave bat (*Vespadelus troughtoni*), greater broad-nosed bat (*Scoteanax rueppellii*) eastern false pipistrelle and yellow-bellied sheath-tail-bat (*Saccolaimus flavescens*).

Legend

-  Longwall Panel
 -  Road
 -  Railway
 -  Watercourse
 -  Study Area
 -  VCA Boundary
 -  Ashton Mining Lease Area
 -  ACOL-Operated RUM
- Threatened Species
-  Brush-tailed phascogale (*Phascogale tapoatafa*)
 -  Eastern Bent-winged Bat (*Miniopterus orianae oceanensis*)
 -  Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*)
 -  Greater Broad-nosed Bat (*Scoteanax rueppellii*)
 -  Grey-crowned babbler (eastern subspecies) (*Pomatostomus temporalis temporalis*)
 -  Latham's snipe (*Gallinago hardwickii*)
 -  Little Bent-winged Bat (*Miniopterus australis*)
 -  Spotted harrier (*Circus assimilis*)
 -  Masked owl (*Tyto novaehollandiae*)
 -  Southern myotis (*Myotis macropus*)
 -  Speckled warbler (*Pyrholaemus sagittatus*)
 -  Eastern Cave Bat (*Vespadelus troughtoni*)
 -  White-bellied sea eagle (*Haliaeetus leucogaster*)
 -  Yellow-bellied Sheath-tail Bat (*Saccolaimus flaviventris*)



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A number of other bat species potentially occur across the ACP site, with varying levels of identification achievable from acoustic call data. These species are listed below in **Table 3.3** as per species present (1) or absent (0) for each site.

Table 3.3 Microbat Species that were Identified as Potentially Occuring within the ACP Site

Species	NSW BC Act	EPBC Act	Control	Impact	NEOC Rehabilitation	Bowmans Creek Diversion Revegetation	ACOL- operated RUM
<i>Austronomus australis</i>	-	-	1	1	0	1	1
<i>Chalinolobus gouldi</i>	-	-	1	1	1	1	0
<i>Chalinolobus morio</i>			1	1	0	1	1
<i>Micronomis norfolkensis</i>	V	-	1	1	0	1	0
<i>Miniopterus australis</i>	V		1	1	1	1	0
<i>Miniopterus orianae oceanensis</i>	V	-	0	1	1	1	0
<i>Myotis macropus</i>	V	-	1	1	1	1	1
<i>Nyctophilus geoffroyi / gouldi group</i>	-	-	1	1	1	1	1
<i>Ozimops ridei</i>	-	-	1	0	0	1	1
<i>Ozimops planiceps</i>	-	-	1	1	1	1	1
<i>Saccolaimus flavescens</i>	V	-	1	0	0	0	0
<i>Scotorepens rueppellii</i>	V	-	1	1	0	1	1
<i>Scotorepens balstoni / rueppellii</i>	V	-	1	1	1	1	0
<i>Vespadelus darlingtoni</i>	-	-	0	1	0	0	0
<i>Vespadelus regulus</i>	-	-	1	1	1	1	1
<i>Vespadelus pumulis</i>	-	-	1	1	1	1	0
<i>Vespadelus troughtoni</i>	V	-	1	1	1	1	1
<i>Vespadelus vulturnus</i>	-	-	1	1	0	1	1

Shannon-Wiener indices were calculated in order to compare the species diversity of mammals recorded between the impact and control sites among habitat types and for the ACP site overall (**Table 3.4**). Shannon-Wiener indices were slightly lower at the control sites for the riparian and combined habitat areas however these were not significantly different.

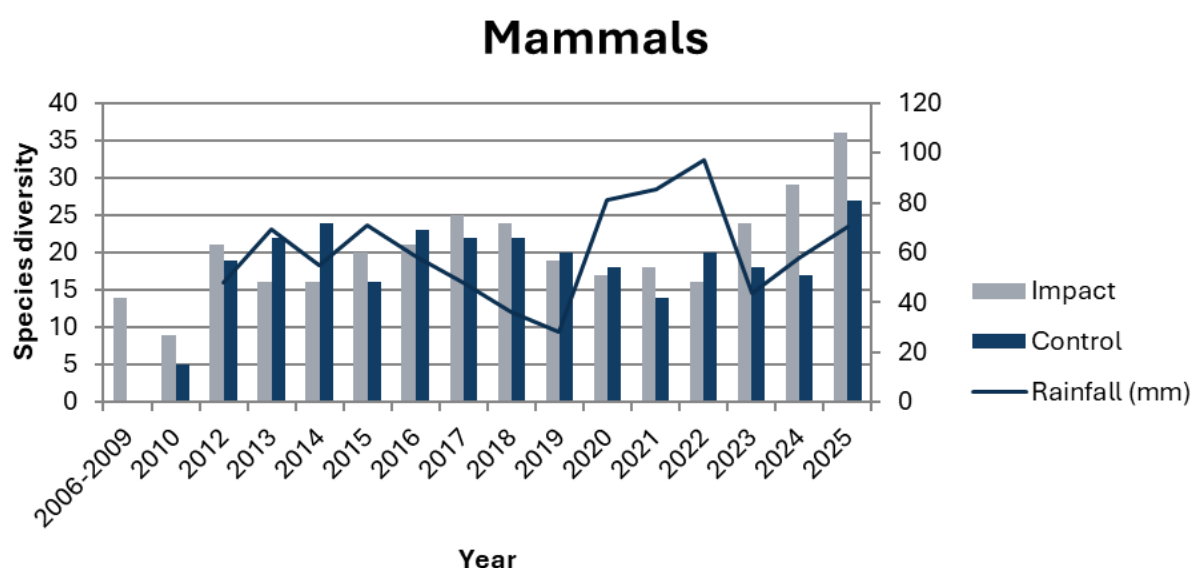
Table 3.4 Mammal Species Diversity Indices and Analysis Results

Shannon-Wiener Species Diversity	Riparian	Woodland	Combined
Control	2.44	2.48	2.60
Impact	2.71	2.48	2.62
Hutcheson t-test results	P = 0.23, df= 71.82, t=-1.21	P= 0.92, df= 167.53, t= 0.10	P=0.89, df = 283.66, t=-1.131

Species evenness measures were higher for the control (0.527) sites compared with the impact (0.360) sites for the woodland areas. Contrastingly, the species evenness was slightly higher for the impact sites (1.191) than the control sites (0.736) for the riparian areas. When all sites were pooled together, the species evenness was slightly higher for the control sites (0.549) compared with the impact sites (0.406).

Species richness in the woodland area was higher at the impact sites with 34 species recorded compared with 26 species recorded at the control sites. Results for the riparian control sites recorded similar richness results, with the control sites recording 19 species compared with the impact 17 species. Overall, there was some difference in species richness between the control sites and impact sites, with 27 species recorded in the control sites compared with 36 species recorded in the impact sites.

Jaccard's similarity index for mammal assemblages was 0.5 in both riparian and woodland habitats, indicating a moderate level of species overlap between survey sites. This suggests that each habitat supports a shared core of mammal species while still exhibiting comparable levels of species turnover and habitat-driven variation. There has been increases in the mammal species diversity recorded for both the control (an increase of seven species), and riparian habitats (an increase of ten species), which occurred alongside a modest rise in rainfall (**Graph 3.2**). There is no obvious trend in these yearly fluctuations when the mean annual rainfall (mm) is plotted with mammalian diversity data (**Graph 3.2**).



Graph 3.2 Mammal Species Diversity Recorded Between the Impact and Control Sites Over Time Compared with Mean Annual Rainfall (mm) Data

3.3.2 Birds

A total of 64 species were observed within the ACP site, representing 35 families, the most represented include Accipitridae which includes diurnal birds of prey recording five species, Acanthizidae (thornbills and warblers), Artamidae (passerine birds), Cuculidae (cuckoos), Meliphagidae (honeyeaters) and Psittaculidae (parrots) all recording four species.

Refer to **Appendix 1** for a complete species list. The most abundant bird species observed during the surveys were grey butcherbird (*Cracticus torquatus*), grey fantail (*Rhipidura albiscapa*), magpie-lark (*Grallina cyanoleuca*), pied currawong (*Strepera graculina*), striated pardalote (*Pardalotus striatus*), superb fairy wren (*Malurus cyaneus*), Australian raven (*Corvus coronoides*), and Australian magpie (*Gymnorhina tibicen*).

Six threatened bird species were recorded in the 2025 monitoring period, these species include the grey-crowned babbler (eastern subspecies) (*Pomatostomus temporalis temporalis*) which was recorded during diurnal bird surveys, opportunistically, as well as caught on remote camera. This species is known to inhabit areas of the ACP, observed frequently across various habitats such as the southern and northern woodland habitats, as well in scattered or remnant treed patches of namely river oak (*Casuarina glauca*).

Other threatened species sighted were the masked owl (*Tyto novaehollandiae*) which was successfully called in from call-play back and subsequently seen during spotlighting surveys in the riparian impact along Bowman's Creek. A pair of white-bellied sea eagle (*Haliaeetus leucogaster*) were sighted on two occasions during spring surveys the pair was observed soaring in proximity to the waterbodies across the ACP.

Latham's Snipe (*Gallinago hardwickii*) was first recorded during the 2024 monitoring period and was observed again in spring 2025 occupying the same waterbody located above the ACP longwalls. This migratory species breeds in Japan and eastern Russia during the northern summer and migrates to Australia for the non-breeding season (typically spring and summer). The final two threatened bird species detected was the spotted harrier (*Circus assimilis*) and speckled warbler (*Pyrholaemus sagittatus*) which were recorded opportunistically and during diurnal bird surveys. All threatened bird species observed are listed as Vulnerable under the NSW BC Act, with Latham's Snipe also listed as Vulnerable under the Commonwealth EPBC Act. Locations of all threatened bird species are shown in **Figure 3.1**.

Riparian habitats provide an important resource for birds including shelter, a source of water and a corridor facilitating movement between areas. Species commonly recorded in this habitat were thornbills (*Acanthiza sp.*), golden-headed cisticolas (*Cisticola exilis*), red-browed finches (*Neochmia temporalis*), and waterfowl including species of duck, egrets, herons, and cormorants. These species were commonly recorded within riparian habitats that retain water, such as Glennies Creek. The riparian habitat of Bowmans Creek Diversion had a substantial amount of water.

Dams across the ACP provide permanent aquatic habitats that support a range of species, including the Australian wood duck (*Chenonetta jubata*), pacific black duck (*Anas superciliosa*), and white-faced heron (*Egretta novaehollandiae*). These waterbodies also attract shorebirds such as the black-fronted dotterel (*Elsayornis melanops*), which forage along exposed flats.

Bird activity was limited during the winter and spring surveys at the NEOC, with only three species recorded during targeted diurnal surveys. The most abundant was the weebill (*Smicrornis brevirostris*), which likely foraged on small insects within the canopy of young, planted eucalypts.

The low species diversity is likely attributable to factors such as seasonal timing and unfavourable weather conditions, as well as the limited structural complexity of the developing forest. At present, resources for other bird group such as honeyeaters and small passerines that rely on a well-developed shrub layer for foraging and protection are scarce. As the forest matures and vegetation structure becomes more complex, it is expected that the diversity of the avian assemblage will increase.

Eight bird species were recorded at the Bowmans Creek diversion revegetation area during the 2025 surveys, which is lower than previous monitoring results. Water was flowing within the creek for the fifth consecutive year since this area was incorporated into the monitoring program in 2018. Some waterbirds were observed using this habitat including the white-faced heron (*Egretta novaehollandiae*) and australasian darter (*Anhinga novaehollandiae*). Bird diversity within the Bowmans Creek diversion revegetation area is expected to increase over time as the revegetated plants mature and develop into a more established riparian habitat.

The bird species diversity Shannon-Wiener indices were calculated in order to compare the species diversity of species detected between the impact and control sites among habitat types and overall (**Table 3.5**). Riparian bird assemblage diversity is statistically similar between Control and Impact sites. Woodland diversity is significantly higher at Impact than Control, which is reflected in the significant difference detected in the Hutcheson t-test ($p > 0.05$).

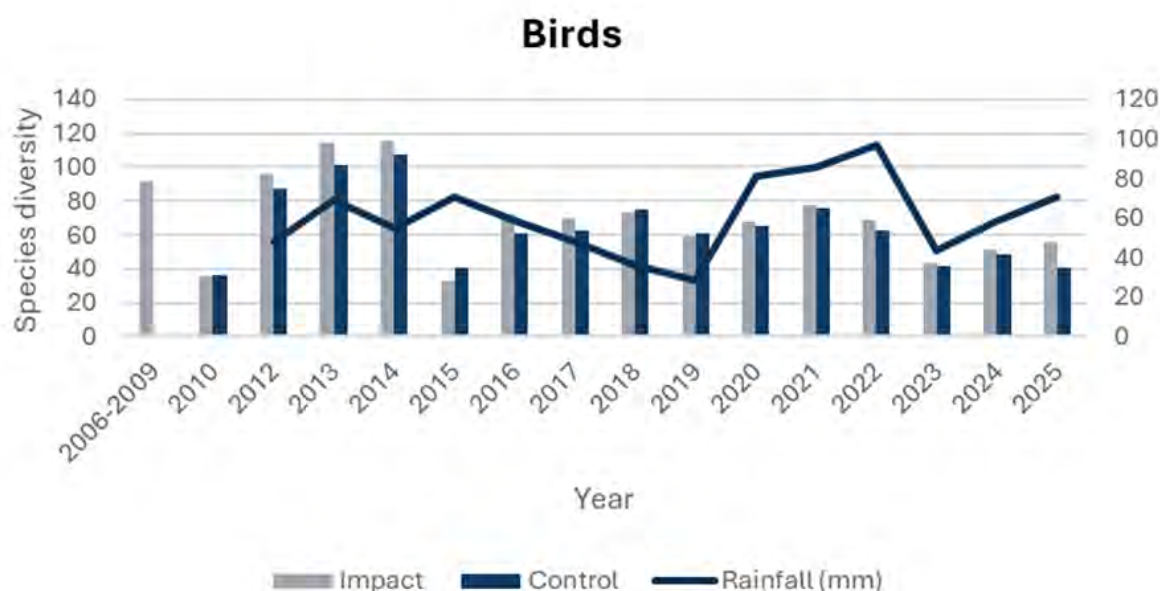
Table 3.5 Bird Species Diversity Indices and Analysis Results

Shannon-Wiener Species Diversity	Riparian	Woodland	Combined
Control	3.18	2.75	3.18
Impact	3.12	3.32	3.51
Hutcheson t-test results	t=0.378 df=183.83, P=0.705	t= -5.107 df= 255.84 P= 0.00000063942	t= -3.9 df=465.74 p=0.000106

Species evenness measures were generally consistent for the impact sites (0.829) compared with the control sites (0.817) for the riparian areas. This result was seen for the species evenness across the woodland habitats, with the control sites (0.640) compared with the impact sites (0.635) for the woodland habitats. When all sites were combined, the species evenness for the control (0.642) sites compared with the impact (0.652) sites are very alike, these similar values show that the community structure hasn't fundamentally changed (no species are dominant or rare across the habitat types).

Species richness in the woodland habitat was considerably lower at the control sites (25 species) compared with the impact sites (46 species). Conversely, in the riparian areas, the control sites supported slightly more species (35) than the impact sites (33). When considered overall, the impact sites recorded a higher total species richness, with 56 species observed compared with 41 species across the control sites.

Jaccards index of community similarity showed a 36 per cent similarity for riparian areas, 47 per cent similarity for woodland areas and a 51 per cent similarity for the overall community similarity between impact and control sites. In 2025, results show that bird diversity dipped slightly at control sites relative to 2024, with Impact having increased, remaining 8–10 species than control; despite increased rainfall, diversity did not rise, indicating a possible lagged or more complex rainfall–diversity relationship (**Graph 3.3**).



Graph 3.3 Bird Species Diversity Recorded Between the Impact and Control Sites Over Time Compared with Mean Annual Rainfall (mm) Data

3.3.3 Amphibians

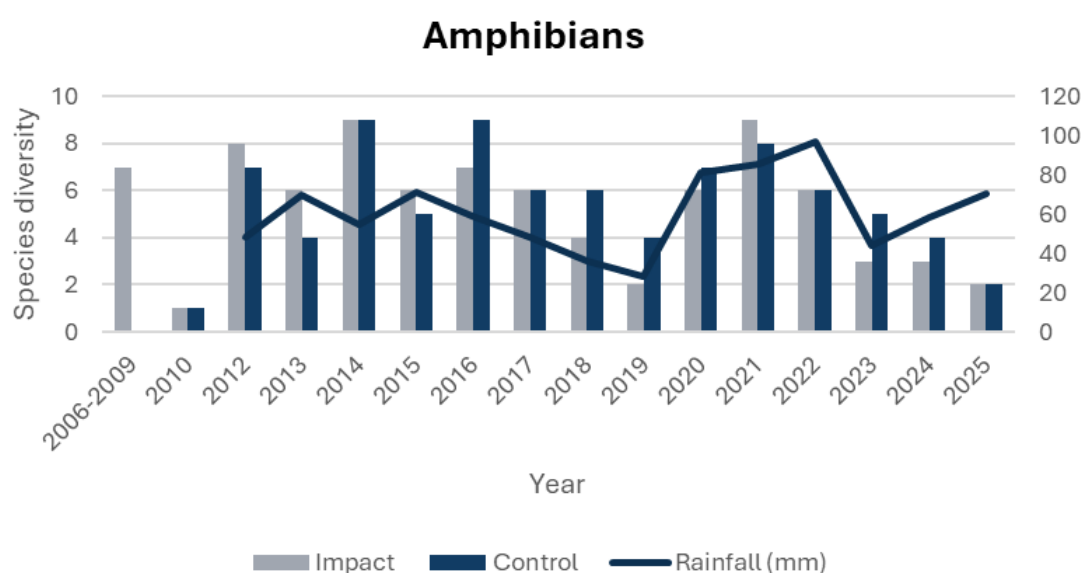
A total of three amphibian species were recorded in the ACP site during 2025. The majority of amphibian observations were at the riparian sites and dams, these areas are important breeding habitat within the ACP site (**Figure 2.1**). These species included the common eastern froglet (*Crinia signifera*), followed by the striped marsh frog (*Limnodynastes peronii*) and spotted marsh frog (*Limnodynastes tasmaniensis*). These frog species are commonly encountered in dams and other permanent or semi-permanent waterbodies across eastern Australia, where they utilise aquatic habitats for breeding and foraging. Although the herptofauna survey does involve searching under suitable habitat such rocks, bark and logs, no amphibians were found in this way during surveys.

No amphibian species were recorded at the NEOC rehabilitation area during the 2025 surveys.

The amphibian species diversity Shannon-Wiener indices were calculated in order to compare the species diversity of species detected between the impact and control sites among habitat types and overall. A Hutcheson t-test could not be performed because the dataset lacked the species-level abundance information required to calculate the variance of Shannon diversity, and sample sizes were too small to support the test; only two amphibian species were recorded in the control habitat and three species in the impact habitat.

The species richness was higher at the control sites (2) than the impact sites (1) for the woodland habitat areas. Species richness was the same at the impact sites (1) than the control sites (1) for the riparian habitat areas. When combined, the species richness of amphibians was consistent across the control sites (3) and the impact sites (3).

The amphibian species assemblage was 100 per cent similar between the control and impact sites for the riparian habitat when calculated using Jaccards index of community similarity. On the other hand, the woodland areas had no species similarity between the impact and control sites with a Jaccards index of 0 per cent. Overall, the species similarity of amphibians across all the habitat areas was 33.3 per cent similarity between the control and impact sites. The amphibian diversity has declined from the 2021–2022 peaks and remained low across both impact and control sites in 2025. Across the multi-year record, diversity generally shows a positive association with annual rainfall (higher in wet years such as 2021–2022 and lower in dry years such as 2018–2019); however, this relationship did not persist in 2025, when diversity stayed low despite a modest rainfall increase likely reflecting reduced survey effort and amphibians’ lagged, weather-dependent detectability (**Graph 3.4**)



Graph 3.4 Amphibian Species Diversity Recorded Between the Impact and Control Sites Over Time Compared with Mean Annual Rainfall (mm) Data

3.3.4 Reptiles

A total of nine species were recorded among the sites at the ACP site with four families being represented. The family Scincidae (skinks) was the most represented in the ACP site with six species observed. Refer to **Appendix 1** for the complete species list. The southern rainbow skink (*Carlia tetradactyla*) was the most abundant species of reptile recorded.

No reptile species were recorded in the NEOC or Bowman’s Creek diversion, however, it is expected that reptile species diversity will continue to develop as these rehabilitated/ revegetated areas become more established.

Reptile data for the woodland and riparian sites individually were unable to produce enough data to run the Shannon-Wiener tests, the combined dataset were able yielded enough recordings to produce a result, these are provided in **Table 3.6** below. The combined results show that the species diversity is slightly higher at the impact sites. These differences in species diversity indices across all sites were not statistically significant according to the Hutcheson t-test analysis.

Table 3.6 Reptile Species Diversity Indices and Analysis Results

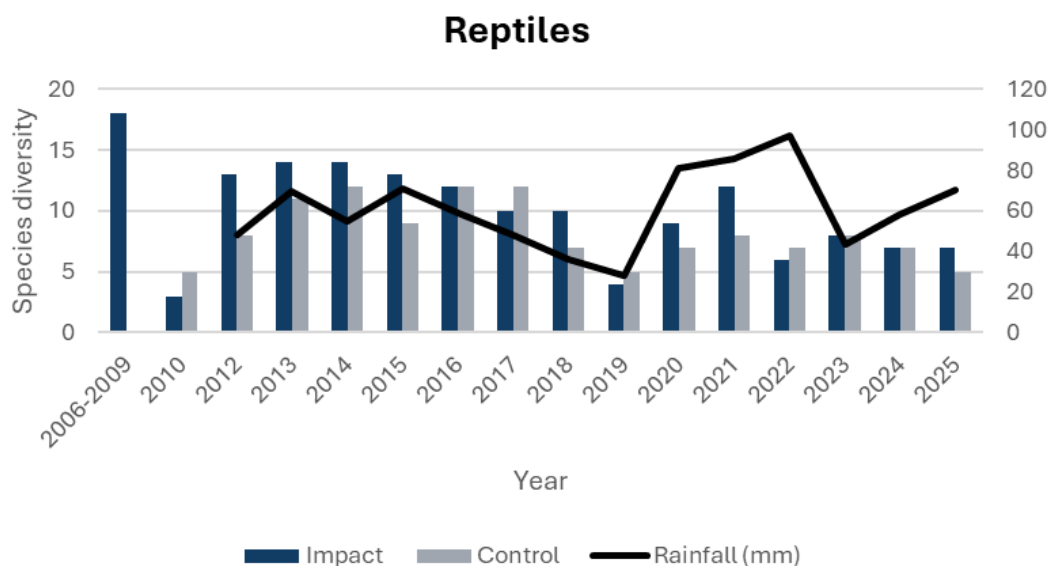
Shannon-Wiener Species Diversity	Riparian	Woodland	Combined
Control	Insufficient data	Insufficient data	1.52
Impact	Insufficient data	Insufficient data	1.86
Hutcheson t-test results	Insufficient data	Insufficient data	t= -1.169 df= 24.22 P= 0.253

Overall, the species evenness was slightly higher at the impact sites (1.183) compared with the control sites (0.923).

Reptile species richness varied unevenly between the woodland control and impact sites. No species were recorded at the control sites, whereas seven species were detected at the impact sites. The opposite pattern occurred in the riparian habitat, where only one species was recorded at the impact sites compared with five at the control sites. Overall, reptile species richness was higher in the impact habitat, which supported seven species, compared with five species recorded in the control habitat.

The reptile species similarity between the control and impact sites for the woodland and riparian habitat both showed 0 per cent when calculated using Jaccards index of community similarity. Overall, there was 20 per cent similarity of reptile species recorded between the control and impact sites. The Jaccard similarity scores indicate that reptile communities in woodland and riparian habitats shared no species between control and impact sites, demonstrating complete species turnover. When habitats were combined, only 20 per cent similarity was observed overall, showing that the two habitat types largely support distinct reptile assemblages.

Reptile diversity for 2025 has remained consistent for the impact sites since 2024 monitoring, however, has decreased (by two species) at the control sites (Graph 3.5). In 2025, site differences are minimal. The pattern since 2022 suggests rainfall is a plausible driver or potential contributor of annual richness variation, with impact sites responding more strongly (both up in 2022 and down afterwards) than controls. By 2025, both have settled into comparable mid-range richness.



Graph 3.5 Reptile Species Diversity Recorded Between The Impact and Control Sites Compared Among Years Compared with Mean Annual Rainfall (mm) Data

3.3.5 Ants

Ant Genera diversity was similar between the Impact and Control sites (**Table 3.7**) with four Subfamilies recorded at the impact sites (Dolichoderinae, Ectatomminae, Myrmeicinae and Formicinae, of which four Genera were identified. Control sites recorded three sub-families (Dolichoderinae, Formicinae and Ectatomminae), with four Genera identified. Diversity indices were not calculated as individuals were only identified to Genera (as per previous monitoring programs).

Rehabilitation sites showed results of which might be expected in early-successional eco-systems, with *Ochetellus* (and *Rhytidoponera* at NEOC) present but woodland affiliates largely absent to date. The ACOL-operated RUM (Narama Dam/Woodland) had *Camponotus* and *Myrmecia* which are consistent with intact woodland structure. Non-detections of *Pheidole* and *Melophorus* likely reflect reduced 2025 effort and method sensitivity rather than true absence, underscoring the value of standardised baiting and longer pitfall durations in future rounds.

Table 3.7 Ant Families and Genera Recorded Between the Impact and Control Sites of the ACP Site

Family: Subfamily	Genera	Location						
		Impact Sites		Control Sites		Rehabilitation Sites		ACOL- Operated RUM
		Riparian	Woodland	Riparian	Woodland	NEOC	Bowmans Creek Diversion	Narama Dam and Woodland
Formicidae: Dolichoderinae	Iridomyrmex	Observed	Not observed	Not observed	Observed	Not observed	Not observed	Not observed
Formicidae: Dolichoderinae	Ochetellus	Observed	Not observed	Observed	Observed	Observed	Not observed	Not observed
Formicidae: Formicinae	Camponotus	Observed	Observed	Not observed	Observed	Not observed	Not observed	Observed
Formicidae: Myrmeicinae	Myrmecia	Observed	Observed	Not observed	Not observed	Not observed	Not observed	Observed
Formicidae: Myrmicinae	Pheidole	Not observed	Not observed	Not observed	Not observed	Not observed	Not observed	Not observed
Formicidae: Formicinae	Polyrhachis	Not observed	Observed	Not observed	Observed	Not observed	Not observed	Not observed
Formicidae: Ectatomminae	Rhytidoponera	Not observed	Observed	Not observed	Observed	Observed	Not observed	Not observed
Formicidae: Formicinae	Melophorus	Not observed	Not observed	Not observed	Not observed	Not observed	Not observed	Not observed

3.4 Baseline Surveys Results ACOL-Operated RUM

Baseline bird surveys within the ACOL-operated RUM area inclusive of the woodland habitat and Narama Dam recorded a total of 21 bird species, representing a mix of raptors, waterbirds, and passerines. Raptors such as the white-bellied sea eagle (*Ichthyophaga leucogaster*), spotted harrier (*Circus assimilis*), australian hobby (*Falco longipennis*), and wedge-tailed eagle (*Aquila audax*) indicate the presence of open habitats and prey availability across the wider landscape. Waterbirds including black swan (*Cygnus atratus*), pacific black duck (*Anas superciliosa*), australian pelican (*Pelecanus conspicillatus*), eurasian coot (*Fulica atra*), white-necked heron (*Ardea pacifica*), eastern great egret (*Ardea modesta*), little black cormorant (*Phalacrocorax sulcirostris*), australian wood duck (*Chenonetta jubata*), and masked lapwing (*Vanellus miles*) were recorded within the Narama Dam itself. There is limited fringing and aquatic vegetation within the dam itself which makes the dam more inhabitable for waterbirds rather than shorebirds which require more complex vegetative structure.

One threatened woodland bird, the speckled warbler (*Pyrholaemus sagittatus*), was recorded within woodland habitat adjacent to Narama Dam. Aside from this observation, the bird census within woodland habitat was dominated by common passerines. The woodland in this area is structurally immature, characterized by predominantly small narrow-leaved ironbark (*Eucalyptus crebra*) trees (<20 cm DBH) and a sparse shrub layer, limiting habitat complexity. Despite this, small narrow-leaved ironbark (*Eucalyptus crebra*) provides an important seasonal resource when flowering, supporting nectar-feeding threatened species such as the regent honeyeater (*Anthochaera phrygia*) and swift Parrot (*Lathamus discolor*).

No herpetofauna were recorded at Narama Dam or woodland area of the ACOL-Operated RUM in this baseline dataset.

Baseline ultrasonic monitoring detected southern myotis (*Myotis macropus*) as probable at Narama Dam during winter, no calls for the species were picked up on recorders in spring. However, during nocturnal spotlighting surveys in spring, observers noted a bat of suitable size for southern myotis, raking the water surface obvious in the observers torch lights which is a very sure sign for the species. Southern myotis (*Myotis macropus*) is the only microbat species known to specialise in trawling or raking the water surface to catch aquatic prey (fish and insects). This is a unique foraging strategy among Australian bats. Microbat assemblages in general recorded across devices indicate structurally diverse woodland and riparian habitats for the various species picked up. Species detected include *Austronomus australis*, *Nyctophilus geoffroyi/gouldi*, *Ozimops ridei*, *Vespadelus regulus*, and others, suggesting moderate to good habitat condition with functional connectivity and aquatic resources.

3.5 Nest Box Monitoring

Nest boxes were inspected for resident fauna, pest species, and structural condition. Common brushtail possums (*Trichosurus vulpecula*) was the most frequently recorded species, with 13 individuals occupying five boxes across the monitoring period. Two boxes recorded a total of nine brush-tailed phascogales (*Phascogale tapoatafa*) during spring surveys, one containing four individuals and the other five. These observations were made in the same nest boxes that contained suspected brush-tailed phascogale nesting material (feather, leaves, bark) during the 2024 monitoring program.

All nest boxes monitored were located within the Southern Woodland (VCA) area (**Figure 3.2**), refer to **Appendix 2** for the GPS location of each nest box, though one box was unable to be located during winter and spring. The contents and condition of all nest boxes monitored are included in **Table 3.8**, and a summary is presented below:

- A total of nine nest boxes were identified as structurally failed, missing, or unsuitable for continued use and require full replacement (Boxes 7, 10, 16, 20, 22, 24, 28, 31, 32).
- Structural issues observed in these boxes included missing lids or bases, broken or detached panels, failed mounting hardware, and complete box loss.
- One nest box (Box 36) displayed minor structural deterioration (lid lifting and delaminating) and requires repair rather than replacement.
- All remaining nest boxes were assessed as being in good or serviceable condition at the time of the Spring 2025 inspection.
- Some boxes contained invertebrate occupation (ants, wasps, bees), but these were not classified as damaged and remain structurally functional.
- The identified failures highlight the need for a targeted maintenance and replacement program to ensure ongoing provision of artificial hollow resources for hollow-dependent fauna.

Across 38 nest boxes assessed in Winter–Spring 2025, vertebrate occupancy brush-tailed phascogale (*Phascogale tapoatafa*), and common brush tailed possum (*Trichosurus vulpecula*) were observed to occupy 20.5 per cent of boxes (8 boxes). Given the lack of small and very small natural hollows identified in an audit conducted in 2016 (Umwelt 2017a), the nest boxes assist in providing augmented habitat for a number of threatened hollow-dependant species using these size classes that have been recorded within the ACP including the brush-tailed phascogale (*Phascogale tapoatafa*), squirrel glider (*Petaurus norfolkensis*), greater broad-nosed bat (*Scoteanax rueppellii*), eastern coastal free-tailed bat (*Micronomus norfolkensis*), little bentwing-bat (*Miniopterus australis*) and yellow-bellied sheath-tail-bat (*Saccolaimus flaviventris*).

Table 3.8 Nest Box Monitoring Results

Box ID	Box Type	Contents		Condition	
		Winter 2025	Spring 2025	Winter 2025	Spring 2025
1	New brushtail	None	None	Good	Good
2	New glider	None	Bees	Good	Good
3	New phascogale	None	None	Good	Good
4	New phascogale	Wasp	Wasp	Good	Good
5	New phascogale	Ants	Ants	Unable to be opened	Good
6	New brush-tailed possum	Brushtail possum (<i>Trichosurus vulpecula</i>) (x2)	Brushtail possum (<i>Trichosurus vulpecula</i>) (x1)	Good	Good
7	Ringtail	Spiders	None	Poor – Lid and bottom are missing	Poor – Lid and bottom are missing
8	Glider	Ants	None	Poor – Hole in the bottom of box	Good
9	New glider	None	Brush-tailed phascogales (<i>Phascogale tapoatafa</i>) (x5)	Good	Good
10	New phascogale	None	None	Poor - Fastening snapped and located on ground	Poor - Missing
11	New glider	None	None	Good	Good
12	New microbat	None	Spiders	Unable to be opened	Good
13	New microbat	Spiders	Spiders	Good	Good
14	New glider	None	None	Good	Good
15	New glider	None	None	Side is falling apart	Good
16	Ringtail	None	Brushtail possum (<i>Trichosurus vulpecula</i>) (x1)	Poor – Lid missing and timber broken	Poor – Lid missing and timber broken
17	New microbat	Spiders	Spiders	Good	Good
18	New microbat	Spiders	Spiders	Unable to be opened	Good
19	New glider	None	None	Lid falling apart	Good
20	Ringtail	None	None	Poor – Lid missing, hinge gone, and side broken	Poor – Lid missing, side is loose

Box ID	Box Type	Contents		Condition	
		Winter 2025	Spring 2025	Winter 2025	Spring 2025
21	New brushtail	None	None	Good	Good
22	Bat	None	None	Poor – Completely destroyed	Poor – Only back panel remains
23	New glider	Honeycomb on lid, no bees present	Brush-tailed phascogales (<i>Phascogale tapoatafa</i>) (x4)	Good	Good
24	Bat	None	None	Poor - Lid missing, front of box is falling apart	Poor – Lid missing, side is loose
25	New microbat	Spiders present	None	Good	Good
26	New microbat	Spiders present	None	Good	Good
27	New glider	None	None	Good	Good
28	Ringtail	None	None	Poor – Lid and bottom are missing	Poor – Lid and bottom are missing
29	New ringtail	Brushtail possum (<i>Trichosurus vulpecula</i>) (x1)	Brushtail possum (<i>Trichosurus vulpecula</i>) (x2)	Good, although lid can't fully close	Good
30	New glider	None	None	Good	Good
31	Glider	None	None	None	Missing
32	Glider	None	None	Missing	Poor - Box found destroyed on ground
33	New microbat	Spiders	None	Good	Good
34	New microbat	Wasp nest	None	Good	Good
35	New microbat	Brushtail possum (<i>Trichosurus vulpecula</i>) (x1)	Brushtail possum (<i>Trichosurus vulpecula</i>) (x2)	Timber is warped from rain	Good
36	New ringtail	None	Brushtail possum (<i>Trichosurus vulpecula</i>) (x1)	None	Lid slightly raised and delaminating
37	New microbat	None	Wasp	None	Good
38	New microbat	Brushtail possum (<i>Trichosurus vulpecula</i>) (x1)	Brushtail possum (<i>Trichosurus vulpecula</i>) (x2)	Timber is warped from rain	Good
39	New phascogale	None	None	None	Good

Legend

-  Nest Box Locations
-  Longwall Panel
-  Road
-  Railway
-  Watercourse
-  Study Area
-  VCA Boundary
-  Ashton Mining Lease Area
-  ACOL-Operated RUM



Scale 1:30,000 at A4
GDA2020 MGA Zone 56



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4.0 Discussion and Recommendations

4.1 Species Diversity

A total of 120 species were recorded across the ACP site in 2025, representing an increase from 116 species in 2024. It is important to note that the ACOL-operated RUM areas contribute additional species due to their differing ecosystems, which provide habitat opportunities not present elsewhere within the ACP site. Pooled species data demonstrates similar species diversity between the control (76) and impact (102) areas, the control remains relatively unchanged since 2024 monitoring, with the impact habitats results having increased by 12 species in 2025. Based on the 2025 monitoring outcomes, fauna species diversity at the ACP site does not show evidence of being adversely affected by mining activities.

The species diversity among faunal groups at the ACP site showed an increase for mammals across the impact sites by seven species compared with the 2024 surveys. This was true for the control sites as well which increased from 2024 by 10 species. Mammal species richness has increased steadily across the monitoring period, with both impact and control sites showing long-term upward trends. After fluctuating through earlier years, richness rose sharply from 2023 to 2025, reaching the highest values recorded (Impact 36; Control 27). Although annual rainfall varied considerably, mammal diversity did not consistently track rainfall patterns, indicating that other ecological or habitat factors are likely driving the recent strong increases at both site types.

In 2025, bird species diversity increased at the impact sites compared with 2024, whereas the control sites recorded eight fewer species than in the previous year. Riparian bird assemblage diversity remained statistically similar between control and impact sites. This outcome is somewhat unexpected given the markedly degraded habitat at the riparian impact site, where the creek bed often holds little to no water and most trees and stags have been removed in recent years due to infrastructure works. These conditions provide limited resources for birds (and fauna in general) yet the diversity results did not reflect a decline in the riparian impact assemblage relative to the control. The opposite is true at the woodland sites the diversity is much higher at Impact than Control, which is reflected in the significant difference detected in the Hutcheson t-test ($p > 0.05$).

In 2025, amphibian species richness was extremely low and identical at both impact and control sites (2 species each), marking a further decline from 2024 and ranking among the lowest values in the dataset despite improved rainfall. Across the full monitoring record, amphibian richness has shown a clear tendency to rise during wetter years (peaking in 2014, 2016, 2020–2022) and decline during drier periods (notably 2018–2019), with no consistent long-term difference between impact and control sites; however, richness has trended downward since 2021, culminating in the suppressed 2025 values. A Hutcheson t-test could not be performed because the dataset lacked the species-level abundance information required to calculate the variance of Shannon diversity, and sample sizes were too small to support the test.

Reptile species diversity was slightly lower when compared to the 2024 monitoring results at the control sites (recording two less species), and consistent with those recorded in the impact sites since 2022. Similar to the amphibian results, there was insufficient data to perform the Hutcheson t-test for the riparian and woodland habitats.

Reptile diversity is largely dependent on the presence of shelter and basking habitats such as logs, rocks, leaf litter and loose tree bark. These habitats were present in various forms and densities throughout the ACP site.

The species diversity among faunal groups varied between control and impact sites among the different habitat areas for 2024. However, the general variations are considered acceptable and can be explained by natural fluctuations in species diversity and with consideration to the region which is recovering from the recent drought conditions.

Fauna monitoring surveys were conducted in the NEOC rehabilitation and Bowmans Creek Diversion revegetation areas for the eighth time since surveys were implemented in 2018. The total number of fauna species recorded at the NEOC had remained consistent with results from 2024; there was a slight decrease of two species from previous year. The fauna consensus from the NEOC lacked contributions from amphibian and reptile species, likely because suitable habitat structure for herpetofauna is not yet well developed. This may also reflect the limited survey window available for herpetological sampling across the reduced effort transects.

The number of species recorded at the Bowmans Creek diversion revegetation area in 2025 was higher than in any year since 2021, with a total of 28 species observed. The presence of water in Bowman's Creek during the spring survey created additional habitat, allowing more bird species to utilise the site.

The fauna species diversity of these two areas are lower compared to both control and impact areas surveyed in the ACP site, however this is to be expected as these areas are relatively young with limited habitat and were surveyed using a reduced survey method. The recovery from drought condition (2016 to 2019) in the previous few years, particularly at the riparian impact site at Bowmans Creek diversion limits the available habitat for birds.

4.2 Community Similarity

Community similarity between control and impact sites varied across fauna groups but generally indicated moderate overlap driven by habitat structure rather than mining disturbance. Bird and mammal assemblages showed mid-range similarity values ($\approx 45\text{--}50\%$), suggesting that both site types share a substantial core of species while still exhibiting natural turnover linked to habitat differences and seasonal conditions. In contrast, amphibians and reptiles showed lower similarity ($\approx 40\%$), reflecting their sensitivity to microhabitat features such as water availability, ground cover and basking structures factors that fluctuated markedly across years and were further influenced by reduced 2025 survey effort (reduced number of transects surveyed). Reptile similarity was particularly low, with 0% overlap in woodland and riparian habitats individually, indicating complete species turnover between site types at finer habitat scales, though combined-habitat similarity rose to 20%.

These patterns are consistent with natural ecological variability and the differing habitat qualities across transects especially the degraded riparian impact site and do not suggest mining-related declines. Instead, the results reflect habitat-driven assemblage differences and climate-linked fluctuations, with overall community similarity remaining stable within the range expected for the ACP's heterogeneous landscape.

4.3 Threatened Species

The threatened species recorded during the 2025 monitoring surveys are largely representative of those recorded during the previous years. Fourteen threatened species were recorded in 2025 monitoring period, which is slightly higher than the two subsequent survey years, being 13 and 12 species respectively.

A total of 32 threatened species have now been recorded within the ACP since monitoring began in 2006 (ERM 2006-2009, PEA 2010-2014, Umwelt 2015–24). The following sub-sections provide information on the threatened species observed during the 2025 monitoring surveys and those species previously recorded.

4.3.1 Grey-crowned Babbler

The grey-crowned babbler (*Pomatostomus temporalis temporalis*) is listed as Vulnerable under the NSW BC Act. This species is common within remnant woodland patches in the Hunter Valley with 152 documented records within ~10 km of the ACP Site (BioNet 2025).

A total of 21 individuals were recorded on during the 2025 fauna monitoring surveys, majority of these observations came from the southern woodland, with some noted in proximity to the riparian impact (**Figure 3.1**). This species has been recorded during every fauna monitoring survey within the ACP site since 2006.

4.3.2 Latham's Snipe

During the 2025 surveys, two sightings of this species (likely the same individual) were made feeding in the dam directly south of the Riparian Impact area (**Figure 3.1**). Latham's Snipe (*Gallinago hardwickii*) was first documented during the 2024 monitoring period and was observed again in spring 2025 at the same waterbody situated above the ACP longwalls. This migratory species breeds in Japan and eastern Russia during the northern summer before travelling to Australia for the non-breeding season, typically during spring and summer.

This species is uncommon in the region with no documented records within 10 km of the ACP site (BioNet 2025). This species is listed as Vulnerable under the NSW BC Act and Commonwealth EPBC Act.

4.3.3 Brush-tailed Phascogale

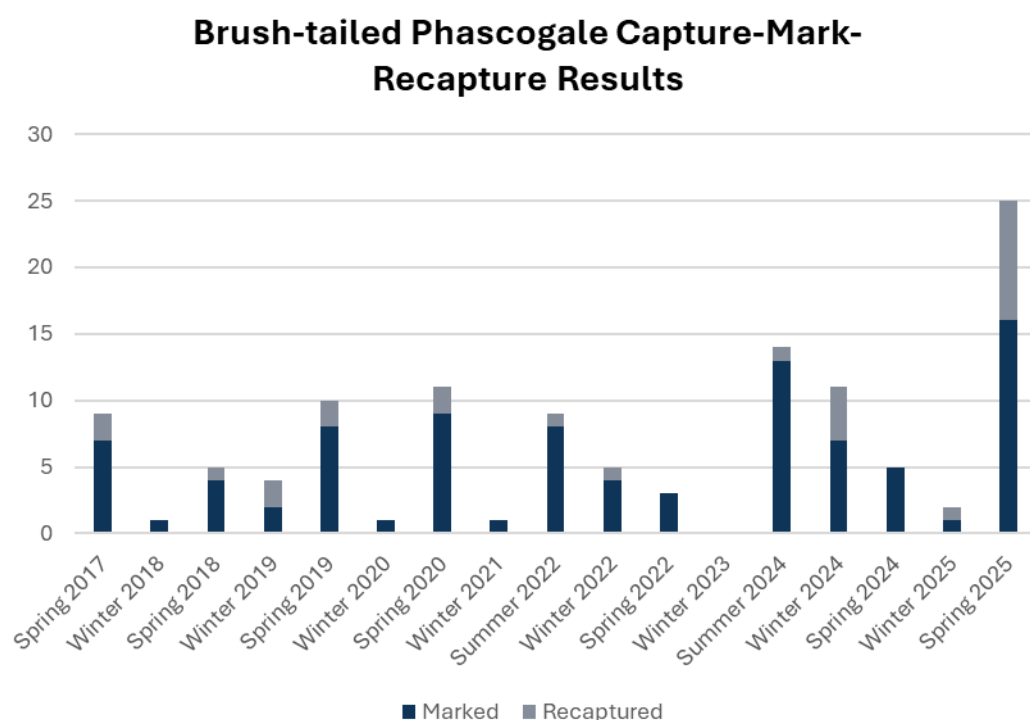
The brush-tailed phascogale (*Phascogale tapoatafa*) listed as Vulnerable under the NSW BC Act, was first recorded at the ACP site in 2014 (PEA 2014) when two individuals were captured. Since then, monitoring results have shown variable detection rates across years; however, 2025 represents the highest recorded abundance for this species at the site to date.

In 2025, a total of 49 brush-tailed phascogales were recorded across the ACP site through various survey methods. Elliott trapping accounted for the majority of detections, with 28 individuals captured. Nocturnal spotlighting confirmed the presence of individuals in the northern and southern woodland, while nest box inspections in the southern woodland documented nine individuals occupying two boxes one containing four animals and the other five. Remote cameras detected the species on eight occasions across the northern woodland, southern woodland, and the NEOC rehabilitation area. Additionally, hair funnel traps in both the NEOC and northern woodland returned identifiable samples confirming the species' presence at those locations.

The mark-recapture methods employed during the surveys provide an indication of the size of the population of this species. Of the 17 individuals that were captured and marked, 10 were recaptured. These marked individuals were located within in the Northern Woodland, Southern Woodland (**Figure 3.1**).

A conservative population estimate of approximately eleven individuals can be made for this species at the ACP site during the time of the surveys. This estimate assumes that no individuals were added or removed from the population in the form of natality, mortality, immigration or emigration.

Brush-tailed phascogale (*Phascogale tapoatafa*) captures increased markedly in 2025, with Spring 2025 recording the highest numbers of both newly marked and recaptured individuals across the entire monitoring program. Earlier years show low and fluctuating capture rates, but from 2023 onward there is a clear upward trend, culminating in a strong spike in 2025 that suggests a substantial increase in local activity and or detectability of the species. Recaptures also rose in recent years, indicating good site fidelity and repeated use of the woodland habitat. Overall, the 2025 results represent the peak abundance and strongest capture-mark-recapture performance recorded to date for the species at the ACP site.



Graph 4.1 **Capture-Mark-Recapture Results for Brush-tailed Phascogales Captured Since 2017**

4.3.4 Eastern Coastal Free-tailed Bat

The eastern coastal free-tailed bat (*Micronomus norfolkensis*) is listed as Vulnerable under the NSW BC Act. This species was detected at two locations both in Spring (Southern Woodland and Bowman's Creek diversion) within the ACP (**Figure 3.1**). This species is relatively uncommon in the region with four records within ~10 km of the ACP site (BioNet 2025).

4.3.5 Little Bent-winged Bat

The little bent-winged bat (*Miniopterus australis*) is listed as Vulnerable under the NSW BC Act. This species was detected at several locations across the ACP site including Northern Woodland, NEOC, Riparian Impact, Southern Woodland and Bowman's Creek diversion across the ACP site (**Figure 3.1**).

This species has been previously recorded at the ACP site during the 2018–2024 monitoring surveys. This species is increasingly being detected across the Hunter Valley, with thirteen records within ~10 km of the ACP site (BioNet 2025). This species roosts in tree hollows and buildings and will forage within most habitats in its territory. The ACP site contains woodland foraging habitat and potential roosting habitat for this species in the form of hollow-bearing trees.

4.3.6 Eastern bent-winged Bat

The Eastern bent-winged bat (*Miniopterus orianae oceanensis*) is listed as Vulnerable under the NSW BC Act. This species was detected at three locations across the ACP including Bowman's Creek Diversion, Riparian Impact and the Southern Woodland across winter and spring (**Figure 3.1**). This species has been recorded at the ACP site in previous years (ERM 2009, PEA 2011–14, Umwelt 2015–19, Umwelt 2022–24). This species is relatively uncommon in the region with 32 documented records within ~10 km of the ACP site (BioNet 2025). This species roosts in tree hollows and buildings and will forage within most habitats in its territory. The ACP site contains potential roosting habitat for this species in the form of hollow-bearing trees.

4.3.7 Southern Myotis

The southern myotis (*Myotis macropus*) is listed as Vulnerable under the NSW BC Act. This species was recorded at all survey locations within the ACP site (**Figure 3.1**). Baseline ultrasonic monitoring at Narama Dam detected Southern Myotis (*Myotis macropus*) as probable at during winter, no calls for the species were picked up on recorders in spring. In addition, during nocturnal spotlighting surveys in spring, observers noted a bat of suitable size for southern myotis, clearly raking the water surface obvious in the observers torch lights which is a very sure sign for the species.

This species generally roosts in groups close to water in caves, mine shafts, hollow-bearing trees and bridges. It forages over streams and pools raking their feet across the surface of the water to catch insects. The habitats within the ACP site likely provide suitable roosting and foraging habitat for this species. This species is relatively uncommon in the region with eleven documented records within ~10 km of the ACP site (BioNet 2025).

4.3.8 Eastern Cave Bat

The eastern cave bat (*Vespadelus troughoni*) is listed as Vulnerable under the NSW BC Act. This species was recorded at five locations within the ACP site: Northern Woodland, NEOC, Narama Dam, Riparian Impact and Bowman's Creek diversion (**Figure 3.1**). This species is relatively uncommon in the region with three documented records within 10 km of the ACP site (BioNet 2025). This species breeds in caves, so the ACP site is unlikely to provide roosting habitat for this species, however, the ACP site provides woodland foraging habitat for this species.

4.3.9 Yellow-bellied Sheath-tail-bat

The yellow-bellied sheath-tail-bat (*Saccolaimus flaviventris*) is listed as Vulnerable under the NSW BC Act. This species is generally difficult to detect, though has been recorded within the ACP in 2017 and 2024, the species was detected within the Northern Woodland and Riparian Control during spring.

Typically, the species roost in caves or mine shafts so the ACP site is unlikely to provide roosting habitat for this species, however, the ACP site provides woodland foraging habitat for this species. Only one documented record within 10 km of ACP site (BioNet 2025).

4.3.10 Greater broad-nosed Bat

The greater broad-nosed bat (*Scoteanax rueppellii*) is listed as Vulnerable under the NSW BC Act. This species has been previously recorded in the ACP in 2018 and 2024; it is generally uncommon and hard to differentiate from calls as it overlaps with other species of the same genus during feeding frenzies. It is for this reason that there are 14 detections of the species, varying levels of confidence some include species group identification which is broad-nosed bat (*Scotorepens balstoni* / *rueppellii*).

4.3.11 Spotted harrier

The spotted harrier (*Circus assimilis*) is listed as Vulnerable under the NSW BC Act. The species has been previously recorded across the ACP; however, it is generally considered infrequent in the Hunter Valley. It is typically observed foraging over open woodland, grassland and agricultural landscapes, preying on small mammals and reptiles. A total of 19 BioNet records occur within ~10 km of the ACP (BioNet 2025). The species was recorded once during the winter survey period in 2025.

4.3.12 White-bellied sea-eagle

The white-bellied sea-eagle (*Haliaeetus leucogaster*) is listed as Vulnerable under the NSW BC Act. The white-bellied sea-eagle is a regular and conspicuous raptor in the Hunter Valley, can often be observed along rivers, wetlands, estuaries and the coast where it forages for fish and water associated prey. During 2025 surveys, a pair were sighted on two occasions during spring surveys soaring in proximity to the waterbodies across the ACP. This species has been recorded previously, with nine BioNet species records present within ~10km of the ACP (BioNet 2025).

4.3.13 Masked owl

The masked owl (*Tyto novaehollandiae*) is listed as Vulnerable under the NSW BC Act. The masked owl is an uncommon nocturnal raptor in the Hunter Valley, typically associated with mature forests

and woodlands where it roosts in tree hollows and forages over adjacent open areas at night. This species has been recorded across the ACP, with 11 BioNet species records present within ~10km of the ACP (BioNet 2025). During 2025 surveys, the masked owl was successfully called in from call-play back and subsequently seen during spotlighting surveys in the riparian impact along Bowman's Creek.

4.3.14 Speckled warbler

The speckled warbler (*Pyrholaemus sagittatus*) is listed as Vulnerable under the NSW BC Act. This species has been recorded previously across the ACP and is not uncommon in woodland patches across the hunter valley with 150 species records present within ~10km of the ACP (dates range from 1994 to 2024) (BioNet 2025). This species favours open eucalypt woodland and forest which has a sparse shrub layer and well-developed grassy ground layer, crucial for its foraging behaviours. Three individuals were recorded in 2025 within woodland habitat adjacent to Namara Dam in the ACOL-operated RUM.

4.3.15 Previously Recorded Threatened Species

A total of 32 threatened species known to occur in or near the ACP site or that were considered likely to occur are identified in the FFMP and/or from previous monitoring records. Fourteen of these species were recorded in 2025. The remaining species previously known or expected to occur were not detected during 2025 monitoring surveys and are outlined in **Table 4.1** below.

Table 4.1 Previously Recorded Threatened Species Not Present in 2025

Species	NSW BC Act 2016	EPBC Act 1999	Likely Reason for Absence in 2024
hooded robin <i>Melanodryas cucullata</i>	V	E	Uncommon woodland species that utilises woodland/grassland fringes. More detectable during winter. No documented records within 10 km of ACP site (BioNET 2025).
turquoise parrot <i>Neophema pulchella</i>	V	-	Uncommon bird in the Hunter Valley and rarely recorded. No documented records within 10 km of ACP site (previous monitoring (PEA 2010) record not listed on BioNet database (BioNet 2025)).
little lorikeet <i>Glossopsitta pusilla</i>	V	-	Previously recorded on the ACP site in 2019. Forages over large distances in response to flowering eucalypts. Three records documented within 10 km of the ACP Site (BioNet 2025).
scarlet robin <i>Petroica boodang</i>	V	-	Previously recorded on the ACP site in 2016. Uncommon in the region with only four records documented within 10 km of the ACP Site (BioNet 2025). The species forages from low perches or on the ground within dry eucalypt forests and woodlands; habitat which is present in the ACP site.
flame robin <i>Petroica phoenicea</i>	V	-	Uncommon woodland species. More detectable during winter. Only two records documented within 10 km of the ACP Site (BioNet 2025).

Species	NSW BC Act 2016	EPBC Act 1999	Likely Reason for Absence in 2024
barking owl <i>Ninox connivens</i>	V	-	Uncommon nocturnal species that forages over large areas. No documented records within 10 km of ACP site (BioNet 2025).
diamond firetail <i>Stagonopleura guttata</i>	V	V	Uncommon woodland species. More detectable during winter. No documented records within 10 km of ACP site (BioNet 2025).
black-breasted buzzard <i>Hamirostra melanosternon</i>	V	-	An occurrence of this species in the Hunter Valley must be considered as vagrant birds. Records of this species are rare anywhere in NSW, typically only occurring in northern Queensland, NT and northern WA. No documented records within 10 km of ACP site (BioNet 2025). Previous record on ACP site likely to be a misidentification or a vagrant individual.
black falcon <i>Falco subniger</i>	V	-	Previously recorded within the ACP site in 2021. A wide-ranging species that is relatively uncommon in the region. No documented records within 10 km of ACP site (BioNet 2025).
little eagle <i>Hieraaetus morphnoides</i>	V	-	Uncommon raptor species. Forages over large areas. One documented record within 10 km of the ACP Site (BioNet 2025).
square-tailed kite <i>Lophoictinia isura</i>	V	-	Recorded in 2021 within the ACP site. This species is relatively uncommon in the region with no records within 10 km of the ACP site (BioNet 2025). This species occupies large hunting ranges of more than 100 m ² .
white-throated needletail <i>Hirundapus caudacutus</i>	-	V	Recorded in 2021 within the ACP site. This species is highly mobile and relatively uncommon in the region with only two documented records within 10 km of the ACP site (BioNet 2025).
grey-headed flying-fox <i>Pteropus poliocephalus</i>	V	V	Wide ranging species that forages in the pollen and nectar of native trees. Roosts in large 'camps'. There are several well-known camps located proximate to the Hunter Valley (Singleton, Muswellbrook), which have recorded up to 25000 individuals, however numbers do fluctuate (McKeown et al. (2024). There are nine records documented within 10 km of the ACP site (BioNet 2025).
spotted-tail quoll <i>Dasyurus maculatus</i>	V	E	Recorded in 2021 within the ACP site. Uncommon in the region with three records within 10 km of the ACP site (BioNet 2025).
large-eared pied bat <i>Chalinolobus dwyeri</i>	V	V	Uncommon in the region. This species typically roosts in caves, crevices in cliffs, in old mine workings and in disused fairy martin nests, so the ACP site is unlikely to provide roosting habitat for this species, however, the ACP site provides woodland foraging habitat for this species. Fifteen records documented within 10 km of the ACP site, four of which are records from 2024 (BioNet 2025).

Species	NSW BC Act 2016	EPBC Act 1999	Likely Reason for Absence in 2024
green and golden bell frog <i>Litoria aurea</i>	E	V	Has not been recorded in the Upper Hunter Valley since 2009 at Ravensworth. Limited habitat in ACP site. Two documented records within 10 km of ACP site (BioNet 2025).
giant burrowing frog <i>Heleioporus australiacus</i>	V	V	Very uncommon in the region. Not found in clay soil types, typical of the ACP site. No documented records within 10 km of ACP site (BioNet 2025).

4.4 Introduced Animals and Weed Species

Introduced animals and weeds have the potential to impact on the fauna diversity within the ACP site. ACOL commission Enright Land Management ELM to undertake regular pest and weed management works within the ACP site. In 2025, nine priority weed species were targeted and treated as part of the ongoing management program (ELM 2026). Management of introduced fauna was also undertaken, focusing on pigs (*Sus scrofa*), wild dogs (*Canis familiaris*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), deer (*Cervidae* spp.), and goats (*Capra hircus*) using appropriate control techniques (ELM 2026).

In 2025, no weed infestations were identified as having a detrimental impact on fauna or their habitats. It is recommended that the existing weed management practices be maintained throughout 2026. A total of 10 introduced animal species were recorded in the ACP site during the 2025 fauna monitoring surveys, being the black rat (*Rattus rattus*), house mouse (*Mus musculus*), feral cat (*Felis catus*), common myna (*Sturnus tristis*), brown hare (*Lepus capensis*), pig (*Sus scrofa*), European fox (*Vulpes vulpes*), European rabbit (*Oryctolagus cuniculus*), red deer (*Cervus elaphus*) and goat (*Capra hircus*). This has been the first detection of goats within the ACP; it was detected in hair funnel traps located within the southern woodland. The red deer (*Cervus elaphus*) was observed during spotlighting surveys during winter, other species were detected on a remote camera on at least one occasion (**Table 4.2**), except the common myna and house mouse, which were recorded during diurnal bird surveys and trapping.

Table 4.2 Introduced Fauna Species Identified 2025 Monitoring

Cat (<i>Felis catus</i>)  2025-11-18 07:20:30 M 1/3 18°C HF2 PRO WHITE	Pig (<i>Sus scrofa</i>)  2025-11-18 08:44:43 M 2/3 28°C HF2 PRO WHITE
Black rat (<i>Rattus rattus</i>)  ENDURO C229B2300000 62F 17C 27/04/2021 15:00:55	Red fox (<i>Vulpes vulpes</i>)  ENDURO C224B2300000 59F 15C 28/04/2021 19:22:07
European rabbit (<i>Oryctolagus cuniculus</i>)  ENDURO C222B2300000 55F 13C 01/05/2021 23:23:21	Hare (<i>Lepus capensis</i>)  2025-11-20 21:29:44 M 3/3 18°C HF2 PRO COVERT

4.5 Recommendations for Future Monitoring

The 2025 survey results indicate that the current biodiversity management program at the ACP site is effectively supporting fauna species diversity, including threatened species. Notably, brush-tailed phascogale (*Phascogale tapoatafa*) were recorded at their highest abundance to date, demonstrating a healthy and well-supported population within the ACP across the control and impact sites.

The results also highlight the challenges of monitoring fauna diversity during periods of climatic variability and drought recovery, which was particularly relevant during the 2025 monitoring period and the preceding three to four years. There has been no observable difference in threatened fauna diversity since monitoring began in 2005 that could be attributed to mining.

A range of recommendations are provided below that may assist ACOL in the ongoing successful management of the ACP site:

- Although reptile and amphibian abundance and diversity were lower during the 2025 monitoring period, both groups are highly sensitive to external conditions and often exhibit low detectability, which can further contribute to under-representation in monitoring datasets. To improve detection rates, the 2026 monitoring program should include increased attention to opportunistic observations, which are likely to bolster the number of reptiles and amphibians recorded enabling the statistical analysis to run.
- The revised 2025 survey design which incorporates the ACOL-operated RUM, proved effective in collecting the necessary fauna data for monitoring. Continuing this design in 2026 is recommended to maintain consistency and data quality.
- Results from the baseline surveys conducted within the ACOL operated RUM and Narama Dam indicate that Southern Myotis (*Myotis macropus*) are utilising habitat in these areas. According to the BMP (ACOL 2025), when southern myotis are detected during baseline surveys, annual monitoring should continue between October and March to confirm species presence and habitat use until two years after the completion of mining in LW 403 to 406. To meet this requirement, ACOL could integrate specific southern myotis (*Myotis macropus*) monitoring into the 2026 biannual fauna survey program. This could involve undertaking additional multi active detection and incorporate two complementary methods with consideration to the ‘Species credit’ *threatened bats and their habitats: NSW survey guide for the Biodiversity Assessment Method (DPIE 2021)*, including:
 - Anabat walk through detector units to capture and display ultrasonic foraging calls over waterbodies such as dams, and
 - Direct visual observation, using spotlighting, head torches, and/or thermal scopes to confirm species presence and behaviour.
- It is recommended that the (9) nest boxes in the southern woodland which were identified as structurally failed, missing, or unsuitable for continued use and be replaced to provide the intended purpose which is to provide augmented habitat for a range of hollow dependant threatened species across the ACP.

- It is recommended that the additional monitoring sites established in 2018 within the NEOC rehabilitation and Bowmans Creek diversion revegetation areas continue to be monitored with a reduced survey effort in order to demonstrate ACOL's ability to re-create fauna habitats. This includes nocturnal spotlighting within the NEOC Rehabilitation area which was completed for the first time in 2021. Particularly given the drought dieback of the habitat in the Bowman's Creek diversion and to track the progression of habitat features within the revegetated NEOC.
- It is recommended that the existing feral animal management program be continued into 2026, with a particular focus on controlling the species identified during the 2025 monitoring surveys. Although feral animal populations currently appear relatively stable, they should continue to be tracked through future monitoring efforts. The presence of feral cats across the ACP is not unexpected; however, it remains a concern for the brush-tailed phascogale (*Phascogale tapoatafa*) population occurring within the site. While direct evidence of cat predation on phascogales is limited, feral cats are well-documented predators known to contribute to the decline of many native mammal species. Ongoing efforts to control feral cat numbers would therefore be beneficial and strongly supported.
- ACOL could consider incorporating the results of the flora monitoring into the fauna monitoring to demonstrate the connection between climatic conditions such as the recent drought and post-drought conditions on fauna diversity.

4.6 Summary and Assessment of Compliance

In summary, the 2025 surveys did not identify any significant or unaccounted-for declines in fauna diversity; instead, 2025 recorded the highest brush-tailed phascogale abundance since monitoring began, with strong Mark-recapture success, nest box occupancy, and distribution across multiple habitat types.

Table 4.3 below is drawn from the ACOL BMP (Version K, April 2025). It consolidates criteria relevant to the terrestrial fauna monitoring program, with performance measures, indicators, key assessment considerations, against findings from the 2025 monitoring. The results of the 2025 fauna monitoring program are considered to meet the performance criteria established by the BMP (ACOL 2025) and specific actions are not required to address compliance.

- The results of the fauna monitoring surveys within the ACP site do not present evidence of mining-related declines in any fauna group; differences between control and impact habitats reflect natural habitat variation and climatic recovery.
- Mammal species richness increased markedly at both impact and control sites, reaching the highest values on record.
- Southern Myotis confirmed at Narama Dam, triggering BMP-required annual monitoring until two years post-mining of LW403–406.
- Bowmans Creek Diversion shows clear ecological recovery following drought, with increased bird activity and flowing water.

Table 4.3 Terrestrial Fauna Monitoring Program (BMP Version K, April 2025): Criteria, Performance Measures, Indicators & 2025 Results

Criterion	BMP Reference	Performance Measure	Indicator Of Success	Key Assessment Considerations	2025 Results
Weed control (enabling fauna habitat condition)	Table 2 (Performance Measures) – General; Sec 4.1	Weeds controlled in accordance with relevant legislation and weed/land management authorities.	Weed densities and spread comparable to (or less than) previous surveys. Areas targeted in prior year show control with limited regrowth.	If measures/conditions are (likely) exceeded: assess risks (habitat loss, connectivity/fragmentation, structural & species diversity, predation, competition/weed invasion, fire), diagnose causes (subsidence, management, climate) and define mitigation/monitoring.	The 2025 monitoring does not indicate that a performance measure has been exceeded or are likely to be exceeded in relation to weed control (enabling fauna habitat condition).
Feral animal control (predation pressure on fauna)	Table 2 (Performance Measures) – General; Sec 4.4.4; Sec 4.6 (Actions)	Appropriate control for declared pest species on ACP and ACOL-operated RUM, annually prior to fox breeding season (and as required).	No increase in fox population; all active rabbit warrens ripped or fumigated upon detection or by campaign.	Use the same exceedance framework as Table 2; link to TARP responses if declining fauna trends are detected.	The 2025 monitoring identified introduced fauna species, which is not unexpected and targeted management impacts are detailed in the annual land management plan (Enright 2025). There was no adverse impact to threatened fauna populations observed.
Terrestrial fauna monitoring & analysis (program delivery)	Sec 4.3.2; Table 5 (1.04); Table 6 (TARP)	Implement biannual fauna & habitat monitoring (birds, targeted threatened species, nest/roost boxes, small/arboreal mammal trapping, reptile transects, amphibians post-rain, ant assemblages, opportunistic records) as specified.	Monitoring completed at mapped sites; results analysed against baselines/controls; triggers/TARPs enacted where thresholds are met.	Compare to baselines and reference sites; investigate site-specific vs climatic/seasonal causes; apply TARP if negative trends in diversity/abundance or habitat complexity occur.	The 2025 bi-annual fauna and habitat monitoring program was completed and compared against baseline. Terrestrial fauna and habitat monitoring shows that the numbers of threatened species are not declining and results are comparable from baseline surveys.
Vegetation diversity (fauna habitat quality)	Table 2 – Terrestrial biodiversity/habitat values	Vegetation communities removed/reduced are replaced with similar communities and dominant species composition; revegetation guided by monitoring/research.	Species diversity broadly comparable to reference sites over time; 91 native flora spp benchmark (from 18 sample sites); ≥30% of disturbed emplacement areas re-established as bushland.	Apply exceedance questions (Table 2): evaluate effects on habitat loss, connectivity, structural & species diversity, seed bank, key habitat elements/abiotic resources, predation/competition; identify causes and actions.	The 2025 monitoring did not identify reduction in fauna habitat quality.
Effective habitat linkages to surrounding vegetated lands	Table 2 – Terrestrial biodiversity/habitat values; Sec 4.4.1; Fig. 4	Rehabilitation program enhances linkages across site and to surrounding vegetation (consistent with Synoptic Plan).	Corridors developed per Rehabilitation Strategy (Evans & Peck, 2009) and Landscape Restoration Report (AECOM, 2009).	Assess connectivity outcomes where fauna monitoring shows movement constraints or fragmentation effects.	The 2025 monitoring did not identify constraints or fragmentation effects.
Ecosystem health (structural complexity & habitat features)	Table 2 – Terrestrial biodiversity/habitat values	Vegetation community structure rehabilitated to be comparable to pre-mining reference sites; structural complexity assessed by modified method and compared to references.	Projected foliage cover and species diversity at all key strata broadly comparable to/better than references; viable hollow limbs/stags salvaged; nest boxes/roosts installed and used.	If divergence from references persists, investigate drivers and implement habitat augmentation, weed/pest controls, or additional plantings per TARP.	The 2025 monitoring results do not indicate any divergence from vegetation community structure in the rehabilitation area (NEOC).
Protection of existing habitat from grazing/vehicle impacts	Table 2 – Terrestrial biodiversity/habitat values; Sec 4.4.1; Table 5 actions	Existing habitat protected via fencing/signage to prevent uncontrolled stock entry and minimise vehicle traffic.	Key habitat areas fenced/signposted; evidence of reduced disturbance in monitoring plots/photo-points.	If degradation persists, review access controls, grazing rotations, and enforcement; link to rehabilitation objectives.	The 2025 monitoring results do not indicate impacts relating to degradation of habitat areas from grazing/ vehicle impacts.
Southern Woodland Conservation Area (VCA) management	Table 2 – VCA; Sec 4.3.5; Sec 4.5; Appendix C (BOMP)	Manage VCA per BOMP/Conservation Agreement/Plan of Management to maintain/improve fauna habitat.	Species diversity and vegetation condition comparable to pre-mining references; SVCA transects show stable or improving trends.	If declines observed, apply BOMP measures (weed/pest control, revegetation, habitat augmentation) and TARP.	The 2025 monitoring results do not indicate that a performance measure or development consent condition has been exceeded or is likely to be exceeded.
Threatened fauna species – population status & habitat features	Table 2 – Threatened species; Table 6 (TARP); Sec 4.3.2; Sec 4.4.2	Threatened fauna and their habitats are not adversely impacted.	Numbers and health (incl. recruitment) of significant populations not declining; individuals expanding into new home ranges; key habitat features (foraging, nesting, refuge; structural complexity) maintained.	On decline, investigate per Table 2 (habitat loss, connectivity, home range, structural elements, migration, seed bank, key abiotic resources, predation/competition, fire); implement mitigation (e.g., nest boxes, logs/hollows, compensatory habitat, increased controls).	The monitoring did not identify any evidence of threatened fauna species decline.
New/updated threatened species records – protocol	Sec 4.4.5; Table 5 (1.15); Appendix B	New listings and species identified during monitoring are assessed; management recommendations incorporated; Table 3 updated.	Timely notification, significance assessment (7-part test), management/mitigation implemented; BMP/Table 3 updated; pre-clearance buffers/relocations applied where required.	Assess impact pathways and required avoidance/mitigation; pause works where necessary; track outcomes in Annual Review.	The 2025 monitoring program did not identify any new threatened species within the ACP or ACOL-Operated RUM.
Targeted species – Southern Myotis monitoring (Narama Dam)	Sec 4.3.2 (methods); Fig. 6	If Southern Myotis is recorded in baseline, continue yearly monitoring Oct–Mar to confirm presence and habitat use until two years post-mining of LW403–406.	Acoustic detections and visual confirmations collected per schedule; presence/usage trends reported and considered in management.	If detections decline, review riparian/waterbody habitat condition, disturbance, lighting; consider adaptive measures; cross-reference Table 2 risk factors.	The 2025 monitoring confirmed the likely presence of Southern Myotis at Narama dam, therefore continual yearly monitoring Oct–March is required (see recommendations for survey approach).

5.0 References

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Appendix 1

Fauna Species List



The following list was developed from 2025 fauna monitoring surveys for the ACP site.

The following abbreviations or symbols are used in the list:

asterisk (*)	Denotes species not indigenous to the Ashton Coal project area
numbers	Number of individuals for each observation
subsp.	Subspecies
H	Hair sample identification
MIG	Listed migratory species under the EPBC Act
V	Vulnerable
E	Endangered.

Birds recorded were identified using descriptions in Pizzey and Knight (2013) and the scientific and common name nomenclature of Birdlife Australia (Birdlife International 2017). Reptiles recorded were identified using keys and descriptions in Cogger (2014) and Wilson & Swan (2017) and the scientific and common name nomenclature of Cogger (2014).

Amphibians recorded were identified using keys and descriptions in Cogger (2014), Anstis (2017) and Barker et al. (1995) and the scientific and common name nomenclature of Cogger (2014). Mammals recorded were identified using keys and descriptions in Van Dyck & Strahan (2008), and Menkhorst & Knight (2010) and the scientific and common name nomenclature of Van Dyck & Strahan (2008).

It should be noted for microbats, abundance estimates are based on presence/absence detections from ultrasonic recording devices rather than quantitative counts, and therefore should not be interpreted as true measures of abundance

Appendix Table A1.1 Fauna Species List

Scientific Name	Common Name	Conservation Status		Control Sites		Impact Sites		Rehabilitation/Revegetation Sites		ACOL-Operated RUM	Total
		BC Act	EPBC Act	Northern Woodland	Riparian Control	Southern Woodland	Riparian Impact	Bowmans Creek Diversion	NEOC		
AVES											
Acanthagenys rufogularis	Spiny-cheeked honeyeater					1	3				4
Acanthiza nana	Yellow thornbill			20		1			6		27
Alisterus scapularis	Australian king-parrot				1	1					2
Anas castanea	Chestnut teal					15					15
Anas superciliosa	Pacific black duck						4		10		14
Anhinga novaehollandiae	Australasian darter					1					1
Aquila audax	Wedge-tailed eagle					2		3	2		7
Ardea modesta	Eastern great egret						1		1		2
Ardea pacifica	White-necked heron								1		1
Cacatua galerita	Sulfur-crested cockatoo					1					1
Cacatua roseicapillus	Galah				4	3					
Cacatua sanguinea	Little corella			1	11	2					13
Cacomantis flabelliformis	Fan-tailed cuckoo					3					3
Centropus phasianinus	Pheasant coucal					1					
Ceyx azureus	Azure kingfisher				1						
Chenonetta jubata	Australian Wood Duck				1	1	7		1		10

Scientific Name	Common Name	Conservation Status		Control Sites		Impact Sites		Rehabilitation/Revegetation Sites		ACOL-Operated RUM	Total
		BC Act	EPBC Act	Northern Woodland	Riparian Control	Southern Woodland	Riparian Impact	Bowmans Creek Diversion	NEOC	Narama Dam and Woodland	
<i>Circus assimilis</i>	Spotted harrier	V								1	1
<i>Cisticola exilis</i>	Golden-headed cisticola						1				1
<i>Coracina novaehollandiae</i>	Black-faced cuckoo shrike			1	1	5	2				9
<i>Corcorax melanorhamphos</i>	White-winged Chough			5	11	16			9	4	45
<i>Corvus coronoides</i>	Australian Raven			9	2	19	17	1		2	50
<i>Cracticus nigrogularis</i>	Pied butcherbird			1	3	5	1				10
<i>cracticus torquatus</i>	Grey butcherbird			2	2	6	1	1			12
<i>Cygnus atratus</i>	Black swan									8	8
<i>Egretta novaehollandiae</i>	White faced heron					1	5	1			7
<i>Elanus axillaris</i>	Black-shouldered kite			1	1		1				3
<i>Elsyornis melanops</i>	Black-fronted dotterel						3				3
<i>Eudynamis orientalis</i>	Eastern koel					2	1				3
<i>Falco longipennis</i>	Australian hobby									1	1
<i>Fulica atra</i>	Eurasian coot									3	3
<i>Gallinago hardwickii</i>	Latham's snipe						2				2
<i>Gerygone mouki</i>	Brown gerygone			2		2	2				6
<i>Grallina cyanoleuca</i>	Magpie-lark			2	5	6	4				17
<i>Gymnorhina tibicen</i>	Australian Magpie			21	1	21	7	15			65
<i>Haliastur sphenurus</i>	Whistling kite				1		2				3
<i>Hirundo neoxena</i>	Welcome swallow						6			2	8

Scientific Name	Common Name	Conservation Status		Control Sites		Impact Sites		Rehabilitation/Revegetation Sites		ACOL-Operated RUM	Total
		BC Act	EPBC Act	Northern Woodland	Riparian Control	Southern Woodland	Riparian Impact	Bowmans Creek Diversion	NEOC	Narama Dam and Woodland	
<i>Ichthyophaga leucogaster</i>	White-bellied sea eagle					1	3			1	5
<i>Lichenostomus chrysops</i>	Yellow-faced honeyeater					1					1
<i>Malurus cyaneus</i>	Superb Fairy Wren			16	7	12	3			1	39
<i>Manorina melanocephala</i>	Noisy miner			5	1	17	1				24
<i>Milvus migrans</i>	Black kite				1						1
<i>Neochmia temporalis</i>	Red-browed finch				1						1
<i>Ocyphaps lophotes</i>	Crested pigeon				2	1					3
<i>Oriolus sagittatus</i>	Olive-backed oriole				1						1
<i>Pachycephala pectoralis</i>	Golden whistler			3	3	1	1			1	9
<i>Pardalotus punctatus</i>	Spotted pardalote			1	1	1					3
<i>Pardalotus striatus</i>	Striated pardalote			3	1	11				1	16
<i>Pelecanus conspicillatus</i>	Australian pelican									2	2
<i>Phalacrocorax carbo</i>	Great cormorant				1	5					6
<i>Phalacrocorax sulcirostris</i>	Little black cormorant									4	4
<i>Philemon corniculatus</i>	Noisy Friarbird			1	1	4	1				7
<i>Platycercus elegans</i>	Crimson rosella					1					1
<i>Platycercus eximius</i>	Eastern rosella					1					1
<i>Podargus strigoides</i>	Tawny frog-mouth				2	1					3

Scientific Name	Common Name	Conservation Status		Control Sites		Impact Sites		Rehabilitation/Revegetation Sites		ACOL-Operated RUM	Total
		BC Act	EPBC Act	Northern Woodland	Riparian Control	Southern Woodland	Riparian Impact	Bowmans Creek Diversion	NEOC	Narama Dam and Woodland	
<i>Pomatostomus temporalis temporalis</i>	Grey crowned Babbler					20	1				21
<i>Porphyrio porphyrio</i>	Purple swamphen				1						1
<i>Pyrholaemus sagittatus</i>	Speckled Warbler									3	3
<i>Rhipidura albiscapa</i>	Grey fantail			6	3	6	2			2	19
<i>Rhipidura leucophrys</i>	Willie wagtail				1	1	3	1			6
<i>Scythrops novaehollandiae</i>	Channel-billed cuckoo					1	1				2
<i>Sericornis frontalis</i>	White browed scrub wren				6						6
<i>Smicrornis brevirostris</i>	Weebill			1		3			4		8
<i>Strepera graculina</i>	Pied currawong			6	5	3	1				15
<i>Streptopelia chinensis</i>	Spotted dove				1						1
<i>Sturnus tristis</i>	Common myna				3	1					4
<i>Tachybaptus novaehollandiae</i>	Australasian grebe					2					2
<i>Todiramphus sanctus</i>	Sacred kingfisher						3				3
<i>Trichoglossus haematodus</i>	Rainbow lorikeet				1						1
<i>Tyto alba</i>	Barn owl			1	1	1					3
<i>Tyto novaehollandiae</i>	Australian masked owl						1				1
<i>Vanellus miles</i>	Masked lapwing				1	3	1			2	7
<i>Zosterops lateralis</i>	Silvereye			10	2	1	1				
AMPHIBIANS											
<i>Crinia signifera</i>	Common eastern froglet			1	2		1			10	14

Scientific Name	Common Name	Conservation Status		Control Sites		Impact Sites		Rehabilitation/Revegetation Sites		ACOL-Operated RUM	Total
		BC Act	EPBC Act	Northern Woodland	Riparian Control	Southern Woodland	Riparian Impact	Bowmans Creek Diversion	NEOC	Narama Dam and Woodland	
<i>Limnodynastes peronii</i>	Striped marsh frog					2					2
<i>Limnodynastes tasmaniensis</i>	Spotted marsh frog			1							1
REPTILES											
<i>Carlia tetradactylus</i>	Southern rainbow skin				1						1
<i>Ctenotus robusta</i>	Eastern striped skink				2						2
<i>Ctenotus sp.</i>						1					1
<i>Egernia striolata</i>	Tree-crevice skink					1					1
<i>Intellagama lesueurii</i>	Australian water dragon				5						5
<i>Lampropholis delicata</i>	Rainbow skink				1	4					5
<i>Lampropholis guichenoti</i>	Garden Skink					1	1				2
<i>Saiphos equalis</i>	Three-toed skink				1						1
<i>Varanus varius</i>	Lace Monitor				1	2					3
<i>Vermicella annulata</i>	Bandy bandy					1					1
MAMMALS											
<i>Antechinus sp.</i>	Antechinus sp.			1		2				1	4
<i>Austronomus australis</i>	White-striped freetail-bat			3	2	3	1	1		4	14
<i>Bos taurus</i>	Cow					1					1
<i>Canis lupus familiaris</i>	Dog					1					1
<i>Capra hircus</i>	Goat					1					1
<i>Cervus elaphus</i>	Red deer								1		1

Scientific Name	Common Name	Conservation Status		Control Sites		Impact Sites		Rehabilitation/Revegetation Sites		ACOL-Operated RUM	Total
		BC Act	EPBC Act	Northern Woodland	Riparian Control	Southern Woodland	Riparian Impact	Bowmans Creek Diversion	NEOC	Narama Dam and Woodland	
<i>Chalinolobus gouldi</i>	Gould's wattled bat			3	2	2	2	1	2		12
<i>Chalinolobus morio</i>	Chocolate wattled bat			1	1	2	1	1		2	8
<i>Felis catus</i>	Cat					2	1	1			4
<i>Isodon macrourus</i>	Northern Brown Bandicoot			1	2	1	2	3			9
<i>Lepus capensis</i>	Brown hare			1	3	6	3		2	1	16
<i>Macropus giganteus</i>	Eastern Grey Kangaroo			2	2	62	1		6	1	74
<i>Macropus robustus</i>	Common wallaroo				1	1			2	2	6
<i>Macropus rufogriseus</i>	Red neck wallaby			5	1	5			2		13
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat						1	1			2
<i>Miniopterus australis</i>	Little bent-winged bat			3		2	1	1	1		7
<i>Miniopterus orianae oceanensis</i>	Large bent-winged bat					2	1	1			4
<i>Mus musculus</i>	House mouse			5							5
<i>Myotis macropus</i>	Southern myotis				1	2	2	1	1	2	9
<i>Nyctophilus geoffroyi / gouldi</i>	Lesser long-eared bat			3	2	2	1		1	2	11
<i>Oryctolagus cuniculus</i>	Rabbit					1					1
<i>Ozimops planiceps</i>	Ride's Free-tailed Bat			3	1	2	1	1	1	1	10
<i>Ozimops ridei</i>	Ride's Free-tailed Bat				1	1	2			5	9

Scientific Name	Common Name	Conservation Status		Control Sites		Impact Sites		Rehabilitation/Revegetation Sites		ACOL-Operated RUM	Total
		BC Act	EPBC Act	Northern Woodland	Riparian Control	Southern Woodland	Riparian Impact	Bowmans Creek Diversion	NEOC	Narama Dam and Woodland	
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale			21	1	25			2		49
<i>Rattus fuscipes</i>	Bush rat					1					1
<i>Rattus rattus</i>	Black Rat			3	6	3		1	2		15
<i>Saccolaimus flaviventris</i>	Yellow-bellied sheath-tail-bat			1	1						2
<i>Scotorepens balstoni/ rueppellii</i> (species group)	Inland broad-nosed bat			1	1	1	2		1	3	9
<i>Scotorepens rueppellii</i>	Rüppell's broad-nosed bat			2		3	2				7
<i>Sminthopsis murina</i>	Common dunnart			1							1
<i>Sus scrofa</i>	Pig					15		1			16
<i>Tachyglossus aculeatus</i>	Echidna					3			1		4
<i>Trichosurus vulpecula</i>	Brush-tailed possum			28	15	48	3	2	3		99
<i>Vespadelus darlingtoni</i>	Large forest bat					1					1
<i>Vespadelus pumulis</i>	Eastern Forest Bat				1	2		1	1	1	6
<i>Vespadelus regulus</i>	Southern forest bat			1	1	3		1	1	2	9
<i>Vespadelus troughtoni</i>	Eastern cave bat			1			1	1	1	1	5
<i>Vespadelus vulturnus</i>	Little forest bat			1	1	1	1	1		2	7
<i>Vulpes vulpes</i>	Fox					2			1		3
<i>Wallabia bicolor</i>	Swamp wallaby			11		41					52

Appendix 2

Survey Locations



Appendix 2 Survey Locations

Table A2.1 below provides the geographical location of all the survey locations for the 2025 monitoring.

All coordinates presented are in UTM projection, using the GDA2020 coordinate reference system and MGA map projection.

Table A2.1 Survey Locations During the 2025 Ashton Fauna Monitoring

Survey Type	Location	Easting	Northing
Remote Camera	Southern Woodland	318449.1	6403460
Remote Camera	Southern Woodland	318564.40	6403509.75
Remote Camera	Southern Woodland	318844.66	6404038.11
Remote Camera	Northern Woodland	319902.22	6406021.56
Remote Camera	Riparian Control	320048.39	6405856.04
Remote Camera	Riparian Control	320049.47	6406005.79
Remote Camera	NEOC	321254.00	6406733.00
Remote Camera	NEOC	321295.00	6406757.00
Remote Camera	Bowmans Creek Diversion	317427.00	6405391.00
Remote Camera	Bowmans Creek Diversion	317390.00	6405456.00
Remote Camera	Riparian Impact	318152.38	6405919.44
Remote Camera	Riparian Impact	318249.17	640,850.21
Anabat	Southern Woodland	318412.66	6403458.86
Anabat	Southern Woodland	318571.88	6403501.34
Anabat	Southern Woodland	318567.89	6403503.71
Anabat	Southern Woodland	318559.87	6403526.53
Anabat	Southern Woodland	318858.58	6404011.64
Anabat	Southern Woodland	318828.63	6404014.42
Anabat	Southern Woodland	318766.84	6404114.79
Anabat	Southern Woodland	318774.83	6404119.82
Anabat	Southern Woodland	318754.46	6404123.77
Anabat	Bowmans Creek Diversion	317396.55	6405364.88
Anabat	Bowmans Creek Diversion	317401.53	6405380.50
Anabat	Bowmans Creek Diversion	317377.97	6405455.82
Anabat	Bowmans Creek Diversion	317392.06	6405456.86
Anabat	Bowmans Creek Diversion	317395.18	6405466.23
Anabat	Bowmans Creek Diversion	317394.97	6405477.54
Anabat	Narama Dam	316862.29	6405526.16
Anabat	Narama Dam	316864.82	6405526.99
Anabat	Narama Dam	316738.63	6405553.30

Survey Type	Location	Easting	Northing
Anabat	Narama Dam	316701.47	6405574.80
Anabat	Riparian Impact	318251.54	6405853.80
Anabat	Riparian Impact	318247.11	6405859.60
Anabat	Riparian Impact	318118.40	6405900.74
Anabat	Riparian Impact	318139.76	6405910.11
Anabat	Riparian Impact	318139.98	6405913.67
Anabat	Riparian Impact	318119.06	6405921.27
Anabat	Northern Woodland	319715.08	6406054.58
Anabat	Northern Woodland	319810.86	6406145.69
Anabat	Northern Woodland	319824.54	6406158.70
Anabat	Northern Woodland	319893.78	6406030.62
Anabat	Northern Woodland	319901.10	6406031.86
Anabat	Northern Woodland	319906.08	6406031.61
Anabat	Northern Woodland	319902.50	6406042.64
Anabat	Northern Woodland	319956.89	6406129.46
Anabat	Riparian control	320041.68	6405858.14
Anabat	Riparian control	320040.85	6405862.23
Anabat	Riparian control	320041.85	6405879.99
Anabat	Riparian control	320047.90	6405993.68
Anabat	Riparian control	320053.65	6406003.10
Anabat	NEOC	321230.19	6406719.56
Anabat	NEOC	321247.70	6406723.42
Anabat	NEOC	321282.45	6406741.56
Anabat	NEOC	321290.38	6406750.25
Anabat	NEOC	321297.16	6406750.14
Anabat	NEOC	321280.47	6406768.37
Frog Survey Dam	ACP	318774.8	6405212
Frog Survey Dam	ACP	318591.2	6405503
Frog Survey Dam	ACP	319923.7	6405907
Frog Survey Dam	ACP	321559.8	6403505
Transect 1 START	Riparian Control	319955.5	6406148
Transect 1 END	Riparian Control	319906.5	6406033
Transect 2 START	Northern Woodland	320049.7	6406010
Transect 2 END	Northern Woodland	320035.1	6405843
Transect 3 START	Northern Woodland	321264	6403345
Transect 3 END	Northern Woodland	321430.4	6403307

Survey Type	Location	Easting	Northing
Transect 5 START	Riparian Impact	318247.8	6405848
Transect 5 END	Riparian Impact	318174.1	6405923
Transect 6 START	Southern Woodland	318566.6	6403503
Transect 6 END	Southern Woodland	318432.5	6403456
Transect 8 START	Southern Woodland	318755	6404112
Transect 8 END	Southern Woodland	318862.2	6404008
Drift Fence Line	Riparian Control	320057.9	6405941
Drift Fence Line	Northern Woodland	319747	6406045
Drift Fence Line	Riparian Impact	318225.7	6405897
Drift Fence Line	Southern Woodland	318832.9	6403593
Drift Fence Line	Southern Woodland	318788.6	6404004
NEOC Transect START	NEOC	321254	6406733
NEOC Transect END	NEOC	321295	6406757
Bowmans Creek Diversion Transect START	Bowmans Creek Diversion	317427	6405391
Bowmans Creek Diversion Transect END	Bowmans Creek Diversion	317390	6405456
Nest Box 1	Southern Woodland	318700	6403685
Nest Box 2	Southern Woodland	318712	6403717
Nest Box 3	Southern Woodland	318752	6403702
Nest Box 4	Southern Woodland	318806	6403721
Nest Box 5	Southern Woodland	318761	6403628
Nest Box 6	Southern Woodland	318761	6403852
Nest Box 7	Southern Woodland	318771	6403922
Nest Box 8	Southern Woodland	318816	6403938
Nest Box 9	Southern Woodland	318856	6403952
Nest Box 10	Southern Woodland	318807	6404020
Nest Box 11	Southern Woodland	318706	6403543
Nest Box 12	Southern Woodland	318735	6403556
Nest Box 13	Southern Woodland	318829	6403573
Nest Box 14	Southern Woodland	318932	6403532
Nest Box 15	Southern Woodland	318936	6403593
Nest Box 16	Southern Woodland	318829	6403662
Nest Box 17	Southern Woodland	318734	6403675
Nest Box 18	Southern Woodland	318735	6403613
Nest Box 19	Southern Woodland	318557	6403513
Nest Box 20	Southern Woodland	318521	6403474
Nest Box 21	Southern Woodland	318479	6403476

Survey Type	Location	Easting	Northing
Nest Box 22	Southern Woodland	318565	6403566
Nest Box 23	Southern Woodland	318516	6403557
Nest Box 24	Southern Woodland	318494	6403543
Nest Box 25	Southern Woodland	318546	6403630
Nest Box 26	Southern Woodland	318519	6403605
Nest Box 27	Southern Woodland	318470	6403614
Nest Box 28	Southern Woodland	318471	6403690
Nest Box 29	Southern Woodland	318432	6403654
Nest Box 30	Southern Woodland	318598	6403840
Nest Box 31	Southern Woodland	318772	6403920
Nest Box 33	Southern Woodland	319165	6403941
Nest Box 34	Southern Woodland	319120	6403917
Nest Box 35	Southern Woodland	319091	6404018
Nest Box 36	Southern Woodland	319010	6403912
Nest Box 37	Southern Woodland	319039	6404003
Nest Box 38	Southern Woodland	318964	6404115
Nest Box 39	Southern Woodland	318928	6404002



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