ANNUAL COMPLIANCE REPORT EPBC 2013/6810
Bango Wind Farm

SQUADRON ENERGY

14 August 2024 - 13 August 2025

Final

11 November 2025

Revision Control

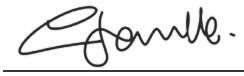
Revision	Date	Issue	Author	Reviewed	Approved	Signature
1	11/11/2025	Final/Issued	S Kidziak	C Somerville	C Somerville	

Confidentiality

Disclaimer

Declaration of Accuracy

In making this declaration, I am aware that sections 490 and 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) make it an offence in certain circumstances to knowingly provide false or misleading information or documents. The offence is punishable on conviction by imprisonment or a fine, or both. I declare that all the information and documentation supporting this compliance report is true and correct in every particular. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed: 

Full name (please print): Candice Somerville

Position (please print): Environmental Manager

Organisation: Squadron Energy

Date: 11/11/2025

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1 Project Description

The Bango Wind Farm (BWF) is located in the Hilltops and Yass Valley Local Government Areas, approximately 8km southwest of Rye Park and 20km north of Yass. The nearest township is Boorowa, which is located approximately 12 km to the north along Lachlan Valley Way. The site is characterised by a mix of native woodland and open-forest, native pasture, exotic pasture and cleared land.

BWF was granted State Significant Development Approval (SSD 6686) by the Independent Planning Commission on 1 May 2018. On 25 May 2018, a third-party appeal was made to the Court by several landowners challenging the granting of the IPC consent. On 6 December 2018, an agreement was reached during a conciliation conference ordered pursuant to s 34 of the *Land and Environment Court Act 1979* (LEC Act).

A Modification (SSD 6686 MOD 1) was granted on 7 June 2019 to approve the subdivision of land (to create one freehold lot for the construction of the collector substation) and amend the description of the Land to include two additional parcels of land to accommodate the oversail of three wind turbine blades onto these two lots.

The Minister for Environment and Energy granted approval on 9 August 2018 with conditions covered by the Commonwealth EPBC Approval (EPBC 2013/6810). The Approval holder is BWF Nominees Pty Ltd (ACN 633 105 405). Variations to the EPBC Approval were granted on 4 April 2019, 19 November 2020, 27 July 2021, and 13 September 2022.

BWF involves construction, operation and decommissioning of the wind farm. Construction on the site commenced on 14 August 2019 (commencement of the action). Practical completion of the Wind Farm was reached on the14 December 2023, and the project is currently in the Operational Phase.

This report has been prepared to meet the requirements of condition 17 of EPBC 2013/6810, for the reporting period of 14 August 2024 to 13 August 2025.

2 Description of Activities

Activities undertaken at BWF during the reporting period included:

- Operation of 46 WTGs;
- Regular maintenance of the WTGs; and access track
- Land management including weed control, bird and bat monitoring, and biodiversity offset management.

3 Compliance Report

Table 1 Compliance report as per the conditions of the EPBC Act Approval 2013/6810

Condition Number	Condition	Compliance Status	Evidence/comments
1	The **approval holder** must:		
1a	Implement conditions 8, 9, 11 and 12 of Schedule 2 and conditions 16, 17, 18, 19 (a) and (c), 20 and 21 of Schedule 3 of the **NSW Development Consent** as they relate to impacts on **protected matters**	Compliant	Measures for managing impacts to protected matters are contained within the approved Biodiversity Management Plan (BMP), Environmental Management Strategy (EMS) and Pollution Incident Response Management Plan (PIRMP). BWF has implemented and complied with all referenced conditions from the NSW development consent. Compliance status of relevant NSW Development Consent Conditions were assessed in an Independent Environmental Audit, which can be found on the Public website -
1b	Notify the **Department** in writing of any proposed change to the conditions of the **NSW development consent** for which Condition 1a applies no later than 5 **business days** after proposing a change or becoming aware of the NSW Government proposing a change.	Compliant	During this reporting period, there have been no changes proposed to the NSW development consent. Previously, on 28/11/2018, changes were proposed to the conditions of the NSW Development consent. Subsequently, a written notification was provided to the Department on 02/12/2018 (2 business days after the changes were proposed. The written notification outlined the proposed changes against each relevant condition.
1c	Notify the **Department** in writing of any change to the **NSW development consent** for which **EPBC** sub-condition 1a applies within 5 **business days** of a change being finalised.	Compliant	During this reporting period, there have been no changes to the NSW development consent for which EPBC sub-condition 1a applies. Previously, on 6/12/2018, an agreement was reached during the s34 conciliation conference. The updated Conditions of development consent then became available on 12/12/2018. Two business days later, on 14/12/2018, CWP issued an email to the Department advising of the updated Conditions of the development consent.
2	The **approval holder** must not clear more than:		

Condition Number	Condition	Compliance Status	Evidence/comments
2a	39.54 ha of **Golden Sun Moth** habitat (as marked in pink and purple on the map at Annexure B)	Compliant	37.9 ha of Golden Sun Moth habitat has been cleared. The Department of Climate Change, Energy, Environment and Water conducted a audit on the Compliance status of EPBC 2013/6810 (final report dated 29 September 2025). Spatial data and clearing information for the project was provided and was deemed compliant with this condition.
2b	9.54 ha of **Superb Parrot** habitat (as marked in brown on the map at Annexure C)	Compliant	5.35 ha of Superb Parrot habitat has been cleared. The Department of Climate Change, Energy, Environment and Water conducted a audit on the Compliance status of EPBC 2013/6810 (final report dated 29 September 2025). Spatial data and clearing information for the project was provided and was deemed compliant with this condition.
2c	0.32 ha of **Box Gum Woodland** (as marked in red on the map at Annexure D)	Compliant	0.3 ha of Box Gum Woodland habitat has been cleared. The Department of Climate Change, Energy, Environment and Water conducted a audit on the Compliance status of EPBC 2013/6810 (final report dated 29 September 2025). Spatial data and clearing information for the project was provided and was deemed compliant with this condition.
2d	8 **primary hollow bearing trees** (as marked on the map at Annexure C)	Compliant	No primary hollow bearing trees were removed during the current reporting period. Overall, 5 primary hollow bearing trees have been removed to date. The Department of Climate Change, Energy, Environment and Water conducted a audit on the Compliance status of EPBC 2013/6810 (final report dated 29 September 2025). Spatial data and clearing information for the project was provided and was deemed compliant with this condition.
3	The **approval holder** must protect **known and potential Superb Parrot nest trees** by:		
3a	Only conducting blasting within 50 m and clearing within 30 m of **known and potential Superb Parrot nest trees** between 1 February and 31 August (outside the breeding season).	Not applicable	No blasting was conducted at the Project site during the reporting period.

Condition Number	Condition	Compliance Status	Evidence/comments
3b	Locating wind turbines at least 50 m away from **known and potential Superb Parrot nest trees.**	Compliant	All wind turbines have been located at least 50m away from known and potential Superb Parrot nest trees. Distances between turbines and known and potential Superb Parrot nest trees was verified during detailed design to ensure that the turbines would not be located within 50m of a known or potential Superb Parrot nest tree (except for the known or potential Superb Parrot nest trees that have been, or will be cleared, in accordance with condition 2d of the approval). The closest wind turbine is located 85m horizontal distance to a known or potential Superb Parrot nest tree.
3c	Locating onsite infrastructure, with the exception of wind turbines, at least 30m away from **known and potential Superb Parrot nest trees.** *Note: for the purposes of this section, crane hardstands and turbine foundations are not considered turbines.*	Compliant	Onsite infrastructure is located at least 30m away from known and potential Superb Parrot nest trees.
4	The **approval holder** must submit plans for site layout required by condition 11 and 12 of Schedule 2 of the **NSW development consent** to the **Minister** at the same time as it is submitted to the Secretary of the Department of Planning and Environment for approval.	Compliant	The site layout plan was submitted to the Secretary of the NSW Department of Planning and Environment (DPE) (per Condition 11 of the NSW Development consent) on 17/05/2019. The same Site layout plan was also submitted to the Minister on 10/06/2019. That site layout plan was subsequently approved by DPE on 15/07/2019. The Site layout plan was revised and submitted to the Secretary of the NSW Department of Planning, Industry and Environment (DPE), per Condition 12 of the NSW development consent, on 06/05/2020. This plan was also submitted to the Minister on 07/05/2020. During consultation with the DPE, a further revision and update was made to the Site layout plan on 16/07/2020. Approval from the Secretary was subsequently received on 25/08/2020 and this plan was submitted to the Minister on 27/08/2020. The site layout plan dated 16/07/2020 is the current site layout plan.

Condition Number	Condition	Compliance Status	Evidence/comments
5	The **approval holder** must submit a Biodiversity Management Plan (BMP) to the **Minister** for approval. Commencement of the action must not occur unless the Minister has approved the BMP. The approval holder must implement the approved BMP. The BMP must include:	Compliant	A draft BMP was first submitted to the Minister on 07/05/2019. Following rounds of reviews and updates, the Minister approved the BMP on 17/06/2019, prior to the commencement of the action. The BMP has been implemented by the approval holder and its contractors. Implementation by the Contractors has been through the development and implementation of specific designs, plans and procedures in accordance with the requirements of the BMP, including but not limited to: • Detailed design with consideration to all conditions of the EPBC Approval 2013/6810. • Construction Environmental Management Plan • Biodiversity Management Sub-Plan, containing: – Pre-clearance survey procedure – Vegetation clearing procedures – Vegetation clearing tracking register – Fauna management protocols – Habitat salvage requirements • Biosecurity Management Sub-plan BWF have undertaken inspections and monitoring to verify the implementation of the BMP by the construction Contractors. The project is compliant with this condition.
5a	Spatial maps, description and quantification of the final disturbance footprint in relation to proposed impacts to **protected matters**, including the number, type of **hollow bearing trees** and size of hollows to be removed.	Compliant	The approved BMP addresses this requirement in Section 2 and Appendix A.
5b	Management measures to ensure the protection and maintenance of habitat for **protected matters** during the construction and operational phases of the approved action.	Compliant	The approved BMP addresses this requirement in Section 4.

Condition Number	Condition	Compliance Status	Evidence/comments
6	The **approval holder** must submit a Bird and Bat Adaptive Management Plan (BBAMP) to the Minister for approval. The approval holder must not export electricity for sale from more than 23 wind turbines simultaneously, other than for the purposes of hold point testing and commissioning, unless the **Minister** has approved the BBAMP. The BBAMP must include, but is not limited to:	Compliant	The BBAMP was approved by the Minister on 16/04/2021. At that time, electricity was not being exported from more than 23 wind turbines simultaneously.
6a	An on-going monitoring program, which must include a description of the methodology and frequency of monitoring.	Compliant	The approved BBAMP addresses this condition within Section 3 and Appendix 4.
6b	Trigger levels to shut down any turbines when there is a high risk of collision based on monitoring data and the results of research conducted as part of EPBC condition 13 on **Superb Parrot** habitat use and breeding ecology.	Compliant	The approved BBAMP addresses this condition within Section 4.
6	The results of the monitoring program from each year must be submitted as part of the annual report required under EPBC condition 17.	Compliant	Appendix A provides the BWF BBAMP Implementation Report Year 2, as per the requirements of the BBAMP.
7	If the **Minister** considers, based on monitoring taken under EPBC condition 6, compliance reporting required by EPBC condition 17 and the risk assessment and mitigation measures included in the BBAMP, the operation of the action is having a detrimental impact on protected matters, then the **Minister** may notify the **approval holder** in writing that specified wind turbines must not be operated for a specified period of time. If the **Minister** makes a written notice under this condition, the **approval holder** must implement that written notice.	Not applicable	The Minister has not issued any notice to BWF in accordance with this condition.
8	Prior to the **commencement of the action**, the **approval holder** must submit to the **Minister**, the calculation of biodiversity impacts consistent with Condition 18 of Schedule 3 of the **NSW development consent** as it relates to **protected matters**.	Compliant	BWF, as the approval holder, commenced the action on 14/08/2019. Calculations of biodiversity impacts were submitted to the Minister on 16/06/2019.

Condition Number	Condition	Compliance Status	Evidence/comments
9	By 4 November 2022, the approval holder must submit evidence of credit retirement consistent with condition 19 (a) or (c) of Schedule 3 of the **NSW development consent** to the **Minister**.	Compliant	BWF, as the approval holder, commenced the action on 14/08/2019. On 8 July 2020, BWF submitted evidence to the Minister via email regarding the retirement of Biobanking credits consistent with Condition 19 (a) of Schedule 3 of the NSW development consent. On 22/06/2021, the NSW DPE granted a 12-month extension of time to retire additional biodiversity credits under Condition 19 of Schedule 3 of the NSW development consent (to 14/08/2022). Evidence of that extension granted by the NSW DPE was provided to the Minister via email on 8/07/2021. On 9/06/2022, the NSW DPE granted a further extension of time to retire additional biodiversity offset credits (to 4/11/2022). Evidence of that extension granted by the NSW DPE was provided to the Minister via email on 24/06/2022. On 3 November 2023, the NSW DPE granted a further extension of time to retire additional biodiversity credits (to 28 February 2023). Evidence of that extension granted by the NSW DPE was provided to the Minister via email on 4 November 2022. On 21 February 2023, the approval holder submitted evidence to the Minister of biodiversity credit retirement completed consistent with Conditions 19a and 19b of the NSW development consent.

Condition Number	Condition	Compliance Status	Evidence/comments
10	In the case that the **approval holder** is establishing **BioBanking site(s)**, they must ensure that the BioBanking Agreement(s) for the BioBanking site(s) include measures for the long-term management of protected matters including but not limited to: a) Specific reference to Superb Parrot, Golden Sun Moth and hollow bearing trees providing habitat to Superb Parrot. b) A textual description of the offset sites, including offset attributes, shapefiles, and a map clearly defining the location and boundaries of the proposed offset sites. c) Site survey and baseline data and documentation of key biodiversity threats and opportunities at each site. d) A detailed description of management actions and responsibilities designed to protect and improve the ecological quality of habitat of Superb Parrot and Golden Sun Moth on the offset sites. e) Key milestones, performance indicators and timeframes for each management action. f) A monitoring program to determine the effectiveness of the management actions. g) Corrective actions and contingency measures to be implemented where monitoring of the offset site shows that management actions are not effectively achieving key milestones or prescribed performance indicators are not being met or are unlikely to be met.	Compliant	As the Successor Mechanism to BioBanking Agreements, the approval holder has established a Biodiversity Stewardship Agreement (BSA) under the Biodiversity Conservation Act 2016 (as agreed to by the Department via email 24/04/2019). The BSA includes measures for the long-term management of protected matters including those listed in Conditions 10a to 10g.
10	Where appropriate offsets credits are acquired from the market, it is accepted that the credit provider has made suitable and appropriate measures to meet the above intent.	Not applicable	Offset credits for protected matters have not been acquired from the market.
11	In the case that the **approval holder** is establishing **BioBanking site(s)**, they must submit a copy of the **BioBanking Agreement(s)** to the **Minister** by 4 November 2022.	Compliant	The approval holder has established a Biodiversity Stewardship Agreement (BSA) (as the successor mechanism to BioBanking Agreements). A copy of the executed BSA (BS0059) (dated 27/09/2022) was sent to the Minister via email on 25/10/2022. Minor amendments to the BSA were later made by the NSW Biodiversity Credit Supply Taskforce in November 2022. A copy of the amended and final BSA was issued to the Minister via email on 15/11/2023.

Condition Number	Condition	Compliance Status	Evidence/comments
12	For each **primary hollow bearing tree** (as marked in the map at Annexure C) removed within 50 m of each turbine (as confirmed through quantification of **hollow bearing trees** impacts through EPBC condition 5), the **approval holder** must legally protect and secure 10 **hollow bearing trees** from the same vegetation formation within the **South-west Slopes of NSW Important Bird Area.**	Compliant	The approval holder has legally secured and protected the required number of hollow bearing trees in accordance with the evidence that was provided to the Minister on 31/05/2021 (refer to Condition 12a below).
12a	Within two years of the **commencement of the action**, the **approval holder** must submit evidence to the **Minister's** satisfaction of the final number of **hollow bearing trees** to be legally protected and secured.	Compliant	The date of commencement of the action was 14/08/2019. On 31/05/2021, evidence of the final number of hollow bearing trees to be legally protected and secured was submitted to the Minister. On 27/07/2021, a delegate of the Minister wrote to BWF confirming that they were satisfied with the evidence provided in relation to the final number of hollow bearing trees to be legally protected and secured.
13	To compensate for potential cumulative impacts on **Superb Parrot**, the **approval holder** must prepare and implement a Superb Parrot Conservation Research Plan (SPCRP).	Compliant	The Superb Parrot Conservation Research Plan (SPCRP) has been prepared and is available at the following web location: https://www.squadronenergy.com/our-projects/bango-wind-farm The Superb Parrot Conservation Research Team completed the SPCRP during the 2024 – 2025 period.
13	The SPCRP must be submitted to the **Minister** for approval prior to **commencement of the action**. The action must not commence unless the **Minister** has approved the SPCRP. The approved SPCRP must be implemented.	Compliant	The SPCRP v1 (dated 3/06/2019) was approved by the Minister on 2 July 2019. The SPCRP was revised on 29/07/2020, and a copy of the revised SPCRP (v2) was submitted to the Department on 31/07/2020.
13	The SPCRP must contribute to better understanding **Superb Parrot** habitat use and breeding ecology within the **South-west Slopes of NSW Important Bird Area**, with a focus on identification of key breeding sites, better understanding local movement patterns during the breeding season and landscape scale movements between the key breeding areas and the winter foraging grounds.	Compliant	The SPCRP addresses this requirement. Refer to the SPCRP (v2) available at the weblink provided above.
13	The SPCRP must contain, but is not limited to, the following:		
13a	Conservation research activities consistent with the National Recovery Plan for the Superb Parrot (*Polytelis swainsonii*) (2011) and reflect input and advice from the **National Superb Parrot Recovery Team.**	Compliant	The SPCRP is consistent with the National Recovery Plan and has been prepared with input from the National Superb Parrot Recovery Team. Refer to the SPCRP (v2) available at the weblink provided above.

Condition Number	Condition	Compliance Status	Evidence/comments
13b	Specific project objectives, indicative timetable for activities, nomination of persons or organisations responsible for carrying out the activities, and outline commitments to the provision and timing of funding.	Compliant	The SPCRP addresses this requirement. Refer to the SPCRP (v2) available at the weblink provided above.
14	The **approval holder** must provide at least $100,000 each year for five years to fund the conservation research activities outlined in the SPCRP. The first year's contribution must be made within 20 business days from the **commencement of the action.**	Compliant	The date of commencement of the action was 14/08/2019. The $100,000 payment for Year 1 was made on 03/09/2019 (14 business days after commencement of the action). The $100,000 payment for Year 2 was made in Sept 2020. The $100,000 payment for Year 3 was made in Sept 2021. The $100,000 payment for Year 4 was made in Aug 2022. The $100,000 payment for Year 5 was made in Oct 2023.
15	Within **14 business days** after the **commencement of the action**, the approval holder must advise the **Department** in writing of the actual date of **commencement**.	Compliant	On 16/08/2019, BWF, as the approval holder, notified the Department in writing that the commencement of the action occurred on 14/08/2019. Notification of the commencement of the action was provided to the Department by email on 16/08/2019, two business days after the date of commencement.
16	The **approval holder** must maintain accurate records substantiating all activities associated with or relevant to these conditions of approval, including measures taken to implement the management plans, and make them available upon request to the **Department**. Such records may be subject to audit by the **Department** or an **independent auditor** in accordance with section 458 of the **EPBC Act** or used to verify compliance with the conditions of approval. Summaries of audits will be published on the **Department's** website. The results of audits may also be publicised through the general media.	Compliant	BWF, as the approval holder, maintains accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the management plans. The Department of Climate Change, Energy, Environment and Water conducted a audit on the Compliance status of EPBC 2013/6810 (final report dated 29 September 2025). Records were provided to substantiate all findings, and no Non-Compliances were identified.

Condition Number	Condition	Compliance Status	Evidence/comments
17	Within three months of every 12-month anniversary of the **commencement of the action**, the **approval holder** must publish a report on its **website** addressing compliance with each of the conditions of this approval including implementation of the management plans. Documentary evidence providing proof of the date of publication must be provided to the **Department** at the same time as the compliance report is published. The report must remain published on the website for the duration of the approval. Reports must continue to be published until such time as advised by the **Minister** in writing. *Note: Compliance reports may be published on the Department's website. The first compliance report may report a period less than 12 months so that it and subsequent compliance reports align with the similar requirement under state approval.*	Compliant	The 2021 – 2022 Annual Compliance Report was published online on 24 October 2022. An email was sent to the Department on the same day advising of compliance. On 8 June 2023 the Department acknowledged via email that the reporting requirements have been met under condition 17. The 2022 – 2023 Annual Compliance Report was published online on 26 October 2023. An email was sent to the Department on the 26 October advising of compliance. On 4 April 2024 the Department acknowledged via email that the reporting requirements have been met under condition 17. The 2023 – 2024 Annual Compliance Report was published online on 12 November 2024. An email was sent to the Department on the 12 November advising of compliance. This annual compliance report details the activities undertaken by BWF as the person undertaking the action, pursuant to the reporting period 14/08/2024 to 13/08/2025. This annual compliance report will be published on the project website by **14/11/2025**, and evidence of the date of publication will be provided to the Department at the same time.
18	Potential or actual contraventions of the conditions of the approval must be reported to the **Department** in writing within **two business days** of the **approval holder** becoming aware of the actual or potential contravention.	Compliant	No potential or actual contraventions of the conditions of approval occurred during the reporting period.
19	Upon the direction of the **Minister**, the **approval holder** must ensure that an independent audit of compliance with the conditions of approval is conducted, and a report submitted to the **Minister**. The **independent auditor** must be approved by the **Minister** prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the **Minister**.	Not applicable	The Minister did not direct an independent audit of compliance during the reporting period.
20	If, at any time after five years from the date of this approval, the **approval holder** has not **commenced** the action, then the **approval holder** must not commence the action without the written agreement of the **Minister**.	Not applicable	This condition is no longer applicable as the action commenced on 14/08/2019.

Condition Number	Condition	Compliance Status	Evidence/comments
21	**Revision of action management plans** The **approval holder** may, at any time, apply to the **Minister** for a variation to an action management plan approved by the **Minister** under conditions 5 and 6, or as subsequently revised in accordance with these conditions, by submitting an application in accordance with the requirements of section 143A of the **EPBC Act**. If the **Minister** approves a revised action management plan (RAMP) then, from the date specified, the **approval holder** must implement the RAMP in place of the previous action management plan.	Compliant	No Action Management Plans have been revised in accordance with this condition during the reporting period.
21A	The **approval holder** may choose to revise an action management plan approved by the **Minister** under conditions 5 and 6, or as subsequently revised in accordance with these conditions, without submitting it for approval under section 143A of the **EPBC Act**, if the taking of the action in accordance with the RAMP would not be likely to have a **new or increased impact**.	Compliant	No Action Management Plans have been revised in accordance with this condition during the reporting period.

Condition Number	Condition	Compliance Status	Evidence/comments
21B	If the **approval holder** makes the choice under condition 21 A to revise an action management plan without submitting it for approval, the **approval holder** must: a. notify the **Department** in writing that the approved action management plan has been revised and provide the **Department** with: i. an electronic copy of the RAMP; ii. an electronic copy of the RAMP marked up with track changes to show the differences between the approved action management plan and the RAMP; iii. an explanation of the differences between the approved action management plan and the RAMP; iv. the reasons the **approval holder** considers that taking the action in accordance with the RAMP would not be likely to have a **new or increased impact**; and v. written notice of the date on which the **approval holder** will implement the RAMP (RAMP implementation date), being at least 20 **business days** after the date of providing notice of the revision of the action management plan, or a date agreed to in writing with the **Department.** subject to condition 21 D, implement the RAMP from the RAMP implementation date.	Compliant	No Action Management Plans have been revised in accordance with this condition during the reporting period.
21C	The **approval holder** may revoke its choice to implement a RAMP under condition 21 A at any time by giving written notice to the **Department**. If the **approval holder** revokes the choice under condition 21A, the approval holder must implement the action management plan in force immediately prior to that RAMP.	Not applicable	This condition was not triggered during the reporting period 14/08/2023 – 13/08/2024.

Condition Number	Condition	Compliance Status	Evidence/comments
21D	If the **Minister** gives a notice to the **approval holder** that the **Minister** is satisfied that the taking of the action in accordance with the RAMP would be likely to have a **new or increased impact**, then: a. a. condition 21 A does not apply, or ceases to apply, in relation to the RAMP; and the **approval holder** must implement the action management plan specified by the **Minister** in the notice.	Not applicable	This condition was not triggered during the reporting period.
21E	At the time of giving the notice under condition 21 D, the **Minister** may also notify that, for a specified period of time, condition 21 A does not apply for one or more specified action management plans. *Note: Conditions 21A, 21B, 21C and 21D are not intended to limit the operation of Section 143A of the **EPBC Act** which allows the **approval holder** to submit a revised action management plan, at any time, to the **Minister** for approval.*	Not applicable	This condition was not triggered during the reporting period.
22	Unless otherwise agreed to in writing by the **Minister**, the **approval holder** must publish all management and research plans referred to in these conditions of approval on its website. Each plan must be published on the website within one month of being approved and remain published on the website for the duration of the approval.	Compliant	Management and research plans referred to in the conditions are published on the Bango Wind Farm Project website, including: • Site layout plan (Condition 4) • Biodiversity Management Plan (Condition 5) • Bird and Bat Adaptive Management Plan (Condition 6) • Superb Parrot Conservation Research Plan (Condition 13).

4 New Environmental Risks

BWF reaching practical completion on the 14 December 2023, transitioning to the operational phase of the Project. The operational phase is considered to present reduced environmental risks to protected matters as construction and vegetation clearing activities have ceased.

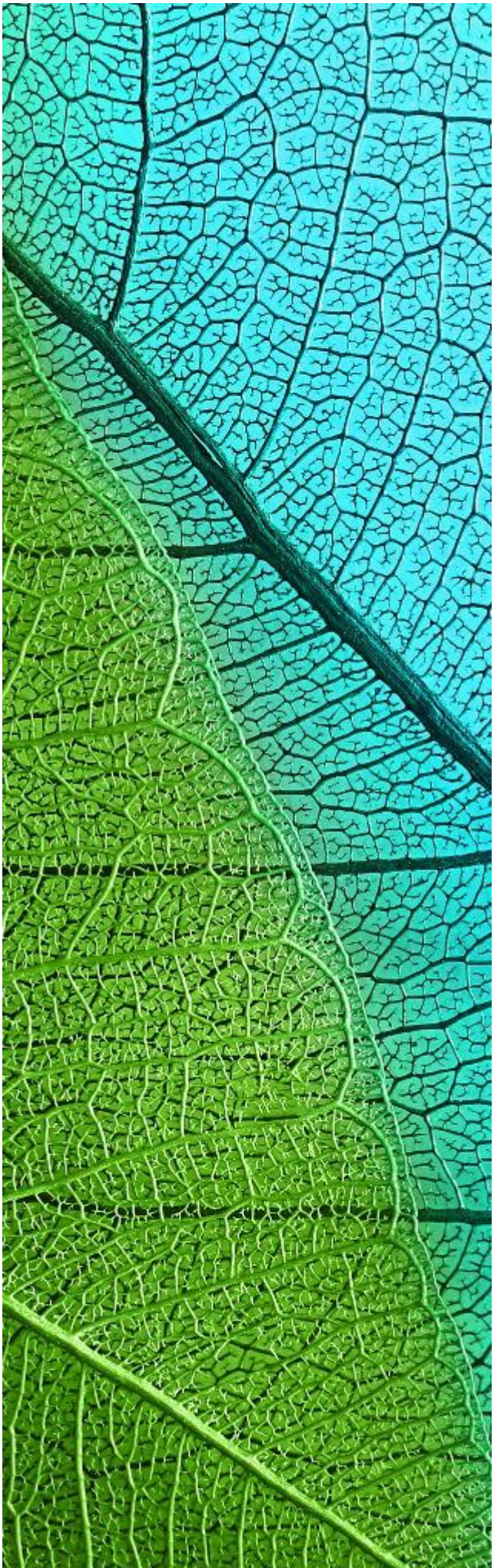
As such, no new environmental risks were identified during this reporting period.

5 Report Summary

During the reporting period 14 August 2024 – 13 August 2025, the Project has complied with all applicable conditions of the EPBC Approval 2013/6810.

Appendix A

BBAMP Implementation Report Year 2



Bango Wind Farm

Annual Report on the Implementation of the Bird and Bat Adaptive Management Program – Year Two

Prepared for Bango Wind Farm Pty Ltd

October 2025
Report No. 18173.7 (2.0)

Nature Advisory
5/61-63 Camberwell Road
Hawthorn East, VIC 3123
PO Box 337, Camberwell VIC 3124
(03) 9815 2111
www.natureadvisory.com.au

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1. Introduction

1.1. Project background

Bango Wind Farm (Bango WF) comprises 46 wind turbine generators (WTG) and is located 20 kms North of Yass, between Boorowa and Rye Park in the southern tablelands of New South Wales (NSW). These 46 WTG have a maximum height (blade tip height) of 200 metres above the ground (Figure 1). The rotor swept area (RSA) of the turbine blades is between 40m and 200m above ground level. The site features, biodiversity attributes and full project description are provided in the Environmental Impact Statement for Bango WF (CWP 2016) and associated documentation (refer to https://bangowindfarm.com.au/). The individual WTG are generally located on ridge lines with elevations of between 600 and 760 metres above the Australian Height Datum (AHD). Approximately 91% of the site has been cleared or has had its tree cover heavily reduced. The area largely comprises private farming properties used for grazing, with some cropping, many with an extensive history in these practices. The dominant vegetation is derived native grassland. Some heavily grazed areas are dominated by introduced pasture with minimal native flora. Patches of woodland and open forest remain in some areas ranging from intact woodland to treed areas with substantially modified understorey and ground cover. Intact woodlands are generally restricted to ridge tops and roadsides with lower elevation areas mostly cleared (ERM 2013). Areas of woodland regeneration also occur, and minor areas of exposed rock.

The avifauna of the site is typical of the southern tablelands of NSW, being dominated by birds of open country, farmland and fragmented woodlands. Knowledge of the bat fauna in the region is developing as more survey work is done, in particular through assessments for proposed wind farms, however woodland remnants at Bango WF support a relatively intact tree canopy that provides foraging and roosting habitat for many insectivorous bat species.

1.2. Project approval conditions

Approval of BWF was granted in 2018 by the Land and Environment Court of NSW under the *Environmental Planning & Assessment Act 1979* (EPA Act 1979) and by the Australian Commonwealth Government (Department of Agriculture, Water and Environment - DAWE) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999).

In accordance with State Significant Development Approval (SSD 6686) condition 21, Schedule 3 requires the preparation of a Bird and Bat Adaptive Management Plan (BBAMP) in consultation with the NSW Office of Environment and Heritage (OEH) (now the Biodiversity Conservation Division (BCD)) within the NSW Department of Climate Change, Energy, the Environment and Water–DCCEEW) and approved by the Secretary of the NSW Department of Planning (formerly Department of Planning, Industry and Environment, DPIE, now Department of Planning, Housing and Infrastructure–DPHI) (Table 1). Similarly, EPBC Act approval (EPBC 2013/6810) condition 6 requires the preparation of a BBAMP for approval by the Australian Minister for the Environment (

Table 2).

Table 1: State Significant Development Approval (SSD 6686) Condition 21

SSD6686 condition	BBAMP section
21. Prior to the commissioning of any wind WTG, the Applicant must prepare a Bird and Bat Adaptive Management Plan for the development in consultation with OEH and to the satisfaction of the Secretary. This plan must include:	
(a) at least 12 months' worth of baseline data on threatened and 'at risk' bird and bat species and populations in the locality that could be affected by the development;	Appendix 1, Section 4
(b) A detailed description of the measures that would be implemented on site for minimising bird and bat strike during operation of the development, including: - minimising the availability of raptor perches on wind WTG; - controlling pests; and - using best practice methods for bat deterrence, including managing potential lightning impacts	Section 3
(c) trigger levels for further investigation of the potential impacts of the projects on particular bird and bat species or populations;	Section 4
(d) an adaptive management program that would be implemented if the development is having an adverse impact on a particular threatened or 'at risk' bird and/or bat species or populations; including the implementation of measures to: - reduce the mortalities of these species or populations; or - enhance and propagate these species or population in the locality; and	Sections 4
(e) a detailed program to monitor and report on: - the effectives of these measures; and - any bird or bat strikes on the site;	Section 3, Appendix 4
(f) provisions for a copy of all raw data collected as part of the monitoring program to be submitted to OEH and the Secretary.	Section 2.10
Following the Secretary's approval, the Applicant must implement the Bird and Bat Adaptive Management Plan.	

Table 2: EPBC Act Approval (EPBC 2013/6810) Condition 6

EPBC 2013/6810 condition	BBAMP section
6. The approval holder must submit a Bird and Bat Adaptive Management Plan (BBAMP) to the Minister for approval. The approval holder must not export electricity for sale from more than 23 wind WTG simultaneously, other than for the purposes of hold point testing and commissioning, unless the Minister has approved the BBAMP. The approval holder must implement the approved BBAMP. The BBAMP must include, but is not limited to:	
a. An on-going monitoring program, which must include a description of the methodology and frequency of monitoring.	Section 3, Appendix 4
b. Trigger levels to shut down any WTG when there is a high risk of collision based on monitoring data and results of research conducted as part of the EPBC condition 13 on Superb Parrot habitat use and breeding ecology.	Section 4
The results of the monitoring program from each year must be submitted as part of the annual report required under EPBC condition 17.	Section 4, Appendix 4

1.3. Objectives of the BBAMP

Bango WF Pty Ltd engaged Nature Advisory (formerly Brett Lane and Associates) to implement the approved Bango WF BBAMP. The specific objectives of this BBAMP, derived from the conditions of approval, are set out below:

- To implement a monitoring program to estimate the impact of the project on at-risk birds and/or bats that can reasonably be attributed to the operation of the project, as an indicator of population impact;
- To directly record impacts on birds and bats through carcass searches;
- To document an agreed decision-making framework that identifies impact triggers requiring a management response to reduce impacts and identifies the management activities that will be considered; and
- To identify matters to be addressed in periodic reports on the outcomes of monitoring, the application of the decision-making framework, mitigation measures and their success

Overall, it is intended to maximise the chances that populations of each threatened species remain at similar or higher levels after 25 years of BWF operation, unless factors unrelated to the wind farm prevent this.

The strategies to be employed to ensure that any impact triggers are detected includes the following:

- Baseline and operational phases bird and bat utilisation surveys;
- Carcass searches under erected and commissioned WTG;
- Statistical analysis of the results of carcass searches to derive estimates of mortality levels and rates; and
- Reporting.

1.4. Objectives of the Annual Report

According to the BBAMP, this annual report presents results of bird and bat mortality searches, identification of any high-risk WTG, outcomes of Bird Utilisation Surveys, and any management measures implemented. It also evaluates impact trigger events, the implementation of associated mitigation measures, and provides recommendations for refinement of monitoring and management activities.

This annual report includes the following sections:

Section 2 outlines the survey methods used for BBAMP implementation between August 2024 and July 2025.

Section 3 presents the results from BBAMP implementation.

Section 4 discusses findings from the first two years of carcass searches at Bango WF.

Section 5 provides recommendations for ongoing BBAMP implementation at Bango WF.

This investigation was undertaken by a team from Nature Advisory comprising of Ahmad Barati (Project Manager and Senior Zoologist), Andrew Quinn (Graduate Zoologist), Bradley Jones (Zoologist), Divyang Rathod (Project Manager and Zoologist), Jackson Clerke (Operational Monitoring Team Leader), Mel Potter (Scent Detection Dog Handler and Zoologist) and Michael Cunningham (NSW Team Leader and Senior Zoologist).

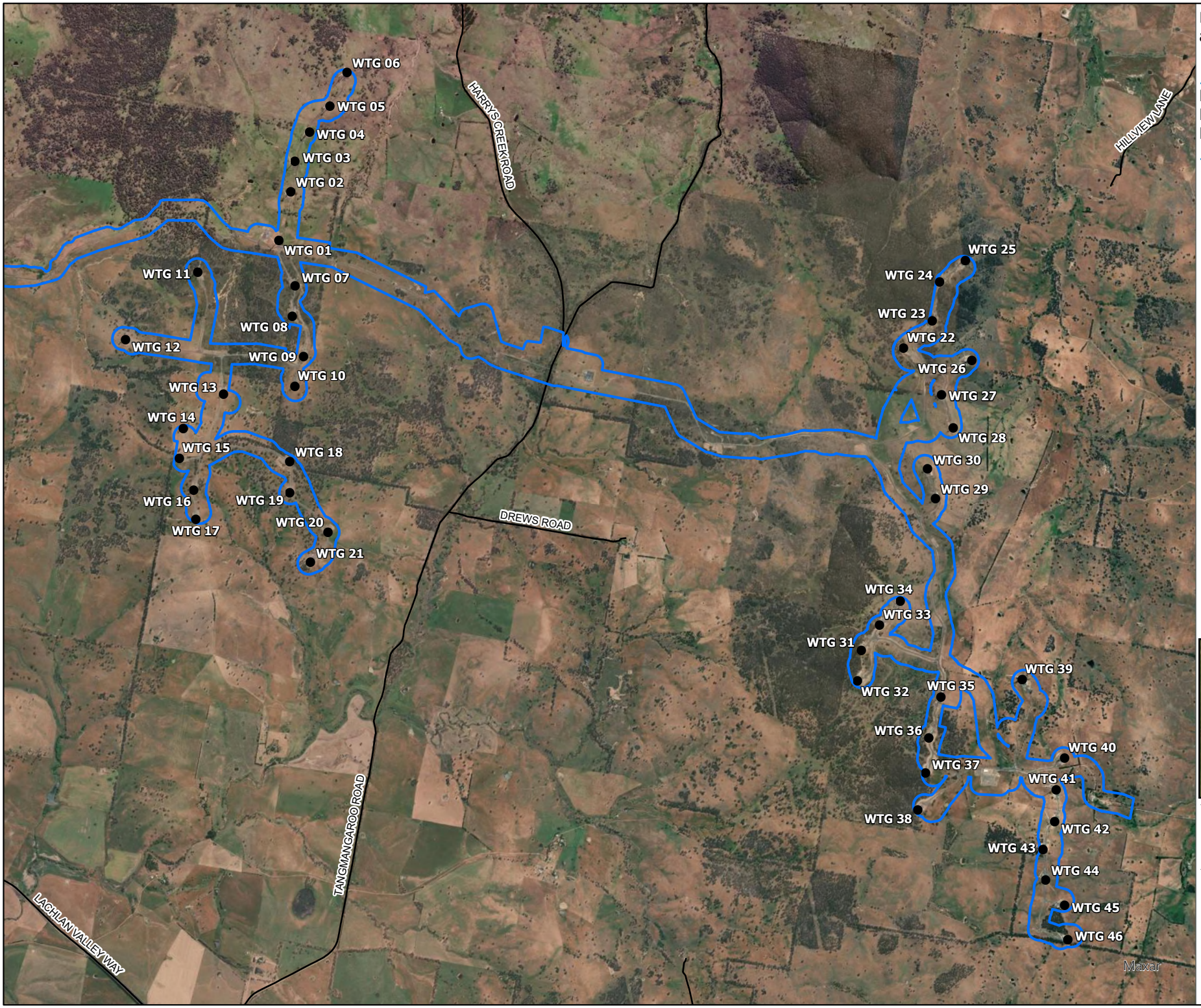

Figure 1: **Bango WF** WTG **and site location**

Project No: 18173_07
Project: Bango Wind Farm
Date: 18/09/2025

Development corridor
Road name extent
Turbine

N
Kilometres
0 0.35 0.7 1.05 1.4 1.75
GDA 1994 MGA Zone 55

Nature Advisory
PO Box 337, Camberwell, VIC 3124, Australia
www.natureadvisory.com.au
03 9815 2111 - info@natureadvisory.com.au

2. Methods

2.1. Mortality Detection Program

This section outlines the Mortality Detection Program at Bango WF undertaken from August 2024 to July 2025. The program is implemented to assess the impact of Bango WF on birds and bats by estimating annual mortality.

Collisions between birds and bats an operating turbine are known to occur. This program monitors that impact and provides data for mortality estimates throughout the operational life of the wind farm. For the purposes of this report, mortality refers to any dead bird or bat detected beneath WTG and within a defined distance where carcasses may fall if struck. Detections may occur during formal carcass searches (which are designed to generate mortality estimates) or incidentally at other times.

Ongoing turbine mortality monitoring at operating wind farms serves to:

- provide data that can inform adaptive management of collision risk (e.g., seasonal mortality patterns); and
- detect mortality of threatened and non-threatened species, thereby improving understanding of potential impacts.

At Bango WF, mortality detection for the second year of BBAMP implementation commenced in August 2024. A detailed description of the survey methodologies is provided in Section 2 of the BBAMP and summarised below

2.1.1. Monthly Carcass Searches

Monthly searches for bird or bat mortality were carried out over a 12-month period. A total of 16 WTGs were selected at random from three different habitat strata (Table 3).

Searches covered the area around each turbine out to 120 m radius from the turbine tower base.

Table 3: WTG selected for monthly carcass searches from three different strata

Habitat strata	Randomly selected WTG	
Cleared pasture	26	13
	6	30
	9	10
	41	
Open Woodland	22	
	16	
	45	
	2	
	11	
Closed Woodland	37	
	24	
	31	
	18	

A follow-up 'pulse search' to 60 metres was conducted at the same 16 WTG during the warmer months (September 2023 to April 2024) coinciding with increased microbat activity and the presences of Superb Parrots. These searches for bird and bat carcasses were undertaken monthly, within few days of the initial search. Pulse searches provide short-term estimates of daily mortality rates and help reduce the likelihood of carcass removal by scavengers between turbine checks.

All searches were carried out by trained and experienced zoologists from Nature Advisory, using either a scent-detection dog (76.46% of all searches) or a human-only (23.54% of all searches) search methodology.

Scent-detection Dog Carcass Searches

The searches were undertaken by one experienced zoologist and dog handler from Nature Advisory. The handler walks parallel transects, 20 m apart, into or across the wind direction (depending on terrain), covering the search radius and controlling the scent detection dog to find any bird or bat carcasses on either side of each transect. The handler tracks the dog's position in real time via a hand-held GPS unit linked to a GPS tracking collar. Any threatened species finds were confirmed by experienced Nature Advisory ornithologists internally. This search method is represented visually in Figure 2.

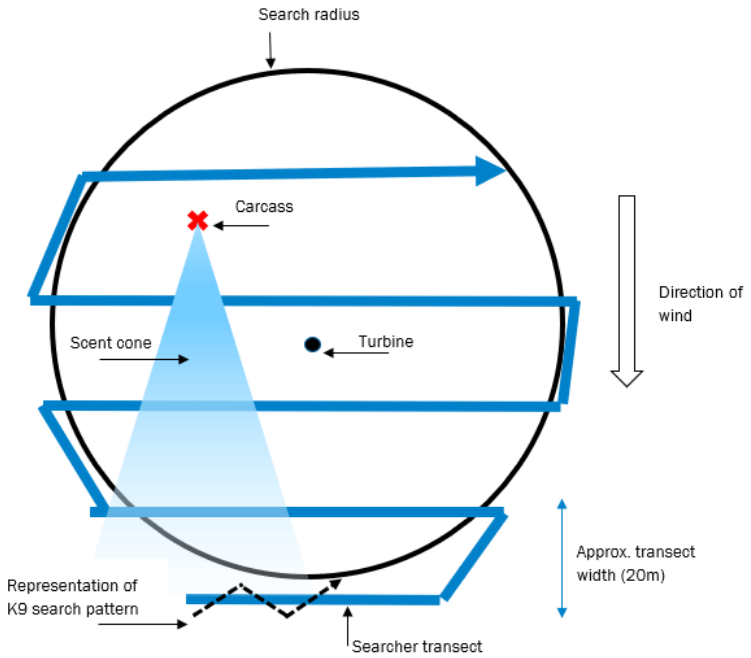

Figure 2: Diagram of search zone, transect width and search pattern at WTG

Human-only Carcass Searches

Human-only searches were undertaken by experienced Nature Advisory zoologists and any threatened species finds were confirmed by experienced Nature Advisory ornithologists internally. The process of undertaking the searches, as displayed in Figure 3, involves:

- The inner zone: a zoologist walks transects spaced six meters apart and carried out up to 60 meters from the turbine tower; nearly all microbats and the majority of small to medium birds are expected to be found in this inner zone (Hull and Muir 2010).

- The outer zone: A zoologist walks transects spaced 12 meters apart between 60 and 120 metres of the turbine tower base to detect medium and larger birds (Figure 3).

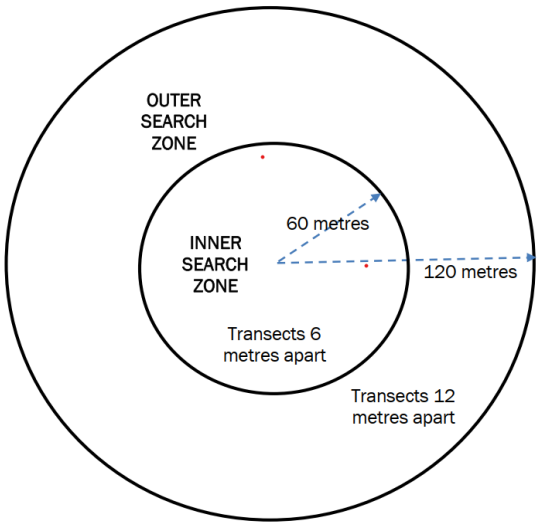

Figure 3: Inner and outer carcass search zones underneath the WTG.

Positive Carcass Detection

For each intact dead bird, bat or bird feather-spot (defined as a clump of five feathers or more) detected under a turbine, it is assumed that the animal has died as a result of a collision or interaction with a turbine, unless there are obvious signs of another cause of death (e.g. shot). For each finding, a report was completed (BBAMP Appendix 3) and a photograph of the carcass was taken. When only feathers were seen, this was recorded as a feather-spot. Feather spots likely represent a bird that collided with a turbine and was later scavenged.

On finding a dead bird, feather-spot or dead bat, the searcher:

- Removes it from the site to avoid re-counting; and
- Transfers fresh carcasses to a freezer at the site office for storage so they could be identified or identity verified and used later in observer efficiency and scavenger trials (see below).

Additionally, incidental records (see 2.1.5) are made for carcasses found under a turbine outside of the formal mortality detection program (e.g., by wind farm personnel during routine inspections of infrastructure or when outside the formal search radius).

2.1.2. Additional Carcass Searches

Additional carcass searches are periodically undertaken on a species-specific basis, such as during the Superb Parrot breeding period when mortality risk is higher. They are also conducted when an impact trigger occurs (see 2.1.7). In both cases, the same fundamental search methods are used as described above, although the timing, search radius and number of WTG surveyed may differ.

Targeted Superb Parrot Carcass Searches

Additional carcass searches were undertaken each month during the Superb Parrot breeding season (September 2024 – December 2024). During this period all WTG were searched once to 100 metres as outlined in section 2.6.4 of the BBAMP.

Targeted White-throated Needletail Carcass Searches

As a result of a threatened species impact trigger for White-throated Needletail (WTNT) during the first year of BBAMP implementation (Nature Advisory 2024), additional carcass searches were undertaken during the WTNT migration period (March 2025 and April 2025). The recommendation was to search all WTG from November 2024 to April 2025; surveys from November 2024 to December 2024 were covered by the Targeted Super Parrot carcass searches, with effort extended into March 2025 and April 2025 to ensure seasonal coverage. During this period, all WTG were searched at least once to a 100 m radius, in line with the recommendations outlined in the First Annual Report for the implementation of the BBAMP at Bango WF (Nature Advisory 2024).

Yellow-bellied Sheathtail Bat Impact Trigger Carcass Searches

As a result of a threatened species impact trigger for Yellow-bellied Sheathtail Bat (YBSB) during the second year of BBAMP implementation, additional carcass searches were undertaken on a fortnightly basis between 31 March and 6 May 2025 (section 4.1.2 of the BBAMP). During this period, all WTG were searched once to 60 meters using trained scent-detection dogs, in line with the recommendations outlined in the YBSB Trigger Investigation Report (Nature Advisory 2025).

2.1.3. Scavenger Trials

Scavenger trials assess the rate at which carcasses are removed from beneath WTG at Bango WF. These results are used to develop correction factors for mortality estimates (Symbolix 2020), accounting for the number of bird and bat carcasses that may be removed by scavengers before being detected during monthly searches. Scavengers include ground-dwelling animals, such as foxes and rats (more likely to detect carcasses by scent), and aerial scavengers, such as birds of prey and ravens (more likely to detect carcasses visually).

Appendix 4 of the BBAMP outlines the methods for scavenger trials. The approach described in the BBAMP, where an observer regularly returns to check carcasses placed at trial sites, has been modified to use motion-sensor cameras to monitor scavenger activity. Cameras are fixed to trees, fence posts, or star pickets approximately three to four metres from each randomly placed carcass, recording scavenging events with a high degree of accuracy.

Carcasses are left in place for 30 days. At the end of this period, the camera is retrieved and images reviewed. If a carcass remains on day 30, it is recorded as having been scavenged on that date for analysis. The camera data provide the exact time and date of scavenging, along with photographic evidence of the scavenger species involved. This refinement extends the BBAMP methodology and provides higher-quality information, enabling more detailed mortality analysis.

Scavenger trials were conducted at Bango WF during the first year of BBAMP implementation (Nature Advisory 2024)

2.1.4. Efficiency/Detectability Trials

Detectability trials assess the average rate at which trained searchers detect carcasses under wind WTG. It is not expected that every carcass present will be found during monthly surveys, given variation in terrain and vegetation. The results of these trials provide correction factors for mortality estimates (Symbolix 2020), accounting for carcasses that may be overlooked. A detailed description of the methodology is provided in Section 3.3.5 of the BBAMP.

Trials were supervised by a qualified ecologist (the 'carcass controller'). To account for observer variability, only personnel responsible for monthly carcass searches at Bango WF participated. Detection efficiency (the percentage of carcasses detected) is then incorporated into statistical mortality estimates (see 3.1.4).

One detectability trial was conducted during the first year of BBAMP implementation, with a second completed in March–April 2025. The staggered timing of these trials is not expected to affect estimates of detection efficiency or associated mortality estimates.

For each trial, ecologists undertaking routine carcass searches were presented with 16 carcasses (eight birds, comprising both medium and large species, and eight bats) placed under WTG without prior knowledge of their locations. Detection of each carcass was recorded along with carcass type, turbine number, and searcher identity. WTG included in the trials were:

- Turbine 1
- Turbine 2
- Turbine 18

2.1.5. Incidental Carcass Finds

As detailed in Section 2.6.5 of the BBAMP, wind farm operators managing Bango WF may from time to time find carcasses within the wind farm site during normal day-to-day activities. In this case, the carcass detection protocol outlined in Appendix 4 of the BBAMP will apply, and a carcass search data sheet included on Appendix 5 of the BBAMP will be completed for each incidental carcass found.

2.1.6. Incidental Raptor Observations

Incidental monthly monitoring of raptor flights and breeding activity has been undertaken, as raptors, particularly Wedge-tailed Eagle, are identified in Section 2.4 of the BBAMP as 'at risk' at Bango WF.

This monitoring was incorporated into the monthly mortality detection monitoring and is intended to inform the ongoing assessment of risks to local populations. All raptors observed during field visits were recorded with each flight documented and mapped. For every recorded flight, the following data were collected:

- Species
- Number of birds
- Time first observed
- Time the bird/s flew out of sight or landed

- The location of the bird (air, perched or ground)
- Height of the bird when first observed
- The height range of the bird (minimum and maximum heights)
- The landscape the bird was observed in (valley, slope or ridge)
- Flight behaviour (soaring, gliding, hovering, flapping, displaying, resting, mobbing, or foraging).
- Any nesting activity was also recorded

2.1.7. Impact Triggers

Section 4 of the BBAMP outlines the impact triggers and associated decision-making framework, which defines the circumstances requiring notification, further investigation and additional mitigation for both threatened and non-threatened birds and bats. If an impact trigger occurs, further investigation is initiated in accordance with the framework set out in the BBAMP.

Threatened Species Impact Trigger

The definition of 'impact trigger' and 'unacceptable impact' is detailed for threatened species in section 4.1.1 of the BBAMP an impact trigger for threatened species is described as:

Impact Trigger for Threatened Species: *A threatened bird/bat species (or recognisable parts thereof) listed under the Commonwealth EPBC Act or NSW Threatened Species Conservation Act 1995, is found dead or injured under or close to a wind turbine during any mortality search or incidentally by wind farm personnel. A Wedge-tailed Eagle is to be included under this trigger.*

The decision-making framework for a threatened species is outlined in section 4.1.2 of the BBAMP.

Non-threatened Species Impact Trigger

The definition of an 'impact trigger' and 'unacceptable impact' for non-threatened species is detailed in section 4.2.1 of the BBAMP. An impact trigger for non-threatened species is described as:

Impact Trigger for Non-threatened Species: *In any two successive monthly carcass searches, two or more bird or bat carcasses (or parts thereof) of a non-threatened species, other than ravens, magpies, White Cockatoos, corellas, pipits and introduced species, are found at the same turbine (i.e. a total of four or more carcasses of the same species in two successive searches at the same turbine).*

The decision-making framework for a threatened species is outlined in section 4.2.2 of the BBAMP.

Superb Parrot Impact Trigger

The definition of 'impact trigger' is detailed for Superb Parrot in section 4.1.3 of the BBAMP. An impact trigger for threatened species is described as:

- A Superb Parrot is found dead or injured under a turbine during any formal mortality search or incidentally by Bango WF personnel;
- Superb Parrots are observed demonstrating "risk behaviour" during the investigations in section 4.1.2 or the targeted parrot surveys described in section 2.4.3. "Risk behaviour" is defined for the purpose of this BBAMP as consistent observations during the investigations in

section 4.1.2 or the targeted parrot surveys described in section 2.4.3 of ten or more flights per day of flocks of ten or more birds between WTG at least 40 metres above the ground;

- Superb Parrots utilising breeding hollows within 200m of a WTG and during monitoring surveys, observed multiple times flying at least 40m above ground towards WTG that could result in collision with WTG.

The decision-making framework for a superb parrot trigger is the same as for a threatened species (section 4.1.2 of the BBAMP) with additional measures specific to the Superb Parrot outlined in section 4.1.3 of the BBAMP.

2.2. Targeted Superb Parrot Surveys

At Bango WF, targeted surveys were undertaken to determine the presence of Superb Parrots and to identify whether any trees within the development footprint (i.e., 250 m of WTG) contained hollows for nesting. Roaming surveys were conducted in October and November of 2024, with the aim of recording potential breeding activity and resource use of Superb Parrot within 250 m of WTG and associated infrastructure.

The following methodology was implemented during the targeted surveys:

- Daytime surveys were conducted on the following dates:
  - 16th to 18th September 2024
  - 9th to 10th October 2024
  - 18th to 20th November 2024
  - 16th to 20th December 2024
- Surveyors walked randomly throughout the area, allowing for comprehensive coverage of different habitats within the study site.
- Existing hollows were checked, and new hollows were marked and recorded, focusing on those with an entrance diameter of 10 cm or larger (Nature Advisory 2024).
- All Superb Parrot activity was documented, including sightings, nesting behaviour and vocalizations.
- GPS coordinates, number of individuals, and other relevant details were recorded for Superb Parrot observations and other threatened species observed.

Visual and auditory observations were recorded with the similar methods mentioned in section 2.1.7.

2.3. Bird Utilisation Surveys

The objective of Bird Utilisation Surveys (BUS) is to quantify bird activity by species at representative locations within the wind farm site. Survey locations and methodologies are described in Appendix 1 of the BBAMP (Nature Advisory 2021). BUS was undertaken in accordance with the requirements for a “Level One” bird risk assessment, as outlined in the Best Practice Guidelines for Wind Energy Developments in Australia (issued by the Clean Energy Council (2018)).

2.3.1. Fixed-point Bird Count

A fixed-point bird count method was used, which involves an observer stationed at a survey point for 15 minutes. An earlier study at another wind farm (Brett Lane & Associates Pty Ltd, unpublished data) demonstrated that 82–100% (average 88%) of species observed within one hour were recorded in the first 15 minutes. Based on this result, a 15-minute count was considered sufficient to generate representative data on bird species present at Bango WF.

During each survey, the following data were recorded for all bird species:

- species and number of individuals
- distance from the monitoring point
- flight height when first observed
- minimum and maximum flight heights observed

In line with section 2.3 of the BBAMP, ten fixed points were surveyed; seven impact points and three reference points. Impact points were located near proposed turbine locations during pre-construction and reference points were located at least 500 metres away from impact points in areas of similar habitat. The survey points were distributed as evenly as possible (subject to access constraints) across the wind farm to maximise coverage in areas where wind WTG are likely to be sited. Impact points were positioned as far as possible on elevated ground, allowing at minimum a 270° view. Fixed point survey locations are displayed in Figure 4.

To improve the diversity of reference data, Reference Point 1 was relocated from its original BBAMP position. This adjustment is not expected to reduce the statistical validity of seasonal or inter-annual data comparisons. A structured survey schedule ensured that all points were visited equally across different times of day to account for diel variation in bird activity.

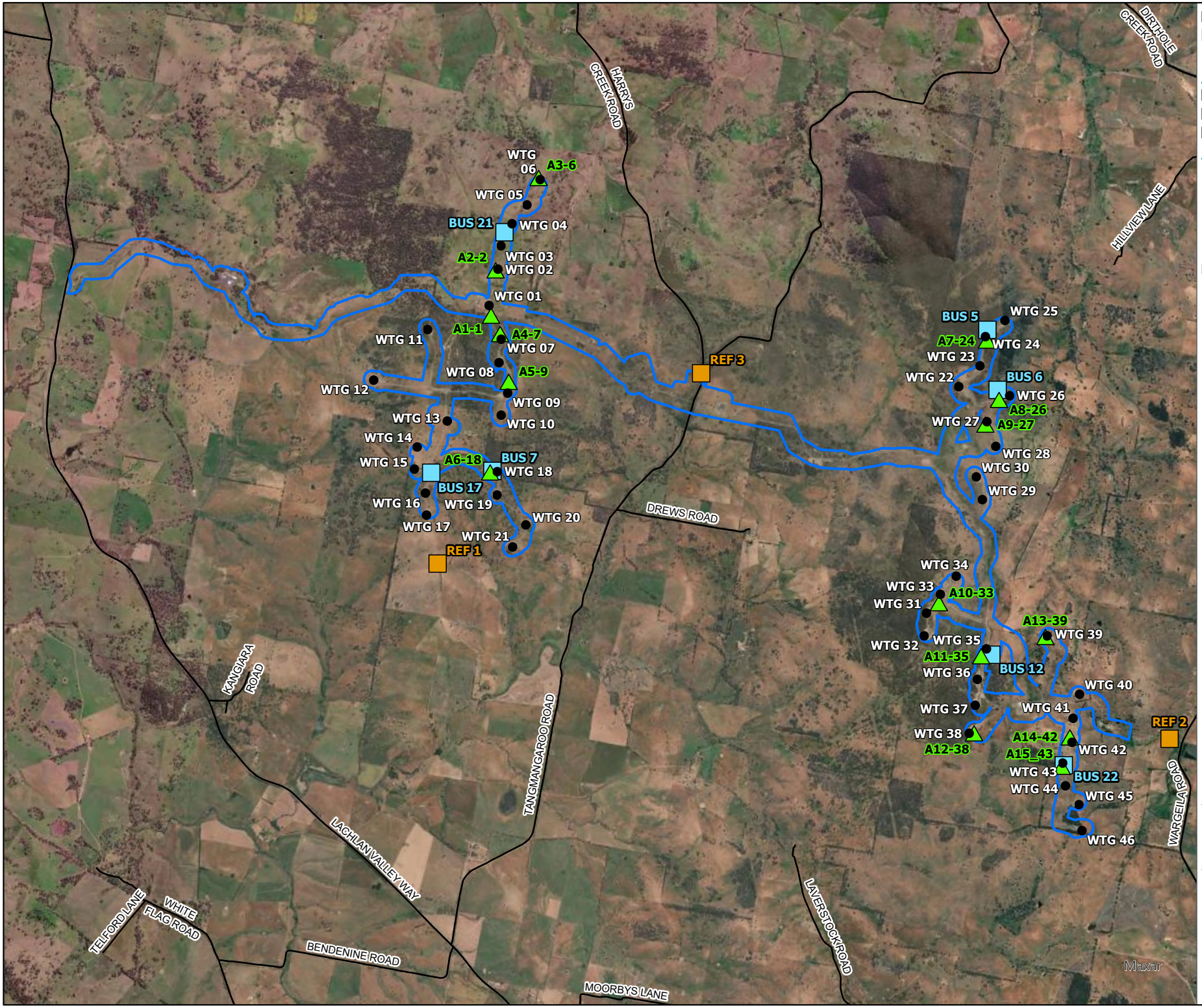

Figure 4: BUS **and** Bat locations at Bango WF.

Project No: 18173_07
Project: Bango Wind Farm
Date: 18/09/2025

- Development corridor
- Road name extent
- Turbine
- Songmeter

BUS Point

- Impact
- Reference

N

Kilometres

0 0.5 1 1.5 2 2.5

GDA 1994 MGA Zone 55

Nature Advisory
PO Box 337, Camberwell, VIC 3124, Australia
www.natureadvisory.com.au
03 9815 2111 - info@natureadvisory.com.au

2.3.1. Incidental Observations

In addition to the observations during formalised BUS, incidental observations of birds of concern (listed threatened species, migratory species and raptors) were also made whilst travelling through the site. Emphasis was placed on observing birds that will fly through the study area at RSA height.

2.3.2. Data Preparation and Statistical Analysis

Data used in the analyses were collected over four BUS conducted from 2024-2025. Surveys were conducted seasonally to capture seasonal changes in bird activity at Bango WF. At all surveys, observations were recorded in the pre-defined observation forms. Raw data were then entered into spreadsheet file and tables and graphs were extracted.

For all analyses, flight heights of observed birds were categorised as either below, at, or above Rotor Swept Area (RSA) height, as detailed below.

- A = Below RSA (<30 meters above ground level);
- B = At RSA (30 - 150 meters above ground level); and
- C = Above RSA (>150 meters above ground level).

2.3.3. Limitations

Agricultural activities, such as crop harvesting and animal feeding, may have influenced the abundance of grassland species observed (e.g. large flocks of Sulphur-crested Cockatoos attracted to areas grain dispersed area near R01). Turbine maintenance activities may also have affected the species abundance and detectability at nearby survey points (e.g. at BUS points 12 and 17).

A total of 16 surveys were not completed during the second year of BBAMP implementation. In Autumn 2025, 8 surveys at R02 were inaccessible due to locked gates by the landholder; while in Winter 2025, 8 surveys at R01 could not be conducted due to hazardous vehicle track conditions.

2.4. Bat Activity Surveys

This section summarises the Bat Activity Survey conducted during the first year of BBAMP implementation at Bango WF. The survey aimed to document bat species present, including any threatened species, and to assess activity levels. Activity levels were measured by the number of call sequences recorded at each survey point, with higher numbers of sequences indicating greater activity.

The BBAMP specifies that bat activity surveys are to be conducted in one month each during Spring 2024 and Summer-Autumn 2023/2024. In addition to these scheduled surveys, a summer survey was also undertaken to better understand bat activity, particularly for the White-striped Free-tailed Bat, which triggered an impact response during the first year of BBAMP implementation.

Bat surveys were carried out as per the methods outlined in section 2.5 of the BBAMP. Surveys were conducted using ultrasonic bat detectors distributed across habitat types at the wind farm site. A map of deployment locations is shown in Figure 4. The results of the Bat Activity Surveys conducted during the BBAMP implementation are presented in section 3.4, and a full list of species detected and identified is presented in Appendix 2.and Appendix 4.

3. Results

3.1. Mortality Detection Program Results

A total of 216 bird and bat mortalities were recorded across all surveys at Bango WF during the second year of BBAMP implementation (Table 4). This total is comprised of all mortalities detected during monthly carcass searches, impact trigger searches, and targeted carcass searches. Mortalities peaked in April 2025 (n = 60) followed by March (n = 36), largely due to elevated bird detections and increased search effort, and December 2024 (n = 30). Bat mortalities were most frequent between October 2024 and December 2024 and again in March 2025 and April 2025.

Additionally, five incidental carcasses were detected outside of formal searches, consisting of four birds and one bat.

See Appendix 1 for a detailed species-level results.

Table 4: Bird and bat mortality detection results at Bango WF during 2nd year BBAMP implementation.

Month	Bat	Bird	Feather Spot	Incidental Bat	Incidental Bird	Total
Aug-24		3	3			6
Sep-24	4	6	6			16
Oct-24	13	8	1			22
Nov-24	10	3	1			14
Dec-24	21	9				30
Jan-25	4	2			1	7
Feb-25	3	3		1		7
Mar-25	24	12				36
Apr-25	18	41			1	60
May-25	1	6				7
Jun-25		9			2	11
Total	**98**	**102**	**11**	**1**	**4**	**216**

3.1.1. Monthly Carcass Searches

During the second year of BBAMP implementation, a total of 105 bird and bat mortalities were recorded beneath WTG during standard monthly carcass searches at Bango WF. This was

comprised of 46 bird carcasses, 7 feather spots, and 52 bat carcasses. Additionally, there were five incidental detections, four birds and one bat.

The monthly breakdown of detections, which includes all bats, birds, feather spots, and incidental records, is summarised in Table 5.

Table 5: Bird and bat mortalities recorded during standard carcass searches by month

Species	Aug 24	Sep 24	Oct 24	Nov 24	Dec 24	Jan 25	Feb 25	Mar 25	Apr 25	May 25	Jun 25	Jul 25	Total
Birds													
Australian Hobby			1										1
Australian Magpie	1			1	1		2	1				1	7
Australian Raven				1									1
Australian Wood Duck								2					2
Common Starling							1						1
Corvid sp.							1						1
Crimson Rosella					1	2	4		3				10
Eastern Koel												1	1
Eastern Rosella	1	1	1				1	1		1		1	7
Galah	1											1	2
Golden Whistler					1								1
Grey Fantail				5	2					1			8
Nankeen Kestrel		2	1	1				2				1	7
Pardalote spp.				1									1
Spotted Pardalote				1	1								2
Unknown Bird sp.										1		1	2
Wedge-tailed Eagle											2		2
White-throated Gerygone									1				1
Bats													
Broad-nosed Bat						1							1
Free-tailed bat sp.					1	1	1						3
Gould's Wattled Bat							2	2					4
Little Forest Bat			5	4	4			1					14
Unknown Bat sp.		3	2	4	3	1	1	2	1	1			18
White-striped Free-tailed Bat		1		2	3	1		4	2				13
Combined Total	**6**	**8**	**10**	**12**	**17**	**7**	**7**	**12**	**13**	**7**	**2**	**9**	**110**

Bird Mortality

A total of 53 bird mortalities, inclusive of carcasses and feather spots, were recorded during the second year of BBAMP implementation. Mortalities were detected in every month of monitoring. The highest monthly total was in April 2025 (n = 9), followed by July 2025 (n = 7) and August and December 2024 (n = 6 each); there were at least two records per month during the monitoring period. The monthly distribution of mortality finds is summarised in Figure 5.

Figure 5

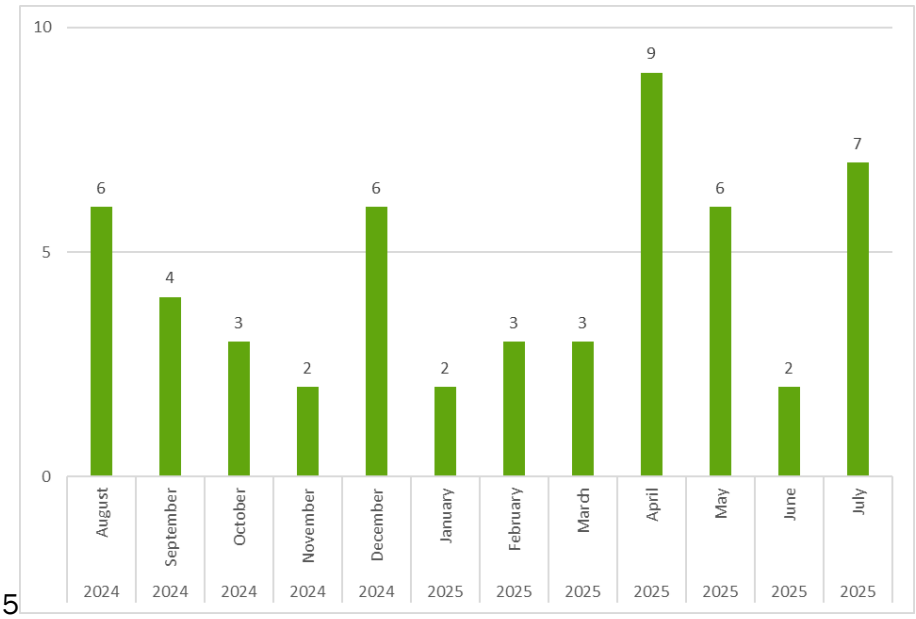

Figure 5: Bird mortality at Bango WF by month

Mortality was not evenly distributed across WTG. The highest number was recorded at Turbine 16 (n = 11), followed by Turbine 37 (n = 9) and Turbine 6 (n = 6). Five WTG recorded no bird mortalities across the entirety of the monitoring period. The distribution of bird mortalities per turbine is summarised in Figure 6.

Figure 6

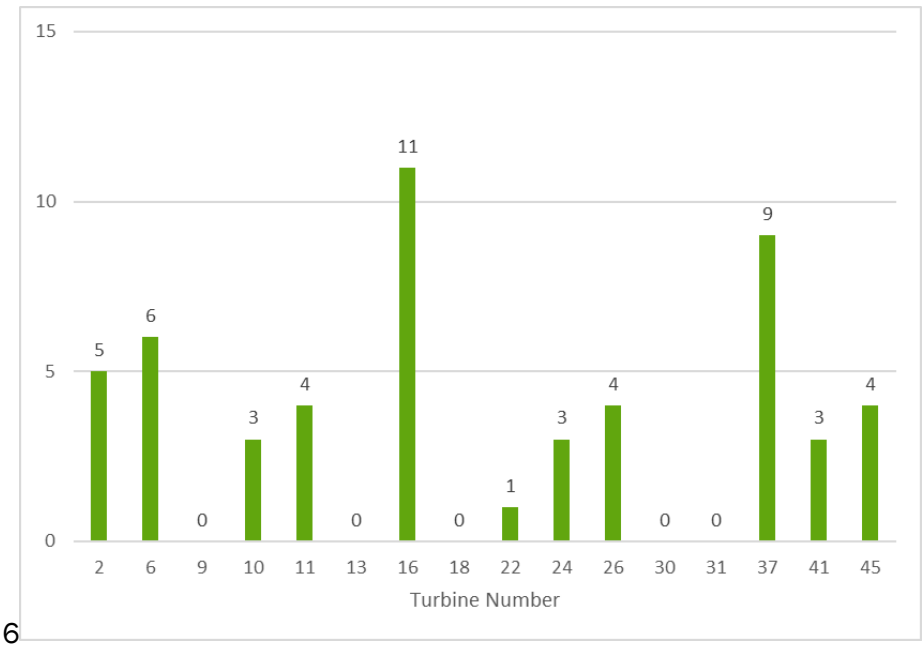

Figure 6: Bird mortality at Bango WF by turbine

Bat Mortality

A total of 52 bat carcasses were recorded during the second year of BBAMP implementation at Bango WF. Mortalities peaked in December 2024 (n = 11) and November 2024 (n = 10), with a secondary peak in March 2025 (n = 9). No bat mortalities were detected during the winter months of June, July, and August. The monthly distribution of bat mortality finds is summarised in Figure 7.

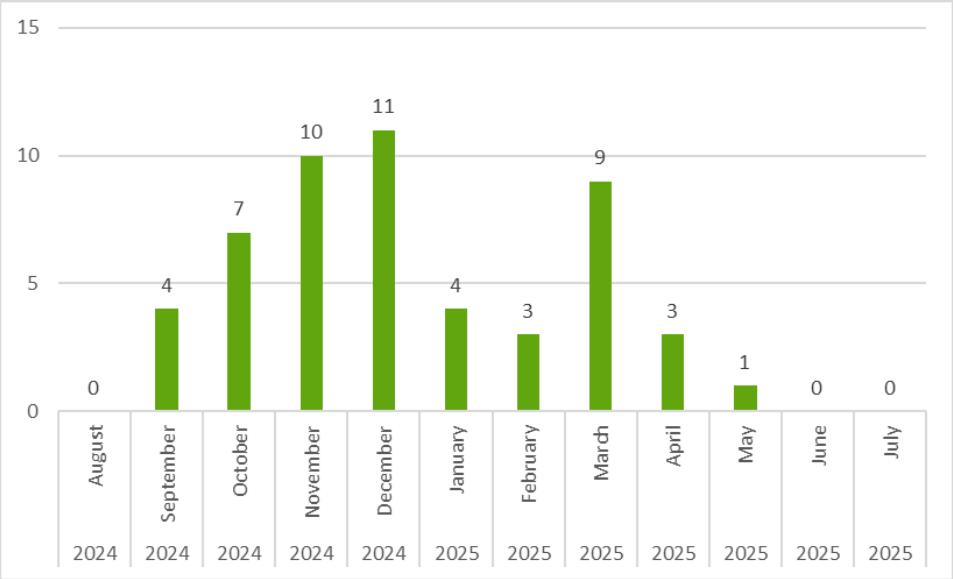

Figure 7: Bat mortality at Bango WF by month

Spatial patterns in bat mortality showed a strong concentration at Turbine 6 (n = 12), which recorded more than double the mortalities of any turbine. Several WTG recorded only one or two mortalities and Turbine 41 was the only turbine with no recorded bat mortalities across the monitoring period. The distribution of bird mortalities per turbine is summarised in Figure 8.

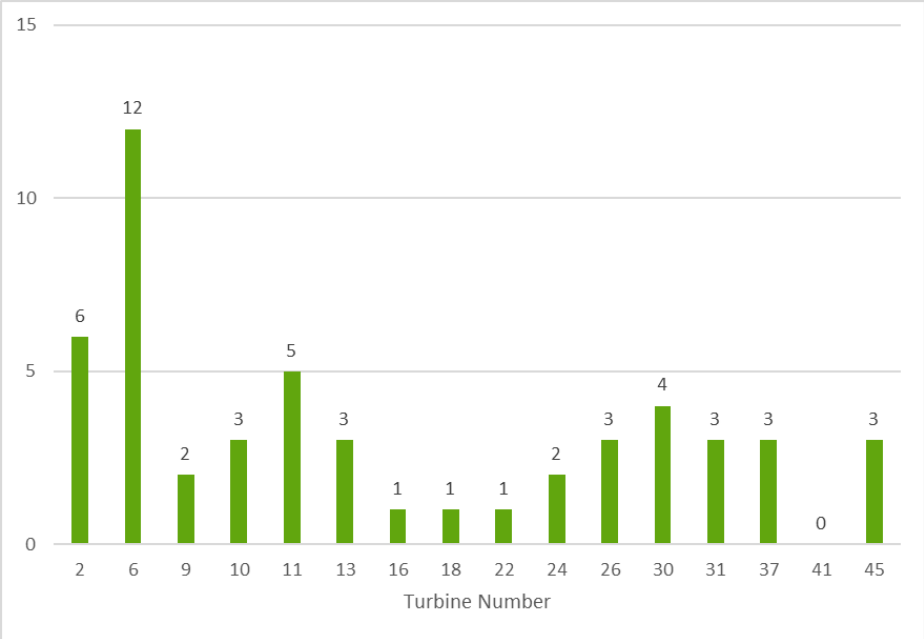

Figure 8: Bat mortality at Bango WF by turbine

3.1.2. Additional Carcass Searches

Targeted Superb Parrot Carcass Searches

Carcass searches for Superb Parrot found a total of 35 carcasses including 16 bats, 15 birds and 4 feather spots. No Superb Parrot Carcasses were found during searches. Results of the Superb Parrot carcass searches are summarised in Table 6.

Table 6: Carcasses found during Superb Parrot carcass searches

Species	Bat	Bird	Feather Spot	Grand Total
Brown Falcon		1		1
Corvid sp.		1		1
Crimson Rosella		2	1	3
Fan-tailed cuckoo		1		1
Free-tailed bat sp.	2			2
Galah		1	1	2
Little Corella		1		1
Little Forest Bat	4			4
Nankeen Kestrel		2		2
Red wattlebird		1		1
Rock Dove		1		1
Unknown Bat sp.	4			4
Unknown Bird sp.		1	1	2
Wedge-tailed Eagle		2	1	3
White-striped Free-tailed Bat	6			6
White-winged Chough		1		1
Grand Total	**16**	**15**	**4**	**35**

Targeted White-throated Needletail Targeted Searches

In Year 1 of BBAMP implementation, on 15 January 2024, an unidentified carcass was found 62 m from the base of Turbine 14 during formal monitoring by a Nature Advisory zoologist (Nature Advisory 2024a). The carcass was reviewed by senior ornithologists and confirmed as a White-throated Needletail (*Hirundapus caudacutus*) on 17 January 2024. This species is listed as Vulnerable and Migratory under the EPBC Act 1999 and NSW BC Act 2016 and therefore met the criteria for a threatened species impact trigger.

Nature Advisory notified Bango WF of the trigger on 17 January 2024. In accordance with Schedule 3, Condition 21 of the Project Approval and the BBAMP decision-making framework (Section 4.1.2), Bango WF notified NSW DCCEEW and NSW DPHI on 18 January 2024. A rapid investigation proposal was then provided.

Subsequent review of two feather spots detected on 13 December 2023, initially identified as Sacred Kingfisher (*Todiramphus sanctus),* confirmed them to be WTNT on 29 January 2024. Two additional WTNT carcasses were also detected on 23 January 2024 at the base of Turbine 10

during expanded searches undertaken as part of the decision-making framework. In total, eight WTNT mortalities were recorded across Year 1. The investigation report (Nature Advisory 2024a) provided the following recommendations:

- Confirm the annual presence is occurring
- If annual presence is confirmed, collect data on the species' habitat utilisation when at BWF. I.e. timing of year, reason for presence (foraging, roosting, and/or transiting), and locations within the wind farm boundary.

During Year 2, targeted WTNT carcass searches were implemented to record the WTNT presence which recorded 54 mortalities (32 birds, 22 bats), but no additional WTNT were found (Table 8). One threatened species - Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*) was detected during these searches, meeting an impact trigger for that species (see 3.1.2). Results of the White-throated Needletail impact trigger searches are summarised in Table 7.

Table 7: Carcasses found during WTNT impact trigger searches

Species	Bat	Bird	Feather Spot	Grand Total
Australian Hobby		1		1
Australian Raven		1		1
Common Starling		2		2
Crimson Rosella		2		2
Eastern Free-Tailed Bat	1			1
Eastern Rosella		1		1
Gould's Wattled Bat	1			1
Grey Fantail		6		6
Little Forest Bat	1			1
Magpie-lark		1		1
Nankeen Kestrel		13		13
Spotted Pardalote		1		1
Unknown Bat sp.	8			8
Unknown Bird sp.		3		3
Wedge-tailed Eagle		1		1
White-striped Free-tailed Bat	10			10
Yellow-bellied Sheath-tailed Bat	1			1
Grand Total	**22**	**32**	**0**	**54**

Yellow-bellied Sheathtail-bat Impact Trigger Carcass Searches

On the 21st of March 2025, a bat carcass was found underneath WTG 20 by a Nature Advisory zoologist/dog handler. This carcass was subsequently reviewed by our bat specialists at Nature Advisory and was identified as a Yellow-bellied Sheathtail-bat (YBSB) on the 22nd of March 2025. This species is listed as 'Vulnerable' under the *NSW Biodiversity Conservation Act 2016* (BC Act)

and as such, meets the criteria for a threatened species trigger. As per Section 4.1.2 of the Decision-Making Framework, the following actions have been undertaken:

- BWF notified the regulator, New South Wales - Department of Climate Change, Energy and the Environment and Water (NSW-DCCEEW), via email, on the 26th March 2025, within 5 working days of the impact trigger.
- An immediate trigger investigation report was submitted to NSW-DCCEEW on the 9th of April 2025 pertaining to one initial carcass identification of a YBSB on 22nd March 2025. The Investigation report (Nature Advisory 2025) provided the following recommendations:
    - No immediate mitigation measures are proposed, given the apparent rarity of occurrence and 'Negligible' risk rating.
    - Continue seasonal acoustic monitoring during March–April, with flexibility to adjust timing and locations based on emerging data (e.g. new carcass finds, habitat use observations, or acoustic activity), to better detect YBSB presence and assess site use patterns
    - Reassess the risk level if any additional YBSB carcasses are discovered or if acoustic surveys indicate increased site use.
    - Include the trigger event and findings in the next annual BBAMP compliance report and review species-specific risk management accordingly.

Following the trigger event, expanded carcass searches were conducted at all 46 WTG on a fortnightly basis between 31st March and 6 May 2025. These searches followed the BBAMP protocol using trained scent-detection dogs to survey a minimum of 60 m radius around each turbine.

Targeted searches for YBSB found a total of 17 carcasses including 8 bats and 9 birds. No additional YBSB were found during searches. Results of the targeted YBSB carcass searches are summarised in Table 8.

Table 8: Carcasses found during targeted YBSB carcass searches

Species	Bat	Bird	Feather Spot	Grand Total
Crimson Rosella		1		1
Grey Fantail		1		1
Little Forest Bat	1			1
Nankeen Kestrel		4		4
Spotted Pardalote		1		1
Striated Pardalote		1		1
Sulphur-crested Cockatoo		1		1
Unknown Bat sp.	2			2
Vespertiliondae sp.	2			2
White-striped Free-tailed Bat	3			3
Grand Total	**8**	**9**	**0**	**17**

3.1.3. Scavenger Trials

Scavenger trials were completed during the first year of BBAMP implementation (Nature Advisory 2024), no further trials were conducted during the second year of BBAMP implementation.

3.1.4. Efficiency/detectability Trials

During the second year of BBAMP implementation, detectability trials were conducted using 16 carcasses (eight birds and eight bats) placed at WTG 1 and 2 in March 2025, and turbine 18 in April 2025. The proportion of these carcasses detected by searchers during the trials is summarised in Table 9

Table 9: Efficiency/detectability trials detection results.

Searcher	Date	Turbine	No. of Birds	No. of Bats	Vegetation Condition
Searcher 1	21/03/2025	1	3/3 (100%)	3/3 (100%)	Short to long grass
	21/03/2025	2	2/2 (100%)	2/2 (100%)	Mostly short grass
	2/04/2025	18	3/3 (100%)	3/3 (100%)	Mostly short grass

3.1.5. Incidental Carcass Finds

Four bird carcasses and one bat carcass were found incidentally at Bango WF during the second year of BBAMP implementation by turbine staff, or at locations not included within the parameters of the mortality detection program. All four birds are common farmland birds, including Australian Magpie, Nankeen Kestrel and Galah. Due to decomposition, the bat was only able to be identified to a genus level (*Ozimops sp.*).

The details of the recorded incidental mortalities are summarised in Table 10.

Table 10: Incidental carcass finds

Date	Common Name	Carcass Type	Threatened Status	Turbine Number	Distance from Turbine (m)	Notes
8/01/2025	Galah	Bird	None	17	18	Entire carcass
12/02/2025	Free-tailed bat sp.	Bat	n/a	24	129	FA 34 >week dorsal gold/brown, ventral white tips dark undercoat, simple ears slightly rounded triangle
8/04/2025	Nankeen Kestrel	Bird	None	3	27	Many feathers scattered all over hardstand, light brown with dark stripes tail feathers, brown with dark stripes and pale

Date	Common Name	Carcass Type	Threatened Status	Turbine Number	Distance from Turbine (m)	Notes
						with dark mid-rib body feathers.
9/07/2025	Australian Magpie	Bird	None	43	28	Entire carcass
9/07/2025	Australian Magpie	Bird	None	3	19	Entire carcass

3.1.6. Incidental Raptor Monitoring

Nine raptor species, comprised of 89 individual raptors, have been observed flying at Bango WF during the second year BBAMP implementation, including both targeted and incidental observations as summarised in Table 11. Nankeen Kestrel was the most commonly observed species (n = 46), followed by Wedge-tailed Eagle (n = 24), however Wedge-tailed Eagle was more commonly recorded flying at or above RSA height. Flight paths for all raptors observed at Bango WF are presented in Table 11 and Figure 9.

Table 11: Raptor observations during second year of BBAMP implementation

Species	Observed at or above RSA	Observed below RSA	Total
Australian Hobby	0	1	1
Black Kite	0	1	1
Brown Falcon	3	7	10
Brown Goshawk	0	5	5
Nankeen Kestrel	13	33	46
Peregrine Falcon	0	1	1
Spotted Harrier	0	1	1
Wedge-tailed Eagle	18	5	23
Whistling Kite	0	1	1
Total	**35**	**55**	**89**

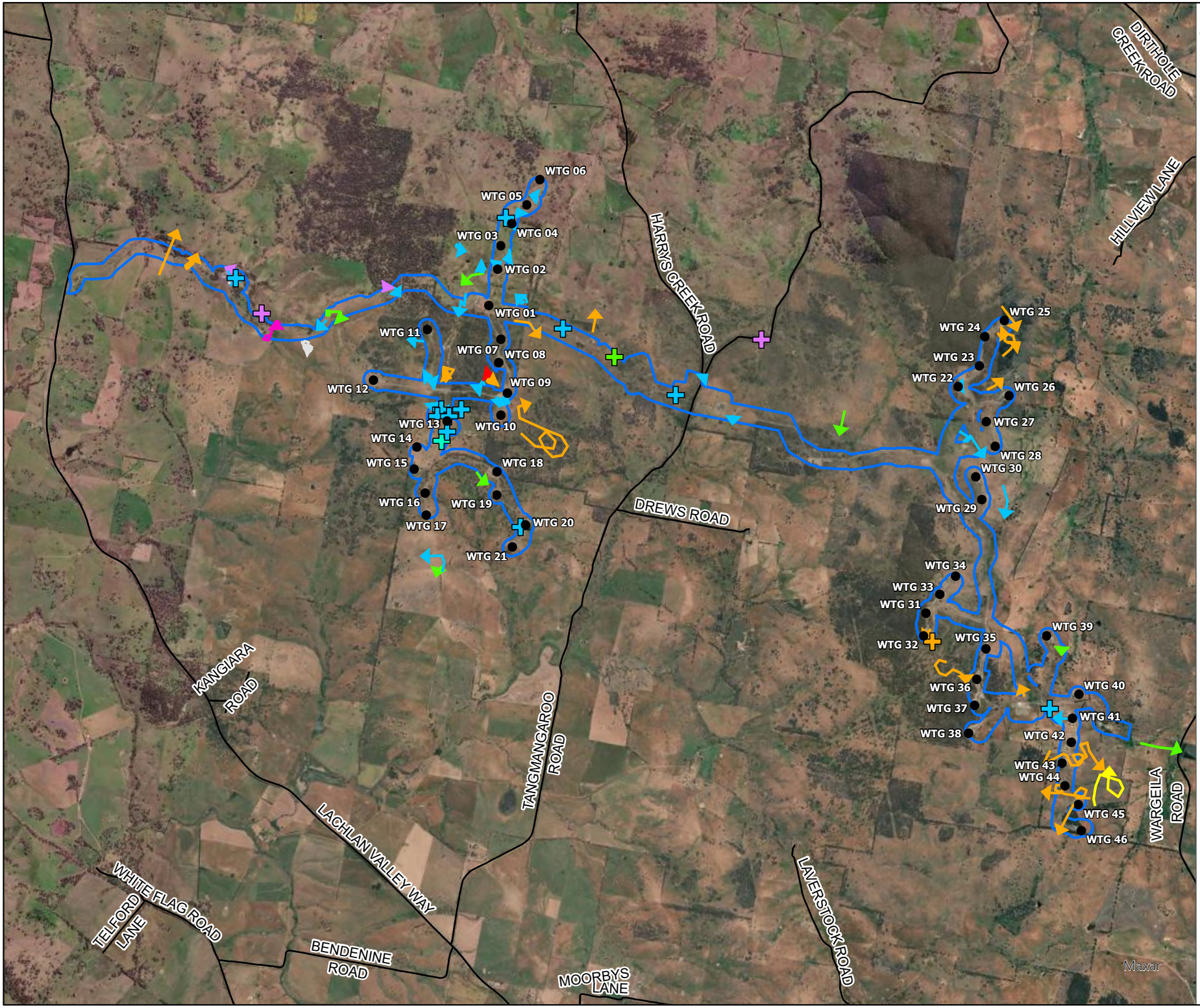

Figure 9: **Raptor flight paths from the second year of BBAMP implementation at Bango WF**

Project No: 18173_07
Project: Bango Wind Farm
Date: 19/09/2025

- Development corridor
- Road name extent
- Turbine

Perched species

- Australian Hobby
- Brown Falcon
- Brown Goshawk
- Nankeen Kestrel
- Wedge-tailed Eagle

Flight path species

- Black Kite
- Brown Falcon
- Brown Goshawk
- Nankeen Kestrel
- Peregrine Falcon
- Spotted Harrier
- Wedge-tailed Eagle
- Whistling Kite

N

Kilometres

0 0.5 1 1.5 2 2.5

GDA 1994 MGA Zone 55

Nature Advisory
PO Box 337, Camberwell, VIC 3124, Australia
www.natureadvisory.com.au
03 9815 2111 - info@natureadvisory.com.au

3.1.7. Impact Triggers

Two impact triggers occurred during the second year of BBAMP implementation at Bango WF: one non-threatened species trigger (Grey Fantail) and one threatened species trigger (Yellow-bellied Sheathtail Bat). The Yellow-bellied Sheathtail Bat trigger is summarised in Section 3.1.2, and the Grey Fantail trigger is summarised below:

Grey Fantail

Four Grey Fantail (GFT) (*Rhipidura albiscapa*) mortalities comprising three carcasses and one feather spot were recorded beneath adjacent WTG 40 and 41 during April 2025 monitoring of the mortality detection program (cite grey fantail trigger report). These were detected by a Nature Advisory zoologist and dog handler team conducting formal carcass searches, including monthly, targeted Yellow-bellied Sheathtail Bat (YBSB) and White-throated Needletail (WTNT) searches. This met the requirements of a non-threatened species impact trigger as stated in 2.1.7. While these mortalities were detected on 10th April 2025 and 16th April 2025 (Table 12), feather spot analysis was completed on the 6th of May 2025. As per the decision-making framework outlined in section 4.2.2 of the BBAMP, the following actions were undertaken:

- Nature Advisory notified Bango WF of the impact trigger on the 6th of May 2025. To comply with Schedule 3, Condition 21 of the Project Approval, as stated in section 4.2.2 of the Bango WF BBAMP, the decision and reporting framework states that an evaluation of impacts to the non-threatened species' bioregional population will be undertaken and a report on the investigation will be provided to New South Wales - Department of Climate Change, Energy and the Environment and Water (NSW - DCCEEW) within three weeks. As per the same decision and reporting framework, Bango WF notified the NSW - DCCEEW, via email, on the 7th of May 2025, within 7 working days of the impact trigger. The investigation report provided (Nature Advisory 2025a) the following recommendations:
    - No immediate mitigation measures are proposed, given the species' abundance and low risk.
    - Reassess risk if further clusters of GFT collisions exceed BBAMP trigger impact thresholds again in future monitoring.
    - Include this trigger event and associated findings in the next annual BBAMP compliance report.

Table 12 summarises all Grey Fantail mortalities recorded at Bango WF during the second year of BBAMP implementation.

Table 12: Grey Fantail mortalities at Bango WF during 2nd year BBAMP implementation

Month	Date	WTG Number											Total
		2	3	4	5	6	16	25	30	37	40	41	
Oct-24	8/10/2024					1							1
	2/04/2025								1				1
	8/04/2025	1											1
Apr-25	10/04/2025											**1**	1
	14/04/2025		1	1	1								3
	15/04/2025							1					1

Month	Date	WTG Number											Total
		2	3	4	5	6	16	25	30	37	40	41	
May-25	16/04/2025									1	2	1	4
	30/04/2025			1									1
	2/05/2025								1				1
	6/05/2025						1						1
	Grand Total	**1**	**1**	**2**	**1**	**1**	**1**	**1**	**2**	**1**	**2**	**2**	**15**

3.2. Targeted Superb Parrot Survey Results

A total of 77 Superb Parrot observation (58 flight observations and 19 perched observations) were made during targeted surveys. While individuals were recorded throughout the wind farm, three key areas supported routine observations of family groups:

- A family group was consistently observed along Tangmangaroo Road, south of the crossroads intersection and east of WTG 21/22, regularly moving into and out of the wind farm.
- A larger group was frequently recorded in the nature strip west of Turbine 1, across the creek just north of the western gate.
- A third group was seen less frequently among the tree lines east of Turbine 1 near the duck pond.

Numerous flights, particularly during mornings and afternoons, were recorded across the western nature strip and extending past the office block. While Superb Parrots generally followed low-lying areas and creek-lines, individuals were also observed flying directly over turbine hardstands.

During the surveys, 189 hollows were investigated. No breeding activity was directly observed, although several suitable hollows were identified in the vicinity of the western nature strip where the second family group, including juveniles, was frequently seen. It is possible that these hollows were utilised prior to Nature Advisory's investigations.

The recorded flight paths of Superb Parrots and the distribution of tree hollows for two years are shown in Figure 10.

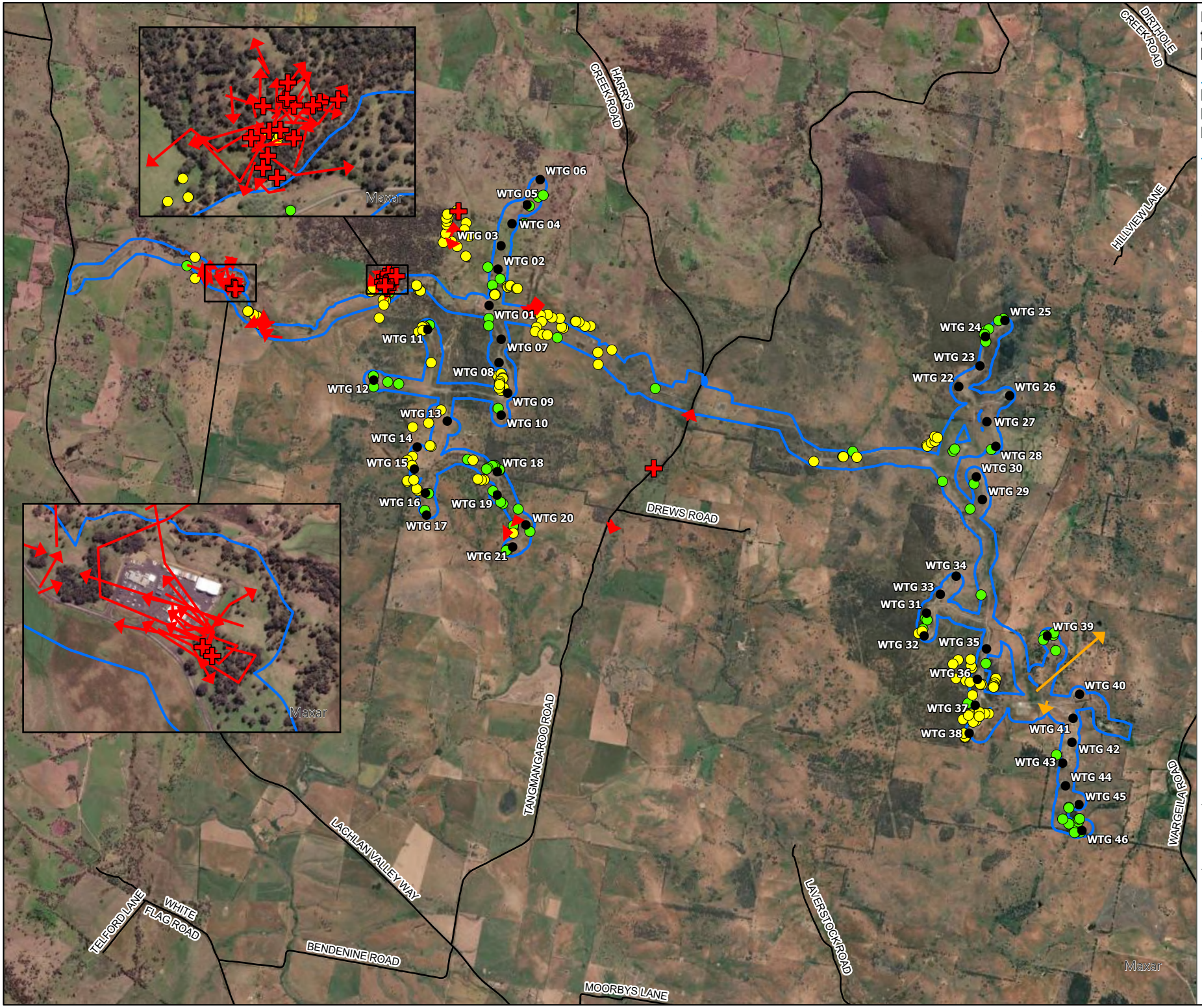

Figure 10: **Superb Parrot flight paths and hollow-bearing trees** at Bango WF

Project No: 18173_07
Project: Bango Wind Farm
Date: 19/09/2025

- Development corridor
- Turbine

Year 2 (Aug 2024 - Jul 2025) survey results

- Superb Parrot
- Superb parrot perched record
- Hollow bearing tree

Year 1 (Aug 2023 - Jul 2024) survey results

- Superb Parrot
- Hollow bearing tree

N

Kilometres

0 0.5 1 1.5 2 2.5

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www.natureadvisory.com.au
03 9815 2111 - info@natureadvisory.com.au

3.3. Bird Utilisation Survey

This section summarises the Bird utilisation Survey (BUS) results for the second year of BBAMP implementation at Bango WF. A total of four BUS was undertaken by experienced zoologists; one survey was undertaken in each season to measure for seasonal differences in bird activity and presence of species.

- 4th to 8th of November 2024 (Spring)
- 6th to 10th of January 2025 (Summer)
- 31st of March to 4th of April 2025 (Autumn)
- 28th of July to 31st of July 2025 / 6th to 7th of August (Winter)

3.3.1. Species Composition

Overall, a total of 6,487 birds belonging to 87 species were observed throughout the second year of BBAMP implementation. The Australian Magpie was the overall most frequently recorded species throughout the full year of BUS, with 1072 individuals counted and accounting for 17% of the total sum of observations. The Australian Magpie was also the most commonly recorded species at impact points, accounting for 20% of observations (n = 721), and Sulphur-crested Cockatoo was the most commonly recorded species at reference sites, accounting for 13% (n = 373) of all observations. The top ten most observed species accounted for 65% (n = 2375) of all birds observed at impact sites and 70% (n = 1969) of all birds observed at reference sites.

Table 13 summarises the top ten species observed during the BUS for the full year.

Table 13: Ten most abundant species during the full second year of the BBAMP implementation

Impact			Reference		
Species	Count	%	Species	Count	%
Australian Magpie	721	20	Sulphur-crested Cockatoo	373	13
Yellow-rumped Thornbill	311	8	Australian Magpie	351	12
Sulphur-crested Cockatoo	236	6	Yellow-faced Honeyeater	308	11
Galah	219	6	Galah	240	9
Crimson Rosella	199	5	Australian Raven	165	6
Common Starling	151	4	Superb Fairy-wren	143	5
Yellow-faced Honeyeater	145	4	Common Starling	128	5
Australian Raven	136	4	Fairy Martin	92	3
Buff-rumped Thornbill	130	4	Crimson Rosella	90	3
Australian Wood Duck	127	3	Yellow-rumped Thornbill	79	3
Total	**2375**	**65**	**Total**	**1969**	**70**

Spring 2024

In total, 1,739 birds comprising 64 species were observed during the Spring 2024 BUS. Australian Magpie was the most recorded species at impact sites (n = 148), accounting for 14% of all observations, while Sulphur-crested Cockatoo was the most recorded species at reference sites (n = 156), accounting for 22% of all observations. The top 10 most recorded species across the Spring 2024 survey is presented in Table 14.

Table 14: Ten most abundant bird species during Spring 2024 BUS

Impact			Reference		
Species	Count	%	Species	Count	%
Australian Magpie	148	14	Sulphur-crested Cockatoo	156	22
Galah	90	9	Superb Fairy-wren	63	9
Striated Pardalote	76	7	Fairy Martin	56	8
Common Starling	69	7	Australian Magpie	49	7
Australian Raven	67	7	Golden-headed Cisticola	42	6
Crimson Rosella	62	6	Galah	34	5
Sulphur-crested Cockatoo	51	5	Australian Raven	29	4
Australian Wood Duck	46	4	Rufous Whistler	23	3
Yellow-rumped Thornbill	44	4	Striated Pardalote	21	3
Straw-necked Ibis	38	4	White-winged Chough	21	3
Total	**691**	**67**	**Total**	**494**	**69**

Summer 2024/2025

In total, 1,697 birds comprising 57 species were observed during the Summer 2024/2025 BUS. Australian Magpie was the most recorded species at impact sites (n = 209), accounting for 27% of all observations, while Galah was the most recorded species at reference sites (n = 157), accounting for 17% of all observations. The top 10 most recorded species across the Summer 2024/2025 survey is presented in Table 15.

Table 15: Ten most abundant bird species during Summer 2024/2025 BUS

Impact			Reference		
Species	Count	%	Species	Count	%
Australian Magpie	209	27	Galah	157	17
Galah	66	8	Sulphur-crested Cockatoo	133	15
Australian Wood Duck	54	7	Australian Magpie	127	14
Sulphur-crested Cockatoo	52	7	Common Starling	108	12
Common Starling	47	6	Australian Raven	103	11
Superb Parrot	43	5	Superb Fairy-wren	38	4
Buff-rumped Thornbill	30	4	Fairy Martin	36	4

Impact			Reference		
Species	Count	%	Species	Count	%
White-throated Treecreeper	23	3	Little Raven	34	4
Yellow-rumped Thornbill	23	3	Yellow-rumped Thornbill	22	2
White-winged Chough	22	3	Rufous Whistler	19	2
Eastern Rosella	22	3			
Total	**591**	**75**	**Total**	**777**	**85**

Autumn 2025

In total, 1,857 birds comprising 47 species were observed during the Autumn 2025 BUS. Australian Magpie was the most recorded species at impact sites (n = 148), accounting for 14% of all observations, while Sulphur-crested Cockatoo was the most recorded species at reference sites (n = 156), accounting for 22% of all observations. The top 10 most recorded species across the Autumn 2025 survey is presented in Table 16.

Table 16: Ten most abundant bird species during Autumn 2025 BUS

Impact			Reference		
Species	Count	%	Species	Count	%
Australian Magpie	204	18	Yellow-faced Honeyeater	306	44
Yellow-faced Honeyeater	142	12	Australian Magpie	105	15
Yellow-rumped Thornbill	135	12	Sulphur-crested Cockatoo	42	6
Crimson Rosella	82	7	Crimson Rosella	30	4
Silvereye	72	6	Galah	26	4
Buff-rumped Thornbill	45	4	Australian Raven	21	3
Superb Fairy-wren	44	4	Yellow-rumped Thornbill	20	3
Galah	38	3	Spotted Pardalote	19	3
Sulphur-crested Cockatoo	34	3	Grey Fantail	18	3
Common Starling	33	3	Weebill	12	2
Total	**829**	**71**	**Total**	**599**	**87**

Winter 2025

In total, 1,194 birds comprising 49 species were observed during the Winter 2025 BUS. Australian Magpie was the most recorded species at impact sites (n = 160), accounting for 23% of all observations, and at reference sites (n = 70), accounting for 14% of all observations. The top 10 most recorded species across the Winter 2025 survey is presented in Table 17.

Table 17: Ten most abundant bird species during Winter 2025 BUS

Impact			Reference		
Species	Count	%	Species	Count	%
Australian Magpie	160	23	Australian Magpie	70	14
Yellow-rumped Thornbill	109	16	Sulphur-crested Cockatoo	42	8
Sulphur-crested Cockatoo	99	14	Silvereye	39	8
Crimson Rosella	36	5	Superb Fairy-wren	38	8
Buff-rumped Thornbill	35	5	Yellow-rumped Thornbill	36	7
Australian Wood Duck	27	4	Crimson Rosella	32	6
Galah	25	4	Buff-rumped Thornbill	29	6
Australian Raven	24	3	White-winged Chough	24	5
White-browed Scrubwren	17	2	Galah	23	5
Wedge-tailed Eagle	15	2	Weebill	23	5
Total	**547**	**78**	**Total**	**356**	**72**

3.3.2. Raptors

A total of 100 individual raptors from seven species were observed during formalised BUS. The most commonly seen raptor species were Wedge-tailed Eagle (n = 60) and Nankeen Kestrel (n = 22). One species listed as Vulnerable under the NSW BC Act, White-bellied Sea-eagle, was observed during formal BUS. This individual was a juvenile, discernible by overall mottled brown colouration, and was seen at BUS point R3. A full list of raptors observed during the formal BUS is summarised in Table 18.

Table 18: Raptors observed during formal BUS at Bango WF

Species	Count		
	Impact	Reference	Total
Black Kite	1	4	5
Black-shouldered Kite	1	5	6
Brown Falcon	2	3	5
Brown Goshawk	1		1
Nankeen Kestrel	16	6	22
Wedge-tailed Eagle	50	10	60
White-bellied Sea-eagle		1	1
Total	**71**	**29**	**100**

3.3.3. Threatened Species

A total of 93 individual birds from six listed threatened species was observed during formal BUS. Superb Parrot was the most commonly observed listed species (n = 54), occurring in far greater numbers than any other listed species at impact sites, and also occurring commonly at reference sites. Varied Sittella was the second most commonly observed listed species (n = 16), occurring exclusively at wooded impact sites. A full list of listed threatened species and their abundance observed during the formal BUS is summarised in Table 19. All six species are listed as 'Vulnerable' under the NSW BC Act.

Table 19: Threatened species observed during formal BUS at Bango WF

Species	Count		
	Impact	Reference	Total
Flame Robin		9	9
Scarlet Robin	5	2	7
Speckled Warbler	2	4	6
Superb Parrot	43	11	54
Varied Sittella	16		16
White-bellied Sea-eagle		1	1
Total	**66**	**27**	**93**

3.3.4. Flight Height

During formal BUS, there were 143 individual birds from 14 species observed flying at or above RSA height (Table 20) accounting for 2% of all birds observed. Wedge-tailed Eagle was the most commonly observed bird flying at RSA (n = 57), accounting for 95% of all Wedge-tailed Eagle observations during formal BUS. Australian Raven was also commonly observed flying at RSA height (n = 30). White-bellied Sea Eagle was the only listed threatened species observed flying at RSA height (n = 1). Table 20 represents the bird species observed at RSA.

Table 20: Birds observed at RSA during formal BUS at Bango WF

Species	Count				
	Spring 2024	Summer 2024/25	Autumn 2025	Winter 2025	Total
Australian Magpie			3	1	4
Australian Raven	14		7	9	30
Australian Wood Duck		3			3
Black Kite		2			2
Brown Falcon		1	1		2
Brown Goshawk	1				1
Galah			2		2
Jacky Winter			2		2

Species	Count				
	Spring 2024	Summer 2024/25	Autumn 2025	Winter 2025	Total
Nankeen Kestrel	4				4
Pied Currawong	1		5		6
Straw-necked Ibis	17				17
Sulphur-crested Cockatoo			4	6	10
Wedge-tailed Eagle	6	14	23	15	58
White-bellied Sea-eagle			1		1
White-necked Heron	1				1
Total	**44**	**20**	**48**	**31**	**143**

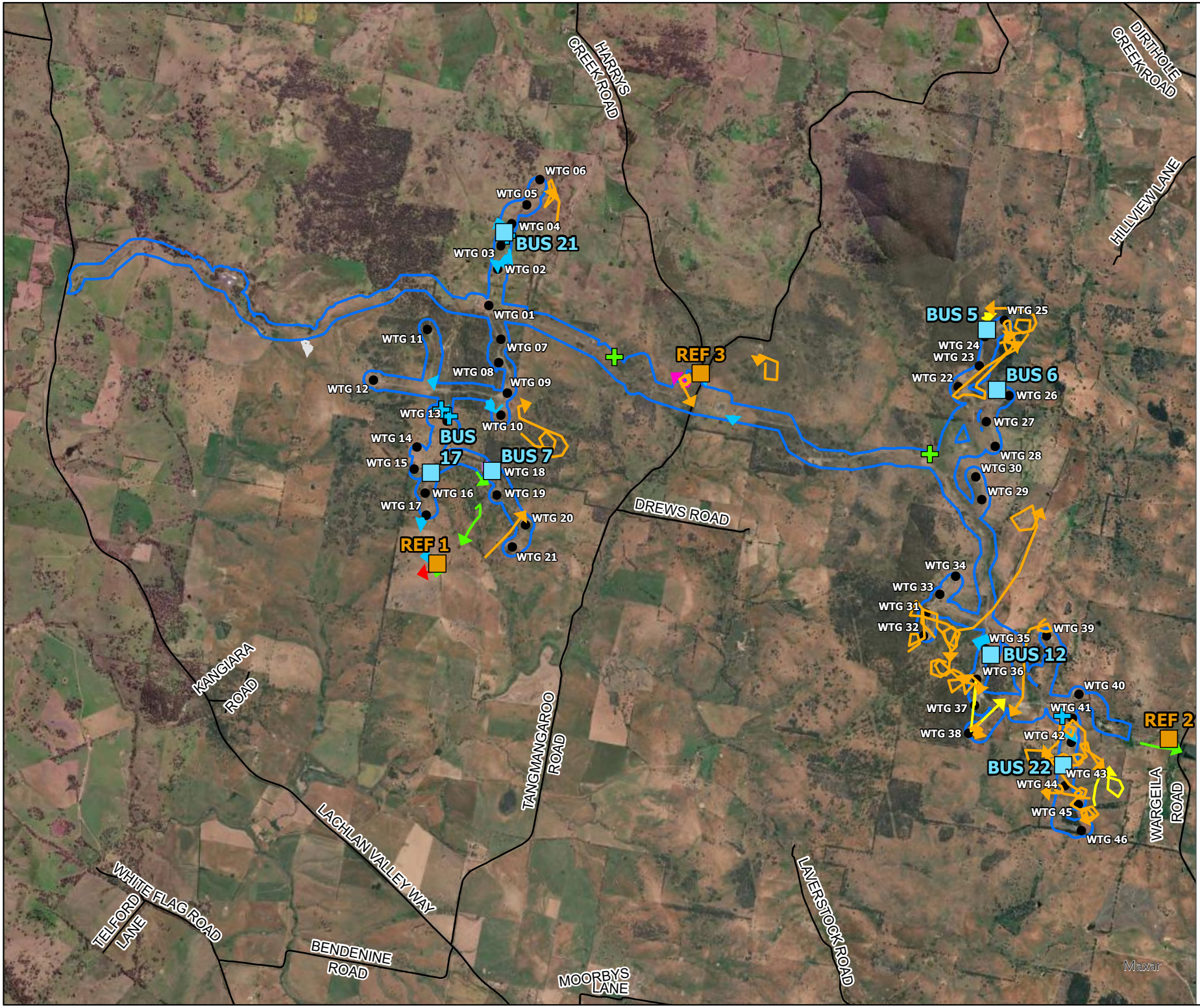

Figure 11: Raptor **flight paths from** BUS

Project No: 18173_07
Project: Bango WF
Date: 19/09/2025

- Development corridor
- Road name extent
- Turbine

BUS Point

- Impact
- Reference

Flight path species

- Black Kite
- Brown Falcon
- Brown Goshawk
- Nankeen Kestrel
- Spotted Harrier
- Black-shouldered Kite
- White-bellied Sea-Eagle
- Wedge-tailed Eagle

Perched species

- Brown Falcon
- Nankeen Kestrel

N

Kilometres
0 0.5 1 1.5 2 2.5

GDA 1994 MGA Zone 55

Nature Advisory
PO Box 337, Camberwell, VIC 3124, Australia
www.natureadvisory.com.au
03 9815 2111 - info@natureadvisory.com.au

3.4. Bat Activity Surveys

As outlined in Section 2.4, ultrasonic bat detector surveys were undertaken at Bango Wind Farm during Spring 2023, Summer 2024, and Autumn 2024. These surveys were conducted as part of the first year of BBAMP implementation, following nationally accepted guidelines for call analysis (Australasian Bat Society 2006). Call sequences were assigned to three levels of confidence: definite, probable, and possible, reflecting the degree of certainty in species identification.

3.4.1. Spring 2023 and Autumn 2024

During the Spring 2023 and Autumn 2024 survey periods, 19,095 identifiable call sequences were recorded from a total survey effort of 298 detector nights. Ten microbat species were confidently identified, with a further six species probably or possibly present. In addition, 17 species complexes were recorded.

Four threatened species listed under the NSW BC Act were identified at varying confidence levels: Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), Large Bent-winged Bat (*Miniopterus orianae oceanensis),* Southern Myotis (*Myotis macropus*), and Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*). The latter was only represented by a very small number of possible call sequences (n = 4), indicating very low activity within the wind farm.

Bat activity was dominated by four taxa: White-striped Freetail-bat (*Austronomus australis*), Gould's Wattled Bat (*Chalinolobus gouldii*), the Large Bent-winged Bat/Forest Bat (*Vespadelus spp.*) complex, and the Forest Bat complex. These accounted for the majority of all call sequences, with the Large Bent-winged Bat/Vespadelus complex contributing 4,642 calls alone. The high number of detections for these widespread species indicates strong year-round activity, particularly by fast-flying taxa known to operate in the airspace intersecting turbine blades.

3.4.2. Summer 2024

An additional targeted summer survey was conducted in January 2024, specifically to investigate White-striped Freetail-bat activity, following concerns raised during the first year of BBAMP implementation. This survey used 15 detectors across 15 sites for a total of 134 detector nights, resulting in 14,695 identifiable call sequences.

Eleven microbat species were confidently identified, with a further five species probably or possibly present. Three threatened species listed as Vulnerable under the NSW BC Act were identified: Eastern False Pipistrelle, Large Bent-winged Bat, and Southern Myotis. Unlike the Spring/Autumn survey, Yellow-bellied Sheathtail-bat was not recorded during summer.

As with Spring/Autumn, activity was dominated by White-striped Freetail-bat, Gould's Wattled Bat, and Vespadelus complexes. The Large Bent-winged Bat/Vespadelus complex contributed 4,196 calls, making it one of the most frequently detected groups across the survey period. The dominance of White-striped Freetail-bat during this summer survey confirmed its sustained use of the site, particularly during warmer months, and underscores its potential collision risk due to high-altitude, fast-flying behaviour.

4. Discussion

4.1. Mortality Detection Program

The mortality detection program at Bango WF in Year 2 of BBAMP implementation provided detailed insights into bird and bat interactions with WTG. The survey effort was distributed across initial, pulse, targeted, and trigger searches, supplemented by incidental finds, resulting in comprehensive coverage across the site. The program documented 216 total mortalities, comprising 117 birds and 99 bats. This dataset not only highlights species most frequently affected but also reveals seasonal peaks and spatial clusters of risk across WTG. While survey effort was elevated in some months due to targeted or trigger surveys (Figure 12), potentially inflating detections, the results nonetheless present a robust picture of turbine-related impacts and patterns of wildlife use at the wind farm.

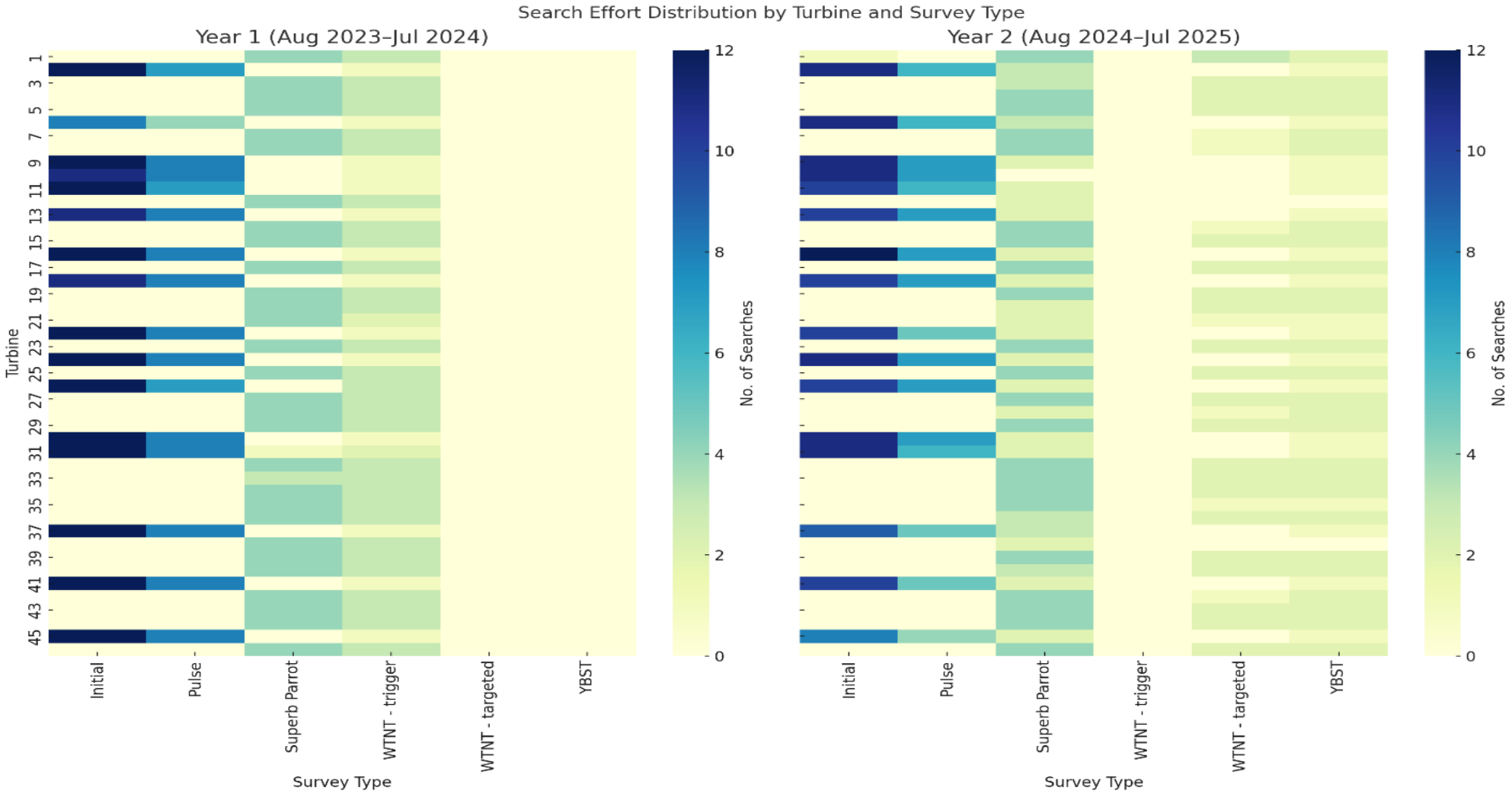

Figure 12: Search effort distribution by turbine and survey type

4.1.1. Bird Mortalities

A total of 117 bird mortalities were recorded in Year 2, comprising 106 carcasses and 11 feather spots. Mortalities were distributed across a wide range of species, though several stood out due to higher numbers or ecological significance.

The Nankeen Kestrel was the most frequently affected species, with 26 mortalities recorded at more than a dozen WTG, including 1, 2, 3, 4, 6, 16, 17, 19, 20, 21, 22, 25, 27, 34, 39, 43, 44, and 45. This broad distribution reflects the kestrel's hunting strategy of hovering within rotor swept areas over open habitats, making it particularly vulnerable. Mortalities were consistently distributed across the site, suggesting sustained interaction with WTG rather than isolated hotspots.

The Grey Fantail also showed notable mortality, with 12 mortalities recorded in April 2025, likely coinciding with a migratory passage. Outside April, only three additional mortalities were recorded across WTG 2, 3, 4, 6, 16, 25, 30, 37, 40, and 41. This sharp seasonal spike suggests that while fantails are not consistently at risk year-round, they can be significantly impacted during seasonal movement events when their highly active foraging and flight behaviour brings them into turbine zones.

Crimson Rosella accounted for 16 mortalities, concentrated at WTG 16, 24, 27, and 37. Peaks occurred in late winter and spring, potentially coinciding with movements between feeding and breeding habitats. Although this species is abundant and widespread, its repeated occurrence in the dataset highlights its regular presence within the wind farm landscape.

The Wedge-tailed Eagle, although recorded in lower numbers (6 mortalities), represents one of the most significant findings due to its conservation importance, large body size, and slow reproductive rate. Mortalities were recorded at WTG 25, 32, 37, and 39, with four incidents concentrated at WTG 37 and 39 in the south-eastern portion of the wind farm. This spatial clustering suggests an area of elevated eagle activity within the site, reinforcing the need for ongoing monitoring.

Other raptors which were impacted include, Brown Falcon which was recorded at WTG 44 and Australian Hobby at WTG 14 and 45. Although each of these species was recorded only once, their presence indicates that a range of raptor taxa occasionally interact with WTG, highlighting the value of maintaining ongoing monitoring.

Beyond these focal species, a range of smaller resident and common birds were represented in lower numbers, including Australian Magpie, Eastern Rosella, Galah, pardalotes, corvids, and starlings. These mortalities were spread across many WTG and months, reflecting broad community-level exposure but without concentrated impact at the population level.

Taken together, bird mortalities in Year 2 highlight that while impacts are spread across many species, consistent susceptibility is evident among raptors, particularly Nankeen Kestrel and Wedge-tailed Eagle.

4.1.2. Bat Mortalities

Bat mortalities in Year 2 totalled 99 individuals, comprising multiple species across the families *Vespertilionidae* and *Molossidae*. Mortalities occurred throughout the year but were strongly concentrated in autumn (March–April) and early summer (December), consistent with broader seasonal activity patterns in temperate Australia.

The White-striped Free-tailed Bat was the most frequently recorded species, with 32 mortalities distributed across March, April, and December. Multiple incidents occurred at WTG 1, 6, and 39, with WTG 39 alone recording four separate events, identifying it as a localised hotspot. These peaks likely reflect migratory or dispersal movements coinciding with heightened turbine risk.

The Little Forest Bat accounted for 20 mortalities, distributed broadly across the site. Mortalities were recorded in April, October, November, and December, with WTG 6, 30, and 31 recording multiple incidents. The species' low flight height and preference for foraging along habitat edges may explain its repeated overlap with WTG during periods of high insect activity.

A significant portion of the dataset comprised of unidentified bats (32 mortalities), representing decomposed carcasses or cryptic species difficult to identify morphologically. These were spread across many WTG, with a pronounced cluster in December.

Other species contributed in smaller numbers. Gould's Wattled Bat was recorded six times, mostly in February and March, while Free-tailed bats (unidentified to species) added five records spread across January, February, October, and December. Broad-nosed Bat and Eastern Free-tailed Bat were each recorded once.

Of particular importance was a single Yellow-bellied Sheathtail Bat mortality at WTG 20 in March 2025. This species is listed as Vulnerable under the NSW BC Act 2016, and its presence underscores the ongoing risk to threatened taxa even at low frequencies.

Overall, bat mortalities in Year 2 were dominated by widespread and common species such as White-striped Free-tailed Bat and Little Forest Bat. However, the inclusion of threatened species and clustering of mortalities during seasonal peaks emphasise the need for continued monitoring

4.1.3. Temporal and Spatial Trends

Analysis of temporal patterns revealed strong seasonal variation in bird and bat mortalities. April 2025 was the highest-mortality month, with 60 total mortalities (42 birds, 18 bats). This peak reflects both a Grey Fantail migratory passage and elevated bat activity. March (36 mortalities) and December (30 mortalities) were also significant, with bats strongly represented in both months. Lower but consistent mortalities were recorded across most other months, demonstrating that turbine risk is present year-round but accentuated during seasonal migration and dispersal events.

Spatially, mortalities were distributed across much of the wind farm, but several WTG emerged as consistent hotspots. For birds, WTG 16 (n = 11) and 37 (n = 9) recorded repeated incidents. For bats, WTG 6 (n = 12), 1 (n = 6), 2 (n =6) and 40 (n = 6) accounted for multiple mortalities, including clusters of White-striped Free-tailed Bats and Little Forest Bats. These WTG appear to coincide with habitat edges or movement corridors that increase wildlife exposure.

It is important to note that survey effort was elevated in certain months (e.g., March and April) due to targeted and trigger searches, which likely increased detection rates compared to baseline effort. While this introduces some inconsistency across the dataset, the patterns observed still provide a reliable picture of activity and risk at the site. The clustering of mortalities in periods of elevated survey effort highlights the importance of matching monitoring intensity to biological events such as migration, ensuring risks are accurately captured. Figure 13 illustrates the temporal distribution of mortalities by search type during Year 2, showing how increased survey efforts accounted for the majority of detections in autumn (particularly March–April), while targeted searches for Superb Parrot, White-throated Needletail, and Yellow-bellied Sheathtail Bat added

additional records later in the year, highlighting both seasonal peaks in activity and the influence of varied survey effort on detection patterns.

Taken together, the temporal and spatial data show that while turbine-related mortality at Bango WF occurs throughout the year, specific seasons and WTG are associated with disproportionately higher risk. These findings are critical for refining risk assessments and informing adaptive management within the BBAMP framework.

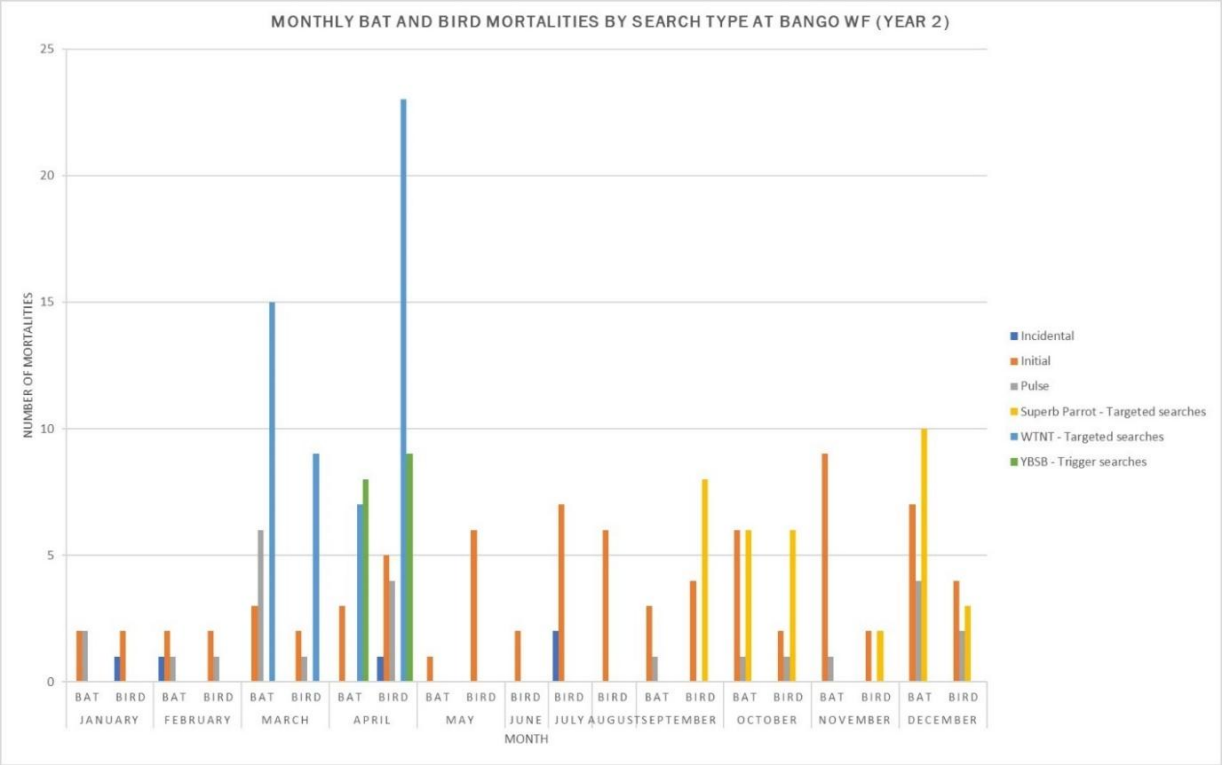

Figure 13: Monthly bat and bird mortalities by search type at Bango WF (Year 2)

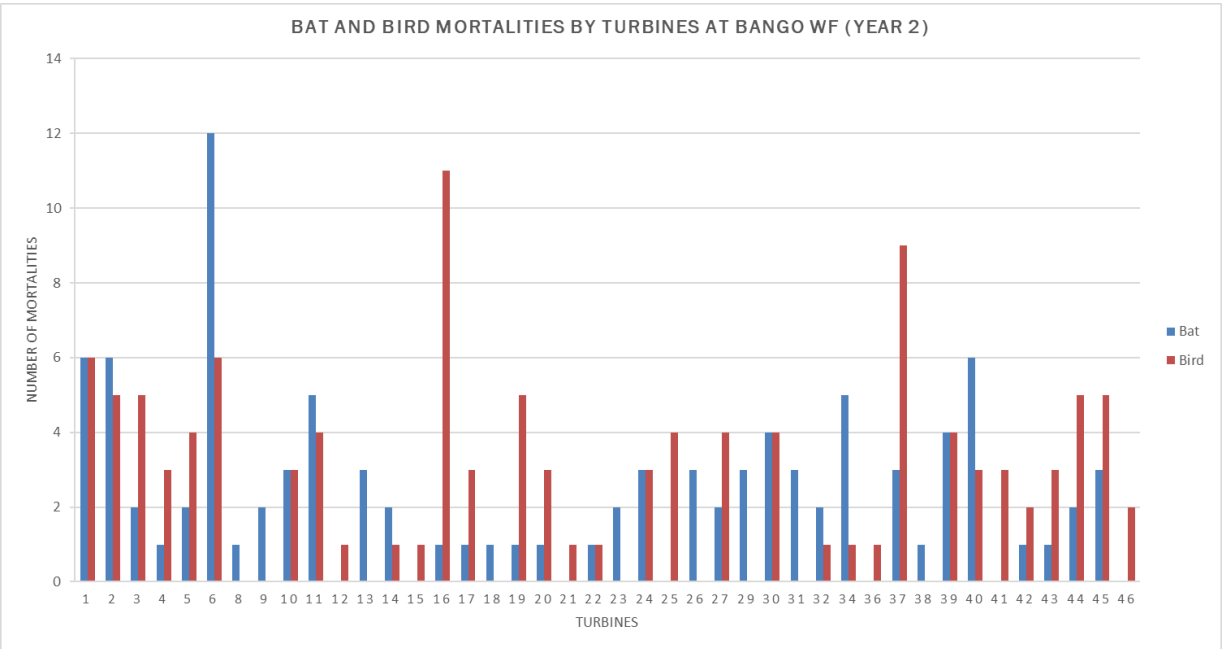

Figure 14: Per turbine mortalities for bird and bats at Bango WF (Year 2)

4.1.4. Incidental Raptor Monitoring

Incidental raptor monitoring during the second year of BBAMP implementation recorded 88 raptor observation events across eight species at Bango WF. As with formal BUS data, these figures represent observation records and may include repeat sightings of the same individuals across different survey days. Nankeen Kestrel was the most frequently observed species (46 records), reflecting its preference for open foraging areas and hovering hunting behaviour that brings it into frequent overlap with turbine operating space. Wedge-tailed Eagle was the next most frequently recorded species (23 records), and importantly, the majority of these (18 records) were of birds flying at or above rotor swept area (RSA) height. This finding reaffirms that while eagles are detected less frequently than kestrels, their flight behaviour places them at higher risk of turbine interaction.

Other raptor species were recorded only occasionally. Brown Falcon (10 records) and Brown Goshawk (5) were the most common among the less frequently detected species, with most observations occurring below RSA. Isolated records of Australian Hobby, Black Kite, Spotted Harrier, and Whistling Kite demonstrate that a wider assemblage of raptors makes use of the wind farm environment, although these species were observed only rarely.

Overall, the incidental raptor observations provide valuable supplementary context to formal BUS data, confirming the regular presence of kestrels and eagles and the occasional occurrence of other raptors within the wind farm. The elevated proportion of eagle observations at RSA height highlights this species as the most significant from a collision-risk perspective, warranting continued monitoring and assessment of turbine-specific risk patterns

4.2. Targeted Superb Parrot Surveys

Targeted surveys confirmed Superb Parrot use of the Bango WF site, with individuals and family groups observed moving through creek-lines and low-lying habitats. No carcasses were recorded and no breeding activity was confirmed during hollow inspections, although suitable hollows were present in areas where groups, including juveniles, were observed.

Given these results, there is no evidence that Superb Parrots are currently at elevated collision risk. Accordingly, ongoing incidental observations during routine monitoring are considered sufficient to detect any potential impacts. Targeted carcass searches and additional hollow-use investigations will only be required if a future impact trigger for Superb Parrot is met, in line with the BBAMP decision-making framework.

4.3. Bird Utilisation Surveys

The second year of Bird Utilisation Surveys (BUS) at Bango WF produced 6,487 observation records across 87 species, providing a comprehensive picture of bird activity and seasonal patterns at the site. These records represent detections of birds during survey sessions, and while they are presented as “individuals,” they may include repeated sightings of the same bird at different times and therefore reflect activity rather than absolute abundance.

Overall bird activity was dominated by a small number of common and generalist species. Australian Magpie was the most frequently recorded species (n = 1,072; 17% of all records), consistently abundant throughout the year and especially prominent at impact sites where it comprised 20% of observations. Sulphur-crested Cockatoo was most frequently recorded at reference sites (n = 373; 13%), while other abundant taxa included Yellow-rumped Thornbill,

Yellow-faced Honeyeater, Galah, Crimson Rosella, Common Starling, and Australian Raven. Together, the ten most abundant species contributed around two-thirds of all detections at impact sites and 70% at reference sites, demonstrating that although a wide range of species was recorded, bird activity was concentrated among a relatively small number of taxa.

Raptor activity was also notable, with 100 observation records from seven species. Wedge-tailed Eagle was the most frequently recorded raptor (60 records, including 50 at impact sites), followed by Nankeen Kestrel (22). These records highlight regular raptor use of the site, with eagles often observed flying at or above rotor swept area (RSA) height, bringing them into direct overlap with turbine operation. Other raptors such as Black-shouldered Kite, Black Kite, Brown Falcon, and Brown Goshawk were observed less frequently, and a single White-bellied Sea Eagle was recorded at a reference site. While these latter detections were limited, they confirm the presence of a broader raptor assemblage within the wind farm area.

Six threatened species listed as Vulnerable under the BC Act 2016 were also detected, totalling 93 observation records. Superb Parrot was the most prominent (n = 54), occurring across both impact and reference sites, while Varied Sittella was recorded 16 times exclusively in wooded impact locations. Other threatened species, including Flame Robin, Scarlet Robin, Speckled Warbler, and White-bellied Sea Eagle, were observed less frequently.

Flight height records showed that 143 birds (2% of all records) were observed at or above RSA, with Wedge-tailed Eagles accounting for the majority (58 records), followed by Australian Ravens (30), Sulphur-crested Cockatoos (10), and Straw-necked Ibis (17). Although relatively few birds were detected at these heights, the concentration of records among large soaring raptors is ecologically significant, reinforcing their status as the species group most at risk of turbine collision. Overall, the Year 2 BUS results demonstrate that bird activity at Bango WF is shaped by a small number of abundant generalists alongside key species of conservation and risk concern, with raptors, particularly Wedge-tailed Eagles and Nankeen Kestrels remaining central to impact assessment and ongoing monitoring.

4.4. Bat Activity survey

The bat activity surveys undertaken during Spring 2023, Summer 2024, and Autumn 2024 provide the first systematic dataset on microbat use of the Bango Wind Farm site. Across the three survey periods, more than 33,700 call sequences were identified, representing at least 11 species with definite records and additional probable or possible detections of several others. This richness is consistent with the range of habitats present across the site, including open farmland, woodland remnants, and riparian corridors, and demonstrates that the project area is regularly used by a diverse microbat community.

Activity patterns were strongly dominated by a small number of common species and complexes. The White-striped Freetail-bat (*Austronomus australis*) and Gould's Wattled Bat (*Chalinolobus gouldii*) consistently produced large volumes of calls across all seasons. Together with the Large Bent-winged Bat/Forest Bat (*Vespadelus spp.*) complex and the broader Forest Bat complex, these taxa accounted for the majority of detections in both survey campaigns. The sustained and widespread detections of White-striped Freetail-bat are particularly relevant, as its high-altitude, fast-flying behaviour places it at an elevated risk of collision with turbine blades. Gould's Wattled Bat, while more often active closer to vegetation edges, also displays flight characteristics that may overlap with the rotor swept area. These findings highlight that common and abundant species are likely to bear the greatest share of collision risk at the site.

Threatened species listed under the NSW BC Act were also detected, albeit at low levels. Eastern False Pipistrelle, Large Bent-winged Bat, and Southern Myotis were all confidently or probably identified in both survey periods, confirming their presence within the wind farm landscape. The Yellow-bellied Sheathtail-bat was only represented by a handful of possible calls during the Spring/Autumn surveys and was absent from the summer dataset, suggesting very limited use of the site.

Seasonal differences in activity were also evident. The spring and autumn surveys recorded higher overall call diversity, consistent with transitional periods when bat activity is typically elevated due to breeding, dispersal, and migratory behaviour. The summer survey confirmed high levels of activity by White-striped Freetail-bat, reinforcing its status as a species of interest, but did not reveal any new threatened taxa beyond those already detected. These seasonal variations align with broader ecological patterns observed in temperate Australia, where bat activity peaks in warmer months when insect availability is high.

Taken together, bat activity surveys indicate that the Bango WF supports a diverse assemblage of microbats, dominated by a few common species that are most likely to be affected by turbine operation. The consistent presence of threatened species, even at low levels, emphasises the need for continued monitoring. Additionally, the regular activity of White-striped Freetail-bat, combined with its susceptibility to rotor blade strike, highlights this species as a priority for future impact assessment and adaptive management.

4.5. Statistical Analysis

Cumulative mortality estimates for the first two years of BBAMP implementation at Bango WF were generated using a Monte Carlo framework that corrects observed carcass counts for searcher efficiency, carcass persistence, survey coverage, and survey design. Separate estimates were produced for bats, birds (excluding Wedge-tailed Eagle), and Wedge-tailed Eagle.

The cumulative bat mortality estimate across all survey types was a median of 3,719 individuals (95% upper: 5,985). When the analysis was restricted to standard monthly surveys only, the estimated median increased to 4,287 (95% upper: 6,345). As highlighted by Symbolix, the ~13% reduction when incorporating all survey effort occurs because targeted and trigger surveys produced fewer detections relative to effort. This provides additional evidence that the true strike rate is lower than would be inferred from standard surveys alone. White-striped Free-tailed Bat remains the dominant species contributing to these totals.

For birds (excluding Wedge-tailed Eagle), the cumulative all-surveys estimate was a median of 3,084 individuals (95% upper: 4,445), compared with 4,277 (95% upper: 6,584) from standard surveys only. The inclusion of all survey effort therefore reduced the central estimate by ~28%. This mirrors the pattern observed for bats, where additional targeted and trigger surveys yielded relatively few carcasses, which in turn moderated the overall mortality estimates. Bird mortality is dominated by common farmland species, with Nankeen Kestrel accounting for a disproportionate share of detections.

Unlike bats and other birds, Wedge-tailed Eagle mortality was assessed by year. For Year 1, the estimated median was 13 individuals (95% upper: 16) from 11 observed carcasses. For Year 2, the estimate was lower at 8 individuals (95% upper: 11) from six observed carcasses. These estimates confirm low but persistent eagle strike risk, with values consistent with other Australian wind farms where eagle collisions occur infrequently but recurrently.

The statistical analysis indicates that:

- Bat mortality is higher than bird mortality in absolute terms, driven primarily by White-striped Free-tailed Bat, but is moderated when all survey effort is considered.
- Bird mortality remains substantial and largely reflects common open-country species, particularly Nankeen Kestrel, with lower overall estimates once targeted and trigger surveys are included.
- Wedge-tailed Eagle mortality is low but persistent, with consistent evidence across both years.

Overall, incorporating all survey effort produced lower cumulative mortality estimates for bats and birds compared with standard surveys alone. This reflects the contribution of additional survey data that demonstrate fewer detections per unit effort, thereby constraining the modelled totals. These results highlight persistent species-specific risks (kestrels, WSFTB, eagles) while providing a robust quantitative basis for adaptive management under the BBAMP.

4.6. Between-years Comparison

The first two years of BBAMP implementation at Bango WF provide an emerging picture of inter-annual variation in wildlife mortality and turbine interactions. Across all survey types, a total of 273 bird and bat mortalities were recorded during Year 1 (August 2023–July 2024) compared to 216 during Year 2 (August 2024–July 2025), representing a decline of approximately 21%. This reduction was driven primarily by lower numbers of bat mortalities, while bird mortalities remained relatively stable between the two years.

The top 10 species accounted for 356 of the 489 total mortalities (73%), indicating that a relatively small subset of species dominates turbine interactions (Table 21). White-striped Free-tailed Bat was the most frequently recorded species overall (n = 85), followed by Unknown Bat sp. (n = 60) and Nankeen Kestrel (n = 33). The consistent appearance of these taxa across both years highlights predictable, species-specific risks that are central to BBAMP implementation and adaptive management.

Table 21: Top 10 species recorded at Bango WF during Year 1 and Year 2 of BBAMP implementation

Species	Year 1 mortalities	% of Year 1 total mortalities	Year 2 mortalities	% of Year 2 total mortalities	Combined Total mortalities	% of grand total
White-striped Free-tailed Bat	53	19.41%	32	14.81%	85	17.38%
Unknown Bat sp.	28	10.26%	32	14.81%	60	12.27%
Nankeen Kestrel	7	2.56%	26	12.04%	33	6.75%
Little Forest Bat	12	4.40%	20	9.26%	32	6.54%
Crimson Rosella	16	5.86%	16	7.41%	32	6.54%
Unknown Bird sp.	20	7.33%	7	3.24%	27	5.52%
Forest Bat sp.	24	8.79%	0	0.00%	24	4.91%
Eastern Rosella	15	5.49%	8	3.70%	23	4.70%
Grey Fantail	6	2.20%	15	6.94%	21	4.29%
Free-tailed bat sp.	14	5.13%	5	2.31%	19	3.89%

Bird mortalities totalled 117 in Year 2 compared to 120 in Year 1, indicating a broadly consistent level of impact. Several species were represented in both years, including Crimson Rosella, Grey Fantail, Australian Magpie, and Nankeen Kestrel, suggesting repeated interaction with WTG across seasons. Notably, Nankeen Kestrel mortalities were higher in Year 2 (26 compared to 15 in Year 1), demonstrating a clearer pattern of site-level susceptibility. Grey Fantail also featured more prominently in Year 2, with a marked mortality event in April 2025 likely linked to migratory passage, whereas its presence in Year 1 was more sporadic. Wedge-tailed Eagle mortalities remained consistent across years, confirming their continued risk despite relatively low numbers overall.

Bat mortalities, by contrast, decreased from 153 in Year 1 to 99 in Year 2, accounting for nearly the entire reduction in total records between years. The White-striped Free-tailed Bat remained the most frequently recorded species in both years, but Year 2 records were more temporally clustered, with clear peaks in autumn and early summer. Little Forest Bat mortalities were also reduced in Year 2 relative to Year 1, though still widely distributed across WTG. Importantly, the Yellow-bellied Sheathtail-bat, a species of conservation concern, was recorded as a mortality in Year 2, but not in Year 1. This demonstrates that even with reduced overall bat detections, risk to threatened species persists.

Differences in survey effort also influenced the comparison between years. Year 2 included a higher level of targeted and trigger searches, particularly in response to species-specific impact triggers. This increased search intensity at certain WTG likely contributed to higher detection rates for some species, particularly kestrels and fantails, and must be considered when interpreting annual variation. At the same time, the overall decline in bat records across two full years of monitoring suggests that inter-annual variation in activity, influenced by environmental conditions such as climate and prey availability, may be an important driver of observed mortality rates.

Taken together, the two years of data indicate that while bird mortalities remain steady, bat mortalities can fluctuate substantially, and both groups include species of particular concern. Continued monitoring over additional years will be essential to confirm whether the lower bat mortality recorded in Year 2 represents a genuine decline or simply annual variability, and to refine the understanding of species-specific and turbine-specific risk patterns at Bango WF.

4.7. Species identified as *'at risk'*

The second year of BBAMP implementation at Bango WF yielded clear, species-specific patterns in mortality and activity that, considered alongside Year 1, help identify those taxa most at risk of turbine interactions on this site. Below we summarise the Bango WF evidence for each focal species and interpret it in the context of published research, noting where variation in search effort or targeted/trigger searches may have contributed to spatial or temporal clustering of records.

4.7.1. Nankeen Kestrel (Falco cenchroides)

Over the first two years of BBAMP implementation at Bango WF, 33 Nankeen Kestrel (NK) mortalities were recorded, with 7 in Year 1 and 26 in Year 2. This makes the kestrel the most frequently recorded bird mortality at the wind farm to date. Mortalities were spread across 22 different WTG, reflecting the species' broad use of the site, but with repeated incidents at WTG 1, 2, 3, 19, 27, and 44. These localised clusters suggest that particular parts of the wind farm present

consistently higher risk, possibly reflecting habitat features that attract kestrels to hunt in close proximity to WTG (Figure 15).

Temporal trends show clear peaks during March and April of Year 2, when 19 incidents were recorded (Appendix 1). These months coincide with the breeding season's conclusion and the onset of juvenile dispersal, when flight activity is typically heightened and young, inexperienced birds may be at greater risk of collisions. Additional mortalities in late spring and early summer (November–December) reinforce the idea that seasonal breeding and dispersal cycles strongly shape risk exposure for this species at Bango WF.

Data from BUS provide valuable context. Across both years, kestrels were consistently recorded at impact and reference sites, with Year 2 surveys documenting 22 individuals and confirming the species' regular use of the wind farm. Unlike wedge-tailed eagles, kestrels are not restricted to ridgeline soaring but frequently hover and hunt at rotor-swept height over open paddocks. Their preference for open farmland with short ground cover corresponds closely with the cleared pasture that dominates much of the Bango WF footprint. The strong overlap between preferred hunting zones and turbine placement appears to underpin the persistent interaction risk.

These findings are consistent with broader research noting that kestrels are one of the more collision-prone raptor species in agricultural landscapes with wind farms (de Lucas et al. 2008; Hull et al. 2013). Their flight behaviour, frequent hovering and slow forward movement at rotor height, creates elevated exposure compared to other small raptors. At Bango WF, the increase from 7 mortalities in Year 1 to 26 in Year 2 indicates that collision risk is persistent and possibly influenced by inter-annual variation in prey abundance or breeding success, both of which can alter kestrel activity levels across farmland habitats.

The NK heatmap indicates that activity is broadly distributed across the Bango WF site but with consistently higher concentrations around turbines in the central and eastern portions of the development corridor. These areas correspond to open farmland and ridgeline habitats that provide suitable foraging opportunities, with kestrels frequently recorded hovering and hunting at rotor-swept height. The clustering of activity across multiple turbines supports the mortality data, which shows repeated incidents at several central turbines, suggesting that collision risk for kestrels is not random but linked to site features that promote persistent use of these spaces (Figure 15).

Although the NK remains one of Australia's most widespread and secure raptors, the concentration of mortalities at Bango WF highlights that certain wind farm layouts and habitats create consistent localised risks for this species. WTG with multiple incidents (e.g., 1, 2, 3, 19, 27, and 44) represent potential risk hotspots where turbine placement and preferred foraging habitat intersect. Ongoing monitoring of these WTG is warranted to confirm whether elevated collision rates persist and to inform any adaptive management responses.

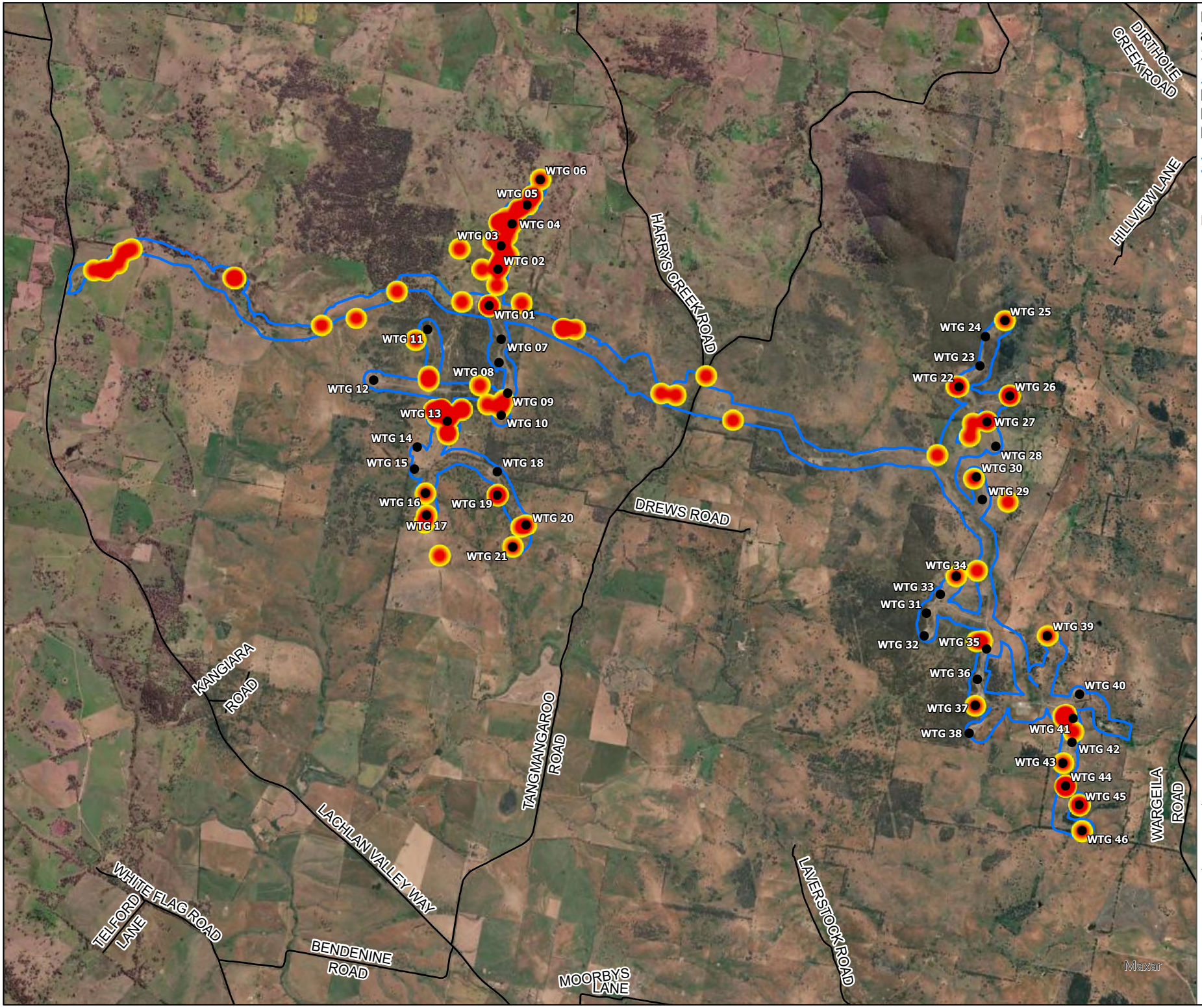

Figure 15: **Nankeen Kestrel activity** at Bango WF (Yr 1 and 2)

Project No: 18173_07
Project: Bango Wind Farm
Date: 19/09/2025

Development corridor

Turbine

Nankeen Kestrel Activity

Activity

High activity

N

Kilometres

0 0.5 1 1.5 2 2.5

GDA 1994 MGA Zone 55

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4.7.2. Wedge-tailed Eagle (Aquila audax)

Across the first two years of BBAMP implementation at Bango WF, 18 Wedge-tailed Eagle (WTE) mortalities were recorded, with 12 in Year 1 and 6 in Year 2. Mortalities occurred throughout the monitoring year but showed seasonal clustering, particularly in May and during the spring months of September–November, when nine incidents were documented. This temporal spread suggests that collision risk is not confined to a single season but may intensify at times of increased eagle activity, such as during juvenile dispersal in spring and early summer (Ritchie et al. 2021).

The turbine-level distribution of mortalities was broad, yet concentrated patterns are evident. Four incidents were recorded at WTG 37, and additional repeated mortalities occurred at WTG 25, 32, and 39. Collectively, these four WTG accounted for nearly half of all eagle mortalities at Bango WF across both years. These machines are situated in the south-eastern portion of the wind farm, an area characterised by elevated ridgelines and open slopes that provide strong uplift and visibility for soaring raptors. Such topographic features are known to concentrate eagle flight paths and increase overlap with turbine RSA, as has been documented at other wind farms in southeastern Australia (Hull et al. 2013; Ritchie et al. 2021).

Flight observations during BUS and incidental monitoring confirm this pattern. In Year 2 BUS, 57 of 60 eagle observation events were at or above RSA height, with frequent soaring along ridgelines that intersect the turbine array. Incidental monitoring similarly showed eagles disproportionately using airspace at rotor height. The combined evidence indicates that eagles repeatedly exploit local wind conditions in these areas, and WTG positioned along these ridgelines are consequently exposed to elevated interaction risk.

Ecologically, the recurrence of carcasses at a limited number of WTG reflects predictable eagle behaviour. WTE are territorial, wide-ranging hunters that patrol established flight corridors across open landscapes (Ritchie et al. 2021). At Bango WF, WTG in the south-east coincide with these corridors, where prey availability on cleared farmland further encourages repeated use of the same airspace. The result is a spatially concentrated but persistent pattern of collisions that is unlikely to diminish naturally, given the species' behavioural ecology.

The Wedge-tailed Eagle heatmap highlights localised hotspots of activity, particularly along the central and north-eastern ridgeline of the wind farm. These areas align with prominent topographic features that provide strong uplift and soaring opportunities (Hull et al. 2013). While eagle activity is more spatially restricted than kestrels, the overlap with turbines on these ridgelines increases collision exposure, consistent with the small but persistent number of eagle carcasses detected during Years 1–2. The concentration of eagle flight paths within predictable zones suggests that risk management should remain focused on turbines situated along these uplift corridors (Figure 16).

Although the total number of mortalities (18 across two years) is relatively low compared to the regional population size, each incident carries ecological weight due to the eagle's long lifespan, delayed maturity, and low annual reproductive output (Ritchie et al. 2021). The repeated overlap of eagle flight paths with WTG 25, 32, 37, and 39 indicates that these WTG represent consistent risk points within the Bango WF landscape. Ongoing monitoring should therefore prioritise these WTG as focal locations for detecting potential changes in eagle activity and evaluating the effectiveness of any adaptive management responses.

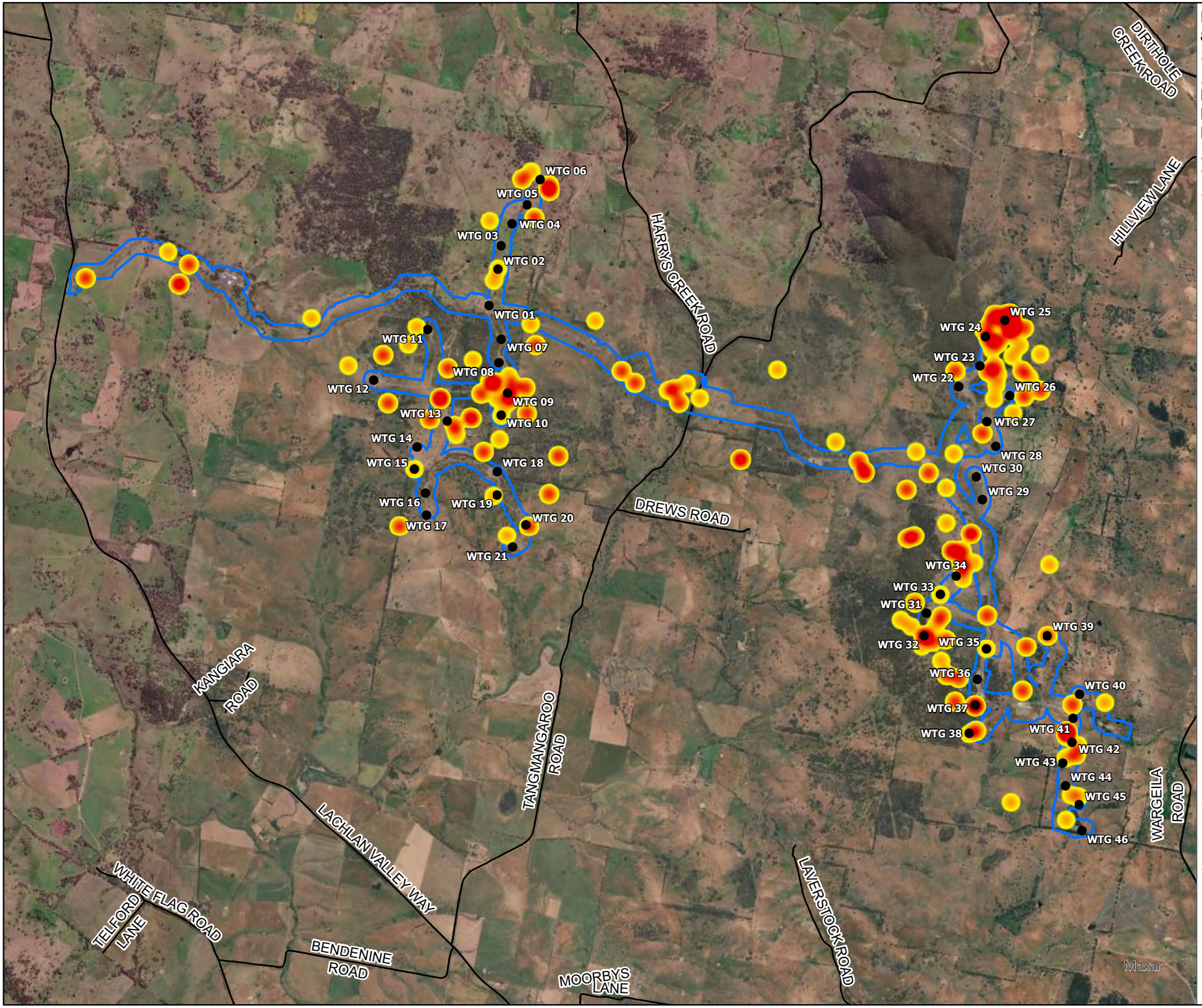

Figure 16: **Wedge-tailed Eagle activity** at Bango WF (Yr 1 and 2)

Project No: 18173_07
Project: Bango Wind Farm
Date: 19/09/2025

Development corridor
Road name extent
Turbine

Wedge-tailed Eagle activity

Activity
High activity

N
Kilometres
0 0.5 1 1.5 2 2.5
GDA 1994 MGA Zone 55

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4.7.3. White-striped Free-tailed Bat (Austronomus australis)

Across the first two years of BBAMP implementation at Bango WF, 85 White-striped Free-tailed Bat (WSFTB) mortalities were recorded, comprising 53 in Year 1 and 32 in Year 2. This species was consistently the most frequently recorded bat mortality at the site, highlighting its persistent vulnerability to turbine interactions. Mortalities occurred in most months of the year but were strongly concentrated in January–April and again in December, when 79% of all incidents were documented. The seasonal pattern aligns with known peaks in WSFTB activity during late summer and early autumn, associated with breeding, dispersal, and migratory movements across temperate southeastern Australia (Rhodes & Catterall 2008; O'Shea et al. 2016).

Spatially, mortalities were widely distributed across the wind farm, being recorded at 31 different WTG, but with repeated detections at WTG 1, 2, 6, 16, 17, 32, 37, 39, and 45. Each of these WTG accounted for four or more incidents across the two years, and collectively they represented more than one-third of all WSFTB mortalities. These WTG are situated along prominent ridgelines or adjacent open slopes where bats exploit uplift and foraging opportunities. The recurrence of carcasses at the same machines across both years indicates that collision risk is not randomly distributed but instead reflects consistent patterns of habitat use and flight behaviour.

The high incidence of WSFTB mortalities at Bango WF is consistent with broader research demonstrating the species' elevated susceptibility to wind turbine strike compared with other microbats. WSFTB is a fast-flying, open-air forager that frequently operates at heights within or above the RSA, particularly during migration or dispersal flights (Law & Chidel 2006; Hull & Cawthen 2013). Carcass detections at Bango WF mirror this ecology, with peak mortalities in January–April likely linked to seasonal long-distance movements that bring large numbers of individuals through the site. The species' echolocation call structure, optimised for open air, may further reduce its ability to detect and avoid turbine blades, compounding collision risk (see also Adams et al. 2015).

From a population perspective, WSFTB is considered one of the most common and widespread bat species in southeastern Australia, occurring in a wide range of open habitats and often in high local abundance (Law & Chidel 2006). This broad distribution and generalist ecology suggest that regional populations are unlikely to be at immediate risk from mortality at a single wind farm. However, the consistently high number of carcasses detected at Bango WF underscores the species' disproportionate exposure to turbine strike relative to other bats. At present, there is insufficient data to determine whether turbine-related mortality is having a measurable impact on WSFTB populations at a landscape scale (O'Shea et al. 2016). The persistence of annual mortality events highlights the importance of continued monitoring to establish whether these losses are sustainable within the species' broader population dynamics.

In summary, although WSFTB is not a listed threatened species, its repeated and frequent appearance in the Bango WF dataset over two years demonstrates that it represents the single greatest species-specific bat risk at the site. Recurrent detections at specific WTG further highlight predictable hotspots of interaction, particularly during the summer–autumn period, and reinforce the need for WSFTB to remain a focal species for ongoing monitoring and adaptive management.

4.7.4. White-throated Needletail (Hirundapus caudacutus)

Across the first two years at Bango WF, White-throated Needletail (WTNT) mortalities were few in number but tightly clustered in time, occurring only in December 2023 – February 2024 with multiple incidents in January and February. Carcasses were spread across several machines (T10,

T14, T22, T32, T37), with no single turbine dominating. That pattern points to episodic, weather-driven exposure rather than fixed flight corridors: when the right conditions arrive, flocks pass broadly across the site and a subset of birds intersect the RSA.

This temporal signal aligns closely with well-described White-throated Needletail (WTNT) behaviour. WTNT are aerial insectivores that track wind and thermal structure at landscape scales (Tarburton 2021). During thunderstorms and pre-/post-frontal systems with strong up- and downdrafts, three ingredients rise together: uplift, outflow boundaries, and dense aerial insect layers. WTNT flock to these features, often forming fast-moving, low- to mid-altitude feeding swarms beneath cloud bases and along storm gust fronts (Tarburton 2021). Over hilly terrain, orographic lift on windward slopes can provide a stationary "escalator" that birds repeatedly ride while foraging (Tarburton 2021). The combination of convective uplift and ridge lift can draw large, rapidly circulating flocks into the rotor-swept envelope for extended periods, increasing collision probability over hours rather than minutes. This mechanism neatly explains Bango's summer-only mortalities and the broad turbine spread: risk switches on during storm windows and is shared across any WTG intersecting the moving foraging mass.

Standard BUS vantage counts did not record WTNT, reflecting the species' highly variable and weather-dependent occurrence (Tarburton 2021). Carcass data therefore provide the most reliable evidence of exposure risk at the site, pinpointing summer convective conditions as the key window of vulnerability. While overall mortality numbers remain low, the species' conservation status (Vulnerable under the EPBC Act and NSW BC Act) means that even infrequent turbine interactions require careful monitoring (NSW DCCEEW 2025).

For Year 3, these insights support a shift from purely schedule-based effort to event-triggered effort layered on top of the routine program. The objective is to sample when risk is actually elevated, and to do so in a way that is safe, repeatable, and analytically useful. The following approach keeps the focus squarely on Bango's observed pattern while drawing on the species' known storm-associated ecology.

The species breeds exclusively in the Northern Hemisphere and migrates to Australia during the non-breeding season, with national population size and trends remaining uncertain (Higgins 1999; del Hoyo, Elliott & Christie 2004; Yamaguchi et al. 2021). Although the infrequent detections at Bango WF are unlikely to represent a significant impact in isolation, cumulative mortality across wider region along the migratory corridor may pose a risk that cannot yet be quantified (Tarburton 2021). Continued monitoring during summer storm periods is therefore critical to improve understanding of WTNT exposure and to support adaptive management in line with the BBAMP decision-making framework.

5. Summary and Recommendations

The second year of BBAMP implementation at Bango WF (August 2024 – July 2025) recorded a total of 216 bird and bat mortalities across all survey types. Bird mortalities (n = 117) remained consistent with Year 1 (n = 120), while bat mortalities decreased from 153 in Year 1 to 99 in Year 2, representing a ~35% decline. Despite this reduction, several species showed repeated turbine interactions, and two impact triggers were activated during the reporting year.

Key findings include:

- Bird mortality: Similar across two years, with Nankeen Kestrel (*Falco cenchroides*) the most frequently recorded bird (26 mortalities in Year 2). Mortalities were widely distributed but concentrated at WTG 1, 2, 3, 26, 27 and 44. Grey Fantail (*Rhipidura albiscapa*) triggered a non-threatened species impact response in April 2025.
- Bat mortality: Overall decrease in Year 2, but White-striped Free-tailed Bat (*Austronomus australis*) remained the most frequently recorded species (32 detections), with mortalities concentrated during late summer–autumn. A threatened species trigger was recorded for Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*) in March 2025.
- White-throated Needletail (*Hirundapus caudacutus*): Few but clustered mortalities were recorded in Year 1, confined to summer storm periods, consistent with known storm-associated foraging behaviour. No additional carcasses were detected in Year 2.
- Superb Parrot (*Polytelis swainsonii*): Individuals and family groups were observed during targeted surveys, including juveniles near potential hollows. No mortalities were recorded, and no breeding activity was confirmed during surveys.
- Raptors: Eight species were observed, with Wedge-tailed Eagle (*Aquila audax*) and Nankeen Kestrel most frequently recorded. Mortality of eagles remained low compared to overall mortality but persistent.

Based on outcomes from Years 1–2 of BBAMP implementation at Bango WF and regulatory feedback, the following recommendations guide Year 3 implementation:

- *White-striped Free-tailed Bat (WSFTB):*

  Maintain systematic 60 m carcass searches at all turbines from November 2025 to April 2026 using scent-detection dogs, given this species' consistency in mortality data. If elevated mortality is detected at a specific turbine, consider targeted turbine feathering during peak activity periods. Where feathering trials are implemented, data should be collected to evaluate effectiveness, with results summarised in monthly reporting.

- *Nankeen Kestrel:*

  Carcass data across the first two years show that 20 of 33 mortalities were detected within 60 m of turbines, and 25 within 80 m. Accordingly, systematic 60 m searches should continue, supplemented by dog-assisted surveys that may extend detections to ~80 m. Opportunistic recording of kestrel flight paths should be undertaken whenever field staff are on site to improve understanding of site use.

- Wedge-tailed Eagle (WTE):

  Continue targeted 100 m carcass searches at all turbines twice per BBAMP implantation year as WTE carcass are expected to persist for longer duration in the field. Triggers should be set at ≥4 mortalities detected within either the eastern (T1–21) or western (T22–46) WTG groups. Trigger responses should include targeted surveys of the affected area, assessment of nearby nests and breeding activity, and evaluation of juvenile dispersal within adjacent woodland. Opportunistic recording of flight paths should be undertaken whenever field staff are on site to improve understanding of site use.

- White-throated Needletail (WTNT):

  Adopt a weather-responsive monitoring protocol to address the species' storm-associated risk profile.

  Vantage surveys: Conduct storm-front vantage point surveys from November to March, focusing on December–February when exposure is highest. The vantage point surveys should be scheduled based on forecast or observed thunderstorms, unstable weather conditions, or radar-indicated cells within ~30–50 km of the site. Surveys should capture flock size, flight height, behaviour, weather variables, and insect activity.

  Carcass searches: Pair storm-front vantage surveys with rapid post-storm 60 m carcass searches at turbines likely to intersect flocks, prioritising windward ridgelines and machines with prior WTNT incidents.

  Reporting: Summarise WTNT carcasses and observations alongside weather context in Year 3 reporting to refine risk attribution and support adaptive management.

- Acoustic Monitoring to provide:

  Deploy six detectors across three periods to record bat activity, with data analysed to refine understanding of species composition, seasonal activity, and overlap with turbine operations.

- Reporting:

  Monthly reporting of all surveys conducted to Bango WF in Year 3.

  Prepare a consolidated Year 3 Annual Report that addresses regulator feedback, presents cumulative analyses, evaluates trigger responses, and makes evidence-based recommendations for future BBAMP implementation.

- Include an initial assessment step in trigger responses for threatened species before commencing a six-week intensive search. Following a trigger, first investigate species presence, behaviour, and relevant site conditions (e.g. WTE nesting or breeding activity surveys). Based on these findings, determine whether a six-week intensive search is appropriate or if alternative targeted surveys would be more effective. This approach allows flexibility, acknowledging that past six-week searches have been both effective (e.g. WTNT) and ineffective (e.g. YBSB).

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Appendix 1: Detailed Mortality Data August 2024 – July 2025

Month	Date	Common Name	Scientific Name	Carcass type	*Find Refence	Turbine number	Distance from turbine (m)	Bearing from turbine (°)	Notes	Search type
August	13/08/2024	Australian Wood Duck	*Chenonetta jubata*	Feather Spot	FS24.08.01	37	106	316	Three larger feathers, one small feather, several downy feathers, < than 1 week old	Initial
August	13/08/2024	Australian Wood Duck	*Chenonetta jubata*	Bird	C24.08.01	37	122	205	skeletal head attached, one wing attached with < 10 feathers attached, 2-3 weeks old	Initial
August	13/08/2024	Nankeen Kestrel	*Falco cenchroides*	Bird	C24.08.02	45	66	125	Entire bird, one wing detached, appears less than 48 hrs old	Initial
August	14/08/2024	Australian Magpie	*Gymnorhina tibicen*	Bird	C24.08.03	11	113	322	One wing with most black and white feathers attached, bone and sinew, 1 week old	Initial
August	14/08/2024	Eastern Rosella	*Platycercus eximius*	Feather Spot	FS24.08.02	10	14	230	Four large feathers, two feathers with blue, green and grey, two feathers with blue, dark grey, with blue, light blue and white tip	Initial
August	15/08/2024	Nankeen Kestrel	*Falco cenchroides*	Feather Spot	FS24.08.03	16	122	288	Around 10 small feathers, small clump of downy feathers, four feathers around 8cm in length	Initial
September	16/09/2024	Crimson Rosella	*Platycercus elegans*	Feather Spot	FS24.09.01	24	80	2	Around 10 small feathers, small downy feathers, grey and red/dark grey and blue/ dark grey, blue and red/dark and light grey, <1 week old.	Initial
September	17/09/2024	Unknown Bat sp.	*n/a*	Bat	C24.09.01	2	60	183	FA 58, very decomposed, no head, fur or tail membrane, bones of rib cage, > 3 weeks old.	Initial
September	17/09/2024	Unknown Bat sp.	*n/a*	Bat	C24.09.02	2	57	191	FA 61, no body, head or tail membrane, just forearm and some wing, > 2 weeks old	Initial
September	17/09/2024	Galah	*Eolophus roseicapilla*	Feather Spot	FS24.09.01	3	57	180	collection of downy feathers	Superb Parrot - Targeted searches
September	18/09/2024	Crimson Rosella	*Platycercus elegans*	Feather Spot	FS24.09.02	10	120	62	Clump of downy feathers, grey and red feathers mixed up with sheep wool	Initial

Month	Date	Common Name	Scientific Name	Carcass type	*Find Refence	Turbine number	Distance from turbine (m)	Bearing from turbine (°)	Notes	Search type
September	18/09/2024	White-throated Gerygone	*Gerygone olivacea*	Bird	C24.09.03	10	92	168	Whole body, intact, < 1 week old.	Initial
September	18/09/2024	Unknown Bat sp.	*n/a*	Bat	C24.09.04	13	61	175	FA 60, no body, head or tail membrane, just FA and both wings found <1m of each other, 2-3 weeks old	Initial
September	18/09/2024	Crimson Rosella	*Platycercus elegans*	Feather Spot	FS24.09.03	16	16	81	One wing, > 20 downy feathers, several larger feathers	Initial
September	18/09/2024	Little Corella	*Cacatua sanguinea*	Bird	C24.09.01	17	45	210	part of wing with skeletal remains	Superb Parrot - Targeted searches
September	18/09/2024	Crimson Rosella	*Platycercus elegans*	Feather Spot	FS24.09.02	19	57	135	part of wing with no skeletal remains	Superb Parrot - Targeted searches
September	19/09/2024	White-winged Chough	*Corcorax melanorhamphos*	Bird	C24.09.03	12	5	180	Whole body, intact, < 1 week old.	Superb Parrot - Targeted searches
September	19/09/2024	Unknown Bird sp.	*n/a*	Feather Spot	FS24.09.03	5	60	90	small collection of grey down feathers	Superb Parrot - Targeted searches
September	19/09/2024	Wedge-tailed Eagle	*Aquila audax*	Bird	C24.09.04	25	35	180	most of body and head, eaten and rotted (dry) - skeletal remains and feathers	Superb Parrot - Targeted searches
September	20/09/2024	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C24.090.05	2	50	16	Entire bat, fully intact FA58, Tail extends beyond membrane, Two white stripes where torso meets wings, 24 hours old	Pulse
September	20/09/2024	Galah	*Eolophus roseicapilla*	Bird	C24.09.05	42	31	135	Whole body > 1 week old.	Superb Parrot - Targeted searches
September	20/09/2024	Wedge-tailed Eagle	*Aquila audax*	Bird	C24.09.06	39	50	180	Whole body, skeletal components visible > 1 week old.	Superb Parrot -

Month	Date	Common Name	Scientific Name	Carcass type	*Find Refence	Turbine number	Distance from turbine (m)	Bearing from turbine (°)	Notes	Search type
										Targeted searches
October	8/10/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.10.01	6	97	109	FA 31mm, bicolour - small body, dark base and light brown on outside, tail fully enclosed within membrane, round ears, <2 days old, body intact and limp	Initial
October	8/10/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.10.02	6	43	109	FA 31mm, bicolour - small body, dark base and light brown on outside, tail fully enclosed within membrane, round ears, bones visible underside, > 3 weeks old	Initial
October	8/10/2024	Grey Fantail	*Rhipidura albiscapa*	Bird	C24.10.03	6	104	255	Body intact, no feathers on head, skull visible, < 3 days old, maggots present.	Initial
October	9/10/2024	Unknown Bat sp.	*n/a*	Bat	C24.10.04	24	46	131	FA 29mm, no tail, no membrane, fur has dark base, underside fur has dark base and light cream colour, wings damaged, decomposed, > 3 weeks old	Initial
October	9/10/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.10.05	30	39	170	FA 29mm, fur has dark base, underside fur has dark base and light cream colour, tail fully enclosed within membrane, round ears, 48 hours old, limp	Initial
October	9/10/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.10.06	30	67	136	FA 29mm, dark base and light brown on underside with dark base fur, tail fully enclosed within membrane, round ears, 48 hours old, limp	Initial
October	9/10/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.10.07	31	37	151	FA 27mm, small body, dark base and light brown on underside with dark base fur, tail fully enclosed within membrane, round ears, < 3 days old, limp and maggots	Initial
October	10/10/2024	Eastern Rosella	*Platycercus eximius*	Feather Spot	FS24.10.01	41	98	286	Feather spread = 50 cm, > 20 downy feathers, grey with red tips, > 20 downy feathers, grey with	Initial

Month	Date	Common Name	Scientific Name	Carcass type	*Find Refence	Turbine number	Distance from turbine (m)	Bearing from turbine (°)	Notes	Search type
									yellow, green red tips, >10 med size feathers grey with blue tips	
October	10/10/2024	Unknown Bat sp.	*n/a*	Bat	C24.10.08	11	26	148	Two small bones, part of a wing, no tissue	Pulse
October	11/10/2024	Unknown Bird sp.	*n/a*	Bird	C24.10.09	6	57	218	One small leg with claw (3 nails) and a small clump (approx. diameter 2 cm) of black downy feathers attached to it, > 3 weeks old	Pulse
October	22/10/2024	Unknown Bat sp.	*n/a*	Bat	C24.10.10	5	32	265	One FA 60mm, one piece of wing bone, no membrane, no other features, > 3 weeks old	Superb Parrot - Targeted searches
October	22/10/2024	Fan-tailed cuckoo	*Cacomantis flabelliformis*	Bird	C24.10.11	1	79	12	Several feathers, dark grey with barred black and white, rufous and dark grey, > 2 weeks old,	Superb Parrot - Targeted searches
October	22/10/2024	Unknown Bat sp.	*n/a*	Bat	C24.10.12	14	80	160	FA 32mm, tail extends beyond membrane, head/face not visible, fur unable to describe as bat was run over	Superb Parrot - Targeted searches
October	22/10/2024	Unknown Bat sp.	*n/a*	Bat	C24.10.13	14	58	214	FA 31mm, head and tail not present, fur light grey /brown in colour and highly matted, > 1 week old	Superb Parrot - Targeted searches
October	23/10/2024	Free-tailed bat sp.	*Ozimops sp.*	Bat	C24.10.14	23	44	148	Entire bat body intact, < 24 hours old, FA 35mm, tail extends beyond membrane, grey fur	Superb Parrot - Targeted searches
October	23/10/2024	Unknown Bat sp.	*n/a*	Bat	C24.10.15	27	66	220	FA 29, body heavily no other distinguishing features as body heavily decomposed and shrivelled including tail, no head	Superb Parrot - Targeted searches
October	23/10/2024	Crimson Rosella	*Platycercus elegans*	Bird	FS24.10.02	27	82	182	One wing with 6 primary blue and dark grey feathers and 4 blue and dark grey primary coverts, > 30 grey with red tip downy feathers,	Superb Parrot - Targeted searches

Month	Date	Common Name	Scientific Name	Carcass type	*Find Refence	Turbine number	Distance from turbine (m)	Bearing from turbine (°)	Notes	Search type
									hollow bearing tree with rosellas nesting <25 m away from find	
October	23/10/2024	Crimson Rosella	*Platycercus elegans*	Bird	FS24.10.03	27	66	217	One wing with 6 primary blue and dark grey feathers, 6 secondary blue and dark grey feather, hollow bearing tree with rosellas nesting <25 m away from find.	Superb Parrot - Targeted searches
October	24/10/2024	Unknown Bird sp.	*n/a*	Bird	C24.10.16	44	105	179	Part of wing with flight feathers, primaries dark/black, wing lining white, secondaries tip half white, base half black	Superb Parrot - Targeted searches
October	24/10/2024	Brown Falcon	*Falco berigora*	Bird	C24.10.18	44	30	183	Entire bird carcass intact, < 48 hrs old	Superb Parrot - Targeted searches
October	24/10/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.10.17	38	39	187	FA 29 mm, body, head and wings intact, tail enclosed in membrane, dark base and grey fur on underside, dark base and brown fur on top of body, > 2 weeks old.	Superb Parrot - Targeted searches
October	25/10/2024	Red wattlebird	*Anthochaera carunculata*	Bird	C24.10.19	19	110	180	Entire body intact, < 24 hours old.	Superb Parrot - Targeted searches
November	11/11/2024	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C24.11.01	6	22	3.1	FA 43mm, tail extends membrane, round ears, stiff body, brown under, dark fur on top, 1 weel old	Initial
November	11/11/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.11.02	13	39	97	FA 30mm, fur has dark base, underside fur has dark base and light cream colour, tail fully enclosed within membrane, small part of body eaten, > 1week old,	Initial
November	12/11/2024	Unknown Bat sp.	*n/a*	Bat	C24.11.03	24	12	42	small flat body part of bat, possibly ear, 2 x 1.5 in diameter	Initial
November	12/11/2024	Unknown Bat sp.	*n/a*	Bat	C24.11.04	30	18	327	Arm and third finger only. No other features.	Initial

Month	Date	Common Name	Scientific Name	Carcass type	*Find Refence	Turbine number	Distance from turbine (m)	Bearing from turbine (°)	Notes	Search type
November	12/11/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.11.05	31	70	50	FA 29 mm, small body and head intact, tail enclosed in membrane, dark base and grey fur on underside, dark base and brown fur on top of body, > 1 weeks old, stiff and dry	Initial
November	12/11/2024	Wedge-tailed Eagle	*Aquila audax*	Bird	C24.11.06	37	64	171	Head missing, body stiff, rest of body intact, > 2 weeks old	Initial
November	12/11/2024	Wedge-tailed Eagle	*Aquila audax*	Bird	C24.11.07	37	49	191	Entire body intact, stiff, squashed, > 1 week old.	Initial
November	12/11/2024	Unknown Bat sp.	*n/a*	Bat	C24.11.08	37	18	76	Dried up small body with no head, tail or any distinguishing features, fur dark base and grey tips, part of finger, just bone with very dry webbing	Initial
November	13/11/2024	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C24.11.09	45	19	107	FA 48mm, entire bat, fully intact, tail extends beyond membrane, two white stripes where torso meets wings, body soft, maggots present, 1-3 days old.	Initial
November	13/11/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.11.10	26	57	1.5	FA 28mm, small part of body eaten, tail enclosed in membrane, dark base and grey fur on underside, dark base and brown fur on top of body, > 2 weeks old.	Initial
November	14/11/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.11.11	18	35	258	FA 28 mm, tail enclosed in membrane, body squashed and full of gravel, dark base and brown fur on top of body, > 3 weeks old.	Initial
November	15/11/2024	Unknown Bat sp.	*n/a*	Bat	C24.11.12	45	59	32	Head only, appears to be a head of a free-tailed bat nut no other feature to identify fully	Pulse
November	18/11/2024	Wedge-tailed Eagle	*Aquila audax*	Feather spot	FS24.11.01	39	66	23	Feather spot, over month old, large dark brown feather, white down feathers	Superb Parrot - Targeted searches
November	22/11/2024	Nankeen Kestrel	*Falco cenchroides*	Bird	C24.11.13	5	35	195	Feathers and thorax spread over 2m, over 2 weeks old	Superb Parrot - Targeted searches

Month	Date	Common Name	Scientific Name	Carcass type	*Find Refence	Turbine number	Distance from turbine (m)	Bearing from turbine (°)	Notes	Search type
December	4/12/2024	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C24.12.01	8	68	163	FA 61 mm, mostly eaten, 48h	Superb Parrot - Targeted searches
December	4/12/2024	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C24.12.02	17	38	107	FA 62Mmm <24h, chocolate brown colour, tail extends beyond membrane	Superb Parrot - Targeted searches
December	5/12/2024	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C24.12.03	3	30	102	FA 61, desiccated, >1 week, tail extends beyond membrane	Superb Parrot - Targeted searches
December	5/12/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.12.04	1	94	116	FA 31mm, week old, Tail within membrane, dorsal gold/brown, ventral white tip, dark undercoat	Superb Parrot - Targeted searches
December	9/12/2024	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C24.12.05	29	27	15	FA 61 mm, >week old, tail extends beyond membrane, run over on hard stand	Superb Parrot - Targeted searches
December	10/12/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.12.06	34	80	31	FA 31 mm, <24h, Tail within membrane, dorsal gold/brown, ventral white tip, dark undercoat	Superb Parrot - Targeted searches
December	10/12/2024	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C24.12.07	44	53	347	FA 62 mm, <24h, tail extends beyond membrane, chocolate brown fur	Superb Parrot - Targeted searches
December	10/12/2024	Nankeen Kestrel	*Falco cenchroides*	Bird	C24.12.08	44	31	221	>week old, only skeleton and feathers	Superb Parrot - Targeted searches
December	10/12/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.12.09	43	59	41	FA 31mm, tail within membrane, dorsal golden brown, ventral white tip, dark undercoat	Superb Parrot - Targeted searches
December	11/12/2024	Free-tailed bat sp.	*Ozimops sp.*	Bat	C24.12.10	42	86	291	FA 36 mm, tail extends beyond membrane, dorsal golden brown, white undercoat, 2-4 days	Superb Parrot - Targeted searches

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December	11/12/2024	Rock Dove	*Columba livia*	Bird	FS24.12.01	42	73	147	Feather spot, grey feathers several weeks old, all feathers below grass, grass grown through	Superb Parrot - Targeted searches
December	11/12/2024	Corvid sp.	*Corvus sp.*	Bird	C24.12.11	39	55	291	Raven species, skeletal remain, some feathers, > month	Superb Parrot - Targeted searches
December	11/12/2024	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C24.12.12	39	52	235	FA 60mm, >2 weeks, skeletal, no head	Superb Parrot - Targeted searches
December	18/12/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.12.13	31	64	90	FA 30 mm Tail within membrane, >week	Initial
December	18/12/2024	Free-tailed bat sp.	*Ozimops sp.*	Bat	C24.12.14	45	58	273	FA 35.5 mm Tail within membrane, simple ears Dorsal golden-brown fur, ventral dark undercoat, golden tips 48h	Initial
December	18/12/2024	Australian Magpie	*Gymnorhina tibicen*	Bird	C24.12.21	45	126	148	Mostly black and white feathers, one leg/foot, month old	Initial
December	19/12/2024	Unknown Bat sp.	*n/a*	Bat	C24.12.15	10	78	357	Wing fragment only, no FA	Initial
December	19/12/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.12.16	10	66	15	FA 31 mm, skeletal with some fur	Initial
December	19/12/2024	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C24.12.17	11	67	15	FA 60.5mm skeleton, some wing membrane decomposed in drainage	Initial
December	19/12/2024	Unknown Bird sp.	*n/a*	Bird	C24.12.22	16	125	230	Partial wing only including bone and flight feathers	Initial
December	19/12/2024	Galah	*Eolophus roseicapilla*	Bird	C24.12.23	16	104	337	Feathers, some clean dry bones, >month	Initial
December	19/12/2024	Eastern Koel	*Eudynamys orientalis*	Bird	C24.12.28	16	132	6	Large black feathers with iridescent blue, some bone fragments and foot	Pulse
December	19/12/2024	Eastern Rosella	*Platycercus eximius*	Bird	FS 24.12.07	16	104	338	Bright green feather, three with dark eye spot	Pulse
December	19/12/2024	Nankeen Kestrel	*Falco cenchroides*	Bird	C24.12.18	2	98	157	2 x wings only	Initial

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December	19/12/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.12.19	6	46	17	FA 30.3 mm dorsal golden brown, ventral dark undercoat white tips, > week, decomposed and dried	Initial
December	19/12/2024	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C24.12.20	6	58	43	FA 59.5 >week, skeleton and fur, no soft tissue	Initial
December	20/12/2024	Unknown Bat sp.	*n/a*	Bat	C24.12.24	9	39	293	Bone fragments including one wing 'finger'' and fur no FA	Pulse
December	20/12/2024	Unknown Bat sp.	*n/a*	Bat	C24.12.25	10	53	80	Wing fragment and membrane only, no FA	Pulse
December	20/12/2024	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C24.12.26	13	63	295	FA 62 mm, >48h, tail extends beyond membrane, chocolate brown fur, body hollowed out and desiccated	Pulse
December	20/12/2024	Little Forest Bat	*Vespadelus vulturnus*	Bat	C24.12.27	2	54	305	FA 32 mm, skeleton only >month	Pulse
January	6/01/2025	Australian Magpie	*Gymnorhina tibicen*	Bird	C25.01.01	11	12	56	Black and white wing and feathers and grey down feathers	Initial
January	7/01/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.01.02	6	75	317	FA 61 mm, tail extends beyond membrane, Chocolate brown fur, large round ears, mostly hollow >48h	Initial
January	7/01/2025	Eastern Rosella	*Platycercus eximius*	Bird	FS25.01.01	6	98	120	200+ feathers, yellow, red, blue, green	Initial
January	8/01/2025	Free-tailed bat sp.	*Ozimops sp.*	Bat	C25.01.03	22	5	121	FA 39 mm, tail extends beyond membrane > week, skin & skeleton. Ventral skin and most soft tissue missing, dorsal brown tips, white undercoat. Ears simple, triangular.	Initial
January	8/01/2025	Galah	*Eolophus roseicapilla*	Bird	INC25.01.01	17	18	89	Entire carcass	Incidental
January	9/01/2025	Unknown Bat sp.	*n/a*	Bat	C25.01.04	11	18	27	Bat wing fragment, bones and fur, no FA	Pulse
January	9/01/2025	Broad-nosed Bat	*Scotorepens sp.*	Bat	C25.01.05	26	20	318	FA 36 mm, skeleton & 1 wing, small amount of fur, ventral skin and most soft tissue missing, dorsal fur golden brown tips, white undercoat.	Pulse
February	10/02/2025	Eastern Rosella	*Platycercus eximius*	Bird	FS25.02.01	16	55	279	Blue and green feather, one green with 'eye spot'	Initial

Month	Date	Common Name	Scientific Name	Carcass type	*Find Refence	Turbine number	Distance from turbine (m)	Bearing from turbine (°)	Notes	Search type
February	11/02/2025	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	C25.02.01	9	70	312	FA 47 'softhead, very dark back, tan ventral side, wattle remaining	Initial
February	11/02/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	C25.02.02	6	82	148	Entire carcass, hollow, soft tissue gone	Initial
February	11/02/2025	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	C25.02.03	6	17	57	FA 46 tail within membrane, mummified, wattle slightly visible one side, OCW 4.5mm	Initial
February	12/02/2025	Free-tailed bat sp.	*Ozimops sp.*	Bat	INC25.02.01	24	129	52	FA 34 >week dorsal gold/brown, ventral white tips dark undercoat, simple ears slightly rounded triangle	Incidental
February	13/02/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	C25.02.04	22	20	345	Entire carcass, <48h	Pulse
February	13/02/2025	Unknown Bat sp.	*n/a*	Bat	C25.02.05	26	57	262	FA 27, fragment only scapular and wing bones and some bicoloured fur	Pulse
March	10/03/2025	Australian Hobby	*Falco longipennis*	Bird	FS25.03.01	45	76	38	Feathers, very dark brown with pale bands	Initial
March	11/03/2025	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	C25.03.01	6	73	300	FA 43, 'buffalo head'	Initial
March	11/03/2025	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	C25.03.02	6	67	167	FA 44 (Soft tissue consumed by ants)	Initial
March	13/03/2025	Unknown Bat sp.	*n/a*	Bat	C25.03.03	30	28	306	C25.03.03, skeletal fragments and fur, FA 43	Pulse
March	13/03/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.03.04	37	52	310	C25.03.04, wings only, FA 61	Pulse
March	13/03/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.03.05	6	28	118	Entire carcass White-Striped Free-Tailed Bat <48h.	Pulse
March	14/03/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.03.06	11	6	70	FA 60, entire carcass <24h, white stripes obvious, tail extends membrane	Pulse
March	14/03/2025	Little Forest Bat	*Vespadelus vulturnus*	Bat	C25.03.07	11	12	325	FA 29, entire carcass <24h, tail within membrane, dorsal golden brown, ventral white tip, dark undercoat	Pulse
March	14/03/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.03.08	16	54	280	FA 61, entire carcass <24h, white stripes obvious, tail extends membrane	Pulse

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March	14/03/2025	Eastern Rosella	*Platycercus eximius*	Bird	C25.03.09	16	54	277	Femur fragment and 100 feathers approx., green, blue, red	Pulse
March	17/03/2025	Unknown Bat sp.	*n/a*	Bat	C25.03.10	23	83	188	Bat fur only.	WTNT - Targeted searches
March	17/03/2025	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	C25.03.11	29	74	199	FA 45, 'buffalo head' entire carcass	WTNT - Targeted searches
March	17/03/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	FS25.03.03	34	93	257	Nankeen Kestrel, many brown feathers with light and dark bands	WTNT - Targeted searches
March	18/03/2025	Eastern Free-Tailed Bat	*Ozimops ridei*	Bat	C25.03.12	40	75	324	FA 34, Tail extends membrane, big overbite, broad muzzle, OCW 3-4mm, hairy feet, abdomen absent, dry skeleton visible	WTNT - Targeted searches
March	18/03/2025	Unknown Bat sp.	*n/a*	Bat	C25.03.13	40	37	52	Bat wing fragment, desiccated, no FA	WTNT - Targeted searches
March	18/03/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	FS25.03.04	44	102	65	Nankeen Kestrel, many brown feathers with light and dark bands, including primaries and tail feathers. Marked as .03 and .04 on map but probably same mortality.	WTNT - Targeted searches
March	18/03/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	FS25.03.05	44	27	158	Very downy soft cream-coloured feathers with dark brown stripe down midrib, some larger chestnut with dark bands.	WTNT - Targeted searches
March	18/03/2025	Unknown Bat sp.	*n/a*	Bat	C25.03.14	44	40	47	Piece of bat skin and with fur attached approx. 2cm x 2cm	WTNT - Targeted searches
March	19/03/2025	Unknown Bat sp.	*n/a*	Bat	C25.03.15	32	50	81	Bat wing	WTNT - Targeted searches
March	19/03/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.03.16	5	77	3	WSFT FA 60, entire carcass 2-4 days old	WTNT - Targeted searches
March	19/03/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	C25.03.17	3	31	36	Nankeen kestrel, disintegrated, >1 week	WTNT - Targeted searches

Month	Date	Common Name	Scientific Name	Carcass type	*Find Refence	Turbine number	Distance from turbine (m)	Bearing from turbine (°)	Notes	Search type
March	19/03/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.03.18	3	36	24	Bat wing, membrane consumed, FA 62	WTNT - Targeted searches
March	19/03/2025	Magpie-lark	*Grallina cyanoleuca*	Bird	FS25.03.06	1	76	20	Tail feathers white with black tip and downy grey body feathers.	WTNT - Targeted searches
March	19/03/2025	Unknown Bat sp.	*n/a*	Bat	C25.03.20	1	33	112	Bat wing, no intact forearm (bitten through)	WTNT - Targeted searches
March	20/03/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.03.21	39	108	313	Entire carcass except only one wing and forearm broken, big rounded ears and tail extends membrane.	WTNT - Targeted searches
March	20/03/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	C25.03.22	39	102	70	Wing with flight feathers and loose feathers.	WTNT - Targeted searches
March	20/03/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.03.23	39	58	188	FA 60 entire carcass	WTNT - Targeted searches
March	20/03/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.03.24	39	70	243	FA 61 entire carcass	WTNT - Targeted searches
March	20/03/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	FS25.03.07	4	92	52	Tail feathers and body feathers, pale brown with dark bands.	WTNT - Targeted searches
March	20/03/2025	Unknown Bat sp.	*n/a*	Bat	C25.03.25	19	16	230	Bat fur and obvious decomposition spot.	WTNT - Targeted searches
March	21/03/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	FS25.03.08	21	103	16	small clump brown with black bands attached to skin	WTNT - Targeted searches
March	21/03/2025	Yellow-bellied Sheath-tailed Bat	*Saccolaimus flaviventris*	Bat	C25.03.26	20	21	207	FA 78, <12h, pouch, penis, ears and facial features intact	WTNT - Targeted searches
March	21/03/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	C25.03.27	17	23	140	Both feet and legs (yellowish) kestrel feathers.	WTNT - Targeted searches
March	21/03/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.03.28	1	39	248	Entire carcass, big rounded ears and tail extend membrane.	WTNT - Targeted searches

Month	Date	Common Name	Scientific Name	Carcass type	*Find Refence	Turbine number	Distance from turbine (m)	Bearing from turbine (°)	Notes	Search type
March	21/03/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	C25.03.29	2	47	67	>week, bones clean and crewed, feathers	Initial
March	21/03/2025	Unknown Bat sp.	*n/a*	Bat	C25.03.30	2	26	123	2 bat wings, no forearms, scapular, some skin including fir from back. >week.	Initial
April	31/03/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	C25.04.01	19	44	237	Some small bones, brown banded feathers	YBSB - Trigger searches
April	31/03/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.04.02	1	64	297	2 bat wings, membrane consumed, FA 60	YBSB - Trigger searches
April	31/03/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	FS25.04.01	1	60	92	tan feathers with dark bands	YBSB - Trigger searches
April	31/03/2025	Spotted Pardalote	*Pardalotus punctatus*	Bird	C25.04.03	5	47	5	Entire carcass Spotted Pardalote	YBSB - Trigger searches
April	1/04/2025	Crimson Rosella	*Platycercus elegans*	Bird	FS25.04.02	27	52	224	Red tip body feathers, blue/green tail feathers, grey downy feathers	YBSB - Trigger searches
April	1/04/2025	Unknown Bat sp.	*n/a*	Bat	C25.04.04	27			Bat fragment some white fur, most very dark, bones broken, no forearm	YBSB - Trigger searches
April	1/04/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.04.05	34	38	315	Skeleton, FA 61	YBSB - Trigger searches
April	2/04/2025	Vespertiliondae spp.	*n/a*	Bat	C25.04.06	29	53	392	FA 48 wings and skin from back, no head or body	YBSB - Trigger searches
April	2/04/2025	Australian Raven	*Corvus coronoides*	Bird	C25.04.08	30	36	333	Australian Raven entire carcass <12h	Initial
April	2/04/2025	Grey Fantail	*Rhipidura albiscapa*	Bird	C25.04.07	30	121	165	Leg of small bird, black, grey and buff feathers on thigh	Initial
April	3/04/2025	Vespertiliondae spp.	*n/a*	Bat	C25.04.10	40	39	170	FA 44, tail within membrane, head missing, foot 8mm inc. claws	YBSB - Trigger searches
April	3/04/2025	Unknown Bat sp.	*n/a*	Bat	C25.04.11	40	46	285	Bat wing bones, some shreds of membrane	YBSB - Trigger searches

Month	Date	Common Name	Scientific Name	Carcass type	*Find Refence	Turbine number	Distance from turbine (m)	Bearing from turbine (°)	Notes	Search type
April	3/04/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	FS25.04.03	43	32	49	Brown wing feathers with dark bars, body feathers cream with dark midrib	YBSB - Trigger searches
April	3/04/2025	Sulphur-crested Cockatoo	*Cacatua galerita*	Bird	C25.04.12	43	67	225	Large white and yellow feathers, some bones including sternum	YBSB - Trigger searches
April	4/04/2025	Spotted Pardalote	*Pardalotus punctatus*	Bird	C25.04.13	16	29	319	Spotted Pardalote feathers and leg	Pulse
April	4/04/2025	Striated Pardalote	*Pardalotus striatus*	Bird	C25.04.14	46	36	165	Small bird, red flashed on shoulder >week	YBSB - Trigger searches
April	8/04/2025	Grey Fantail	*Rhipidura albiscapa*	Bird	C25.04.15	2	81	118	Entire carcass >week	Pulse
April	8/04/2025	Australian Magpie	*Cracticus tibicen*	Bird	C25.04.16	2	111	334	Feathers and bones over 4 locations, >2 weeks	Initial
April	8/04/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	INC25.04.01	3	27	172	Many feathers scattered all over hardstand, light brown with dark stripes tail feathers, brown with dark stripes and pale with dark mid-rib body feathers.	Incidental
April	9/04/2025	Unknown Bat sp.	*n/a*	Bat	C25.04.17	2	58	316	2 bat wing fragments, P2 1-2mm longer than P1, no forearms	Initial
April	9/04/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.04.18	6	92	333	Entire carcass <24h, throat pouch visible	Initial
April	9/04/2025	Pardalote spp.	*Pardalotus spp.*	Bird	C25.04.19	6	102	249	Skeleton, bird skeleton bill length 6mm width at widest point 7mm, width at seam 4mm	Initial
April	10/04/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.04.20	37	18	148	FA 61, no head, hollowed out, >week	Initial
April	10/04/2025	Grey Fantail	*Rhipidura albiscapa*	Bird	C25.04.21	41	82	52	Entire carcass, >week	Initial
April	11/04/2025	Eastern Rosella	*Platycercus eximius*	Bird	FS25.04.04	20	101	289	Feathers >2-week-old, green, red body feathers, blue tail feathers.	WTNT - Targeted searches
April	11/04/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	FS25.04.05	20	67	153	Feathers >2 weeks, tan with black stipes, black tip tail feathers, dark with light zigzag wing feathers >50 feathers	WTNT - Targeted searches

Month	Date	Common Name	Scientific Name	Carcass type	*Find Refence	Turbine number	Distance from turbine (m)	Bearing from turbine (°)	Notes	Search type
April	11/04/2025	Unknown Bird sp.	*n/a*	Bird	FS25.04.06	20	68	141	White body feathers with grey down, white wing feather, a lot of fox digging and disturbance and marking	WTNT - Targeted searches
April	11/04/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	FS25.04.07	19	44	234	Feathers >1 week, tan with black stipes, black tip tail feathers, dark with light zigzag wing feathers, brown body feathers, grey down >50 feathers	WTNT - Targeted searches
April	11/04/2025	Australian Raven	*Corvus coronoides*	Bird	C25.04.22	19	95	277	Skeleton and feathers, bill 57mm	WTNT - Targeted searches
April	11/04/2025	Australian Hobby	*Falco lomgipennis*	Bird	FS25.04.08	14	74	45	>20 feathers, wing chocolate brown with light zigzag, body mid brown with dark horizontal stripes	WTNT - Targeted searches
April	11/04/2025	Crimson Rosella	*Platycercus elegans*	Bird	FS25.04.09	15	58	276	>200 feathers, red and green body feathers, grey down, blue tail feathers	WTNT - Targeted searches
April	14/04/2025	Grey Fantail	*Rhipidura albiscapa*	Bird	FS25.04.10	5	79	51	Very downy soft cream-coloured feathers with dark brown stripe down midrib, some larger chestnut with dark bands.	WTNT - Targeted searches
April	14/04/2025	Grey Fantail	*Rhipidura albiscapa*	Bird	C25.04.24	4	60	288	Entire carcass	WTNT - Targeted searches
April	14/04/2025	Unknown Bat sp.	*n/a*	Bat	C25.04.23	4	51	268	Bat wing no forearm	WTNT - Targeted searches
April	14/04/2025	Grey Fantail	*Rhipidura albiscapa*	Bird	C25.04.25	3	74	99	Small wing, leg, torso Grey Fantail	WTNT - Targeted searches
April	14/04/2025	Common Starling	*Sturnus vulgaris*	Bird	C25.04.26	1	61	300	Head missing, skeleton and mid brown feathers	WTNT - Targeted searches
April	14/04/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	FS25.04.11	1	68	320	8 tail feathers, tan with dark stripes, black tips.	WTNT - Targeted searches
April	14/04/2025	Common Starling	*Sturnus vulgaris*	Bird	C25.04.27	1	42	122	Bill length 20mm, skeleton and mid brown feathers	WTNT - Targeted searches

Month	Date	Common Name	Scientific Name	Carcass type	*Find Refence	Turbine number	Distance from turbine (m)	Bearing from turbine (°)	Notes	Search type
April	14/04/2025	Little Forest Bat	*Vespadelus vulturnus*	Bat	C25.04.28	1	40	119	Forearm 30mm, tail within membrane, all soft tissue consumed.	WTNT - Targeted searches
April	15/04/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	C25.04.29	27	47	127	Feathers >1 week, tan with black stipes, black tip tail feathers, dark with light zigzag wing feathers, brown body feathers, grey down >50 feathers	WTNT - Targeted searches
April	15/04/2025	Grey Fantail	*Rhipidura albiscapa*	Bird	FS25.04.12	25	24	167	Most of one wing, body feathers, one tail feather.	WTNT - Targeted searches
April	15/04/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	FS25.04.13	25	55	56	Feathers >1 week, tan with black stipes, black tip tail feathers, brown body feathers, grey down >100 feathers	WTNT - Targeted searches
April	15/04/2025	Spotted Pardalote	*Pardalotus punctatus*	Bird	FS25.04.14	25	85	171	Small feathers with distinctive white spot, one red tipped	WTNT - Targeted searches
April	16/04/2025	Grey Fantail	*Rhipidura albiscapa*	Bird	C25.04.31	37	30	202	Entire carcass	Pulse
April	16/04/2025	Grey Fantail	*Rhipidura albiscapa*	Bird	C25.04.32	41	87	305	Grey Fantail entire	Pulse
April	16/04/2025	Unknown Bird sp.	*n/a*	Bird	FS25.04.15	46			15 grey downy body feathers, some torn out.	WTNT - Targeted searches
April	16/04/2025	Grey Fantail	*Rhipidura albiscapa*	Bird	C25.04.35	40	85	289	Approx 20 tail and wing feathers, one leg and foot, grey body feathers.	WTNT - Targeted searches
April	16/04/2025	Grey Fantail	*Rhipidura albiscapa*	Bird	FS25.04.17	40	90	78	5 tail and wing feathers, about 20 grey body feathers.	WTNT - Targeted searches
April	16/04/2025	Unknown Bird sp.	*n/a*	Bird	FS25.04.18	40	62	104	Grey downy body feathers, white and black tips.	WTNT - Targeted searches
April	16/04/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.04.33	40	92	67	Tail extends membrane, Forearm 59mm, soft tissue consumed, skeleton exposed.	WTNT - Targeted searches
April	16/04/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.04.34	40	93	181	Wing of bat, forearm present but fractured measures >55mm.	WTNT - Targeted searches

Month	Date	Common Name	Scientific Name	Carcass type	*Find Refence	Turbine number	Distance from turbine (m)	Bearing from turbine (°)	Notes	Search type
April	17/04/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.04.36	32	49	268	Bat wing FA 60mm, skull, ribs, vertebrae	WTNT - Targeted searches
April	17/04/2025	Wedge-tailed Eagle	*Aquila audax*	Bird	C25.04.37	32	22	199	Wedge-tailed Eagle >24h	WTNT - Targeted searches
April	17/04/2025	Unknown Bat sp.	*n/a*	Bat	FS25.04.19	34	38	127	Bat fur spot, a lot of fur, carcass absent.	WTNT - Targeted searches
April	17/04/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.04.38	34	34	308	Bat wing, membrane consumed, FA 60mm.	WTNT - Targeted searches
April	17/04/2025	Crimson Rosella	*Platycercus elegans*	Bird	FS25.04.20	36	90	83	8 bright red feathers, grey down.	WTNT - Targeted searches
April	22/04/2025	Nankeen Kestrel	*Falco cenchroides*	Bird	FS25.04.21	45	50	197	50+ body feathers light with dark midrib and chestnut brown with dark horizontal stripes.	YBSB - Trigger searches
April	28/04/2025	Little Forest Bat	*Vespadelus vulturnus*	Bat	C25.04.39	34	61	22	FA 31mm, wing only, membrane consumed.	YBSB - Trigger searches
April	30/04/2025	White-striped Free-tailed Bat	*Austronomus australis*	Bat	C25.04.40	1	14	238		YBSB - Trigger searches
April	30/04/2025	Grey Fantail	*Rhipidura albiscapa*	Bird	FS25.04.22	4	62	290	4 tail feathers, many dark grey body feathers.	YBSB - Trigger searches
May	2/05/2025	Crimson Rosella	*Platycercus elegans*	Bird	FS25.05.01	37	77	206	Red body feathers with grey down, bright blue tail feathers.	Initial
May	2/05/2025	Golden Whistler	*Pachycephala pectoralis*	Bird	C25.05.01	30	121	183	Small bright yellow body feathers and some small bones.	Initial
May	2/05/2025	Grey Fantail	*Rhipidura albiscapa*	Bird	FS25.05.02	30	61	243	Many small body feathers, grey and buff.	Initial
May	5/05/2025	Australian Magpie	*Gymnorhina tibicen*	Bird	C25.05.02	2	30	264	Bony wing end, one black primary feather and cut of stubs of 8 primaries attached to bone.	Initial
May	5/05/2025	Spotted Pardalote	*Pardalotus punctatus*	Bird	FS25.05.03	6	55	142	Many body feathers including chestnut and a couple of red, wing feathers with white spot near tip.	Initial

Month	Date	Common Name	Scientific Name	Carcass type	*Find Refence	Turbine number	Distance from turbine (m)	Bearing from turbine (°)	Notes	Search type
May	5/05/2025	Unknown Bat sp.	*N/A*	Bat	FS25.05.04	6	71	32	Fur only, enough to be a mortality, mid-brown.	Initial
May	6/05/2025	Grey Fantail	*Rhipidura albiscapa*	Bird	FS25.05.05	16	105	48	8 Grey Fantail tail feathers.	Initial
June	2/06/2025	Crimson Rosella	*Platycercus elegans*	Bird	FS25.06.01	24	112	343	7 wing feathers, 14 body feathers	Initial
June	3/06/2025	Crimson Rosella	*Platycercus elegans*	Bird	FS25.06.02	37	108	359	7 wing and tail feathers and 4 red body feathers with grey down.	Initial
July	6/07/2025	Common Starling	*Sturnus vulgaris*	Bird	FS25.07.01	16	106	285	Primaries approx. 112mm long, mid-brown with green iridescence, approximately 30 feathers.	Initial
July	6/07/2025	Crimson Rosella	*Platycercus elegans*	Bird	FS25.07.02	11	82	8	6 red body feathers and 2 blue primaries	Initial
July	6/07/2025	Crimson Rosella	*Platycercus elegans*	Bird	FS25.07.03	11	112	246	>1000 red body feathers with grey down, blue tail feathers.	Initial
July	9/07/2025	Corvid sp.	*Corvus spp.*	Bird	C25.07.01	45	122	145	Skull, black feathers	Initial
July	9/07/2025	Australian Magpie	*Gymnorhina tibicen*	Bird	INC25.07.01	43	28	48	Entire carcass	Incidental
July	9/07/2025	Australian Magpie	*Gymnorhina tibicen*	Bird	INC25.07.02	3	19	244	Entire carcass	Incidental
July	9/07/2025	Crimson Rosella	*Platycercus elegans*	Bird	FS25.07.04	37	125	250	18 red body feathers and 5 blue wing feathers	Initial
July	9/07/2025	Crimson Rosella	*Platycercus elegans*	Bird	FS25.07.05	37	117	214	20 red and olive-green body feathers and 1 blue tail feather	Initial
July	9/07/2025	Eastern Rosella	*Platycercus eximius*	Bird	FS25.07.06	24	121	352	3 blue and black wing feathers with white bar, 14 olive green and red body feathers 1 blue tail feather.	Initial

Appendix 2: Microbat species recorded at the Bango Wind Farm during the Spring 2023 and Autumn 2024 survey periods.

Species name	Common Name	Survey site, Definite (D), probable (Pr), and possible (Po) identification																
		WTG 01	WTG 02	WTG 04	WTG 06	WTG 07	WTG 09	WTG 18	WTG 24	WTG 26	WTG 27	WTG 33	WTG 35	WTG 38	WTG 39	WTG 42	WTG 43	NAC
Austronomus australis	White-striped Free-tailed Bat	D	Nd	D	D	D	D	D	D	D	D	D	D	D	D	D	D	Pr
Chalinolobus gouldii	Gould's Wattled Bat	D	Nd	D	D	D	D	D	D	D	D	D	D	D	D	D	D	Nd
Chalinolobus morio	Chocolate Wattled Bat	D	Nd	D	D	D	D	D	D	D	D	D	D	D	D	D	D	Nd
Falsistrellus tasmaniensis*	Eastern False Pipistrelle	Po	Nd	Po	Nd	Po	D	D	Po	Po	D	Po	Po	Po	Po	D	Po	Nd
Miniopterus orianae oceanensis*	Large Bent-winged Bat	Pr	Nd	Po	Po	Pr	D	Po	D	Pr	Pr	Pr	Po	Po	D	Po	Po	Nd
Myotis macropus*	Southern Myotis	Po	Nd	Po	Nd	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Nd
Nyctophilus geoffroyi	Lesser Long-eared Bat	Po	Nd	Po	Nd	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Nd
Nyctophilus gouldi	Gould's Long-eared Bat	Po	Nd	Po	Nd	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Nd
Ozimops planiceps	South-eastern Free-tailed Bat	D	Nd	D	D	D	D	D	D	D	D	D	D	D	D	D	D	Nd
Ozimops ridei	Eastern Free-tailed Bat	Po	Nd	D	Po	D	Pr	Po	Pr	Po	Nd	D	D	Po	Po	D	D	Nd

Species name	Common Name	Survey site, Definite (D), probable (Pr), and possible (Po) identification																
		WTG 01	WTG 02	WTG 04	WTG 06	WTG 07	WTG 09	WTG 18	WTG 24	WTG 26	WTG 27	WTG 33	WTG 35	WTG 38	WTG 39	WTG 42	WTG 43	NAC
Saccolaimus flaviventris*	Yellow-bellied Sheath-tailed Bat	Po	Nd	Nd	Nd	Nd	Nd	Nd	Pr	Po	Nd	Nd	Nd	Nd	Nd	Nd	Nd	Nd
Scotorepens balstoni	Inland Broad-nosed Bat	Nd	Nd	Nd	Po	Po	Nd	Nd	Po	Nd	Nd	Nd	Nd	Nd	Nd	Nd	Po	Nd
Scotorepens greyii	Inland Broad-nosed Bat	Po	Nd	Po	Nd	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Nd
Vespadelus darlingtoni	Large Forest Bat	D	Nd	D	D	D	D	D	D	D	D	D	D	D	D	D	D	Nd
Vespadelus regulus	Southern Forest Bat	Po	Nd	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Nd
Vespadelus vulturnus	Little Forest Bat	D	Nd	Po	Pr	Po	D	Po	D	D	D	Po	Po	Pr	Po	Pr	Pr	Nd

Appendix 3: Microbat species and species complex activity levels at the Bango Wind Farm during the Spring 2023 and Autumn 2024 survey period.

Species and species complexes		Survey site, and the number of definite, probable, and possible call sequences																
Species names	Common names	WTG 01	WTG 02	WTG 04	WTG 06	WTG 07	WTG 09	WTG 18	WTG 24	WTG 26	WTG 27	WTG 33	WTG 35	WTG 38	WTG 39	WTG 42	WTG 43	NAC
Austronomus australis	White-striped Free-tailed Bat	99	0	92	47	95	250	222	73	93	94	39	92	72	58	52	42	1
Chalinolobus gouldii	Gould's Wattled Bat	232	0	67	31	237	237	24	87	131	56	529	570	350	77	9	391	0
Chalinolobus morio	Chocolate Wattled Bat	292	0	24	16	75	374	9	199	51	1,268	49	173	8	431	2	313	0
Falsistrellus tasmaniensis	**Eastern False Pipistrelle**	0	0	0	0	0	9	0	0	0	1	0	0	0	0	1	0	0
Miniopterus orianae oceanensis	**Large Bent-winged Bat**	8	0	0	0	1	3	0	18	0	5	58	0	0	4	0	3	0
Ozimops planiceps	South-eastern Free-tailed Bat	66	0	166	11	79	30	19	179	144	64	18	18	19	19	23	34	0
Ozimops ridei	Eastern Free-tailed Bat	0	0	4	3	2	6	0	6	2	1	1	2	0	0	2	6	0
Saccolaimus flaviventris	**Yellow-bellied Sheath-tailed Bat**	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0
Scotorepens balstoni	Inland Broad-nosed Bat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vespadelus darlingtoni	Large Forest Bat	49	0	6	7	18	723	12	221	3	77	87	10	24	11	7	66	0
Vespadelus vulturnus	Little Forest Bat	11	0		2	0	31	0	26	2	66	0	0	3	1	1	2	0

Species and species complexes		Survey site, and the number of definite, probable, and possible call sequences																
Species names	Common names	WTG 01	WTG 02	WTG 04	WTG 06	WTG 07	WTG 09	WTG 18	WTG 24	WTG 26	WTG 27	WTG 33	WTG 35	WTG 38	WTG 39	WTG 42	WTG 43	NAC
Species complexes																		
Chalinolobus gouldii, *Ozimops planiceps* or *Ozimops ridei*	Gould's Wattled Bat, South-eastern Free-tailed Bat or Eastern Free-tailed Bat	2	0	16	1	17	18	6	0	10	0	5	24	18	1	1	42	0
Chalinolobus gouldii, *Ozimops planiceps*, or *Scotorepens balstoni*	Gould's Wattled Bat, South-eastern Free-tailed Bat, or Inland Broad-nosed Bat	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chalinolobus gouldii or *Ozimops ridei*	Gould's Wattled Bat or Eastern Free-tailed Bat	29	0	6	2	16	213	9	15	30	0	40	22	38	4	4	12	0
Chalinolobus gouldii or *Scotorepens balstoni*	Gould's Wattled Bat or Inland Broad-nosed Bat	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0
Chalinolobus morio or *Miniopterus orianae oceanensis*	Chocolate Wattled Bat or Large Bent-winged Bat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0

Species and species complexes		Survey site, and the number of definite, probable, and possible call sequences																
Species names	Common names	WTG 01	WTG 02	WTG 04	WTG 06	WTG 07	WTG 09	WTG 18	WTG 24	WTG 26	WTG 27	WTG 33	WTG 35	WTG 38	WTG 39	WTG 42	WTG 43	NAC
Chalinolobus morio, ***Miniopterus orianae oceanensis*** or *Vespadelus vulturnus*	Chocolate Wattled Bat or **Large Bent-winged Bat** or Little Forest Bat	74	0	0	0	0	0	0	1	0	12	0	3	0	0	0	0	0
Chalinolobus morio or *Vespadelus vulturnus*	Chocolate Wattled Bat or Little Forest Bat	17	0	0	13	3	77	0	34	2	123	4	10	2	18	0	9	0
Falsistrellus tasmaniensis or *Scotorepens greyii*	**Eastern False Pipistrelle** or Little Broad-nosed Bat	0	0	0	0	2	85	0	59	3	251	2	3	112	0	2	15	0
Falsistrellus tasmaniensis, *Scotorepens greyii*, or *Vespadelus darlingtoni*	**Eastern False Pipistrelle**, Little Broad-nosed Bat, or Large Forest Bat	3	0	1	0	3	115	2	34	0	7	6	1	31	15	3	22	0
Miniopterus orianae oceanensis or *Vespadelus* species (either *Vespadelus darlingtoni, Vespadelus regulus*, or *Vespadelus vulturnus*)	**Large Bent-winged Bat** or Forest Bat Species (either Large Forest Bat, Southern Forest Bat or Little Forest Bat	473	0	20	22	236	524	11	1,207	16	66	824	174	740	147	4	178	0

Species and species complexes		Survey site, and the number of definite, probable, and possible call sequences																
Species names	Common names	WTG 01	WTG 02	WTG 04	WTG 06	WTG 07	WTG 09	WTG 18	WTG 24	WTG 26	WTG 27	WTG 33	WTG 35	WTG 38	WTG 39	WTG 42	WTG 43	NAC
Myotis macropus, *Nyctophilus geoffroyi, or Nyctophilus gouldi*	**Southern Myotis**, Lesser Long-eared Bat, or Gould's Long-eared Bat	35	0	9	0	17	23	4	3	18	12	6	46	2	22	7	47	0
Myotis macropus, *Nyctophilus geoffroyi*, *Nyctophilus gouldi*, ***Falsistrellus tasmaniensis***, or *Scotorepens greyii*	**Southern Myotis**, Lesser Long-eared Bat, Gould's Long-eared Bat, **Eastern False Pipistrelle**, or Little Broad-nosed Bat	0	0	0	0	2	0	0	0	0	0	0	0	1	1	0	0	0
Nyctophilus geoffroyi or *Nyctophilus gouldi*	Lesser Long-eared Bat or Gould's Long-eared Bat	4	0	1	0	4	21	3	0	5	3	3	34	1	16	5	8	0
Ozimops planiceps or *Ozimops ridei*	South-eastern Free-tailed Bat, Southern Free-tailed Bat, or Free-tailed Bat	1	0	0	0	1	0	0	10	5	0	0	0	0	1	1	0	0
Ozimops planiceps or ***Saccolaimus flaviventris***	South-eastern Free-tailed Bat or **Yellow-bellied Freetail-bat**	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

Species and species complexes		Survey site, and the number of definite, probable, and possible call sequences																
Species names	Common names	WTG 01	WTG 02	WTG 04	WTG 06	WTG 07	WTG 09	WTG 18	WTG 24	WTG 26	WTG 27	WTG 33	WTG 35	WTG 38	WTG 39	WTG 42	WTG 43	NAC
Vespadelus darlingtoni or *Vespadelus regulus*	Large Forest Bat or Southern Forest Bat	91	0	4	2	12	83	2	147	11	18	222	37	11	8	1	91	0
Vespadelus regulus or *Vespadelus vulturnus*	Southern Forest Bat or Little Forest Bat	478	0	1	5	22	414	1	171	19	18	72	45	6	4	2	36	0
Total number of identifiable call sequences		**1,975**	**0**	4,17	**163**	**843**	**3,236**	**327**	**2,492**	**545**	**2,142**	**1,965**	**1,264**	**1,438**	**838**	**128**	**1,321**	**1**

Appendix 4: Microbat species recorded at the Bango Wind Farm during the Summer 2024 survey period.

Species name	Common Name	Survey site, Definite (D), probable (Pr), and possible (Po) identification														
		WTG 01	WTG 04	WTG 06	WTG 07	WTG 09	WTG 18	WTG 24	WTG 26	WTG 27	WTG 33	WTG 35	WTG 38	WTG 39	WTG 42	WTG 43
Austronomus australis	White-striped Free-tailed Bat	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Chalinolobus gouldii	Gould's Wattled Bat	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Chalinolobus morio	Chocolate Wattled Bat	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Falsistrellus tasmaniensis	**Eastern False Pipistrelle**	Po	D	Nd	Po	Po	Po	Po	Po	Po	Po	Nd	D	Po	Po	Po
Miniopterus orianae oceanensis	**Large Bent-winged Bat**	Pr	D	Po	D	Pr	Po	Pr	Pr	Pr	D	Pr	Pr	Po	Po	Po
Myotis macropus	**Southern Myotis**	D	Po	Po	Po	Po	Po	D	Po	Po	Po	Po	Po	Po	Po	Po
Nyctophilus geoffroyi	Lesser Long-eared Bat	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po
Nyctophilus gouldi	Gould's Long-eared Bat	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po
Ozimops planiceps	South-eastern Free-tailed Bat	D	D	Pr	D	D	D	D	D	Po	D	D	D	D	D	Pr
Ozimops ridei	Eastern Free-tailed Bat	Pr	Po	Po	D	D	D	D	D	Po	Po	Po	Po	Po	Po	Po
Scotorepens balstoni	Inland Broad-nosed Bat	Po	Po	Pr	Pr	Po	Nd	D	Nd	Po	Po	Pr	D	Nd	Po	Po
Scotorepens greyii	Inland Broad-nosed Bat	Po	Po	Nd	Po	Po	Po	Po	Po	Po	Po	Nd	Po	Po	Po	Po
Vespadelus darlingtoni	Large Forest Bat	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Vespadelus regulus	Southern Forest Bat	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po	Po
Vespadelus vulturnus	Little Forest Bat	Pr	Pr	Po	Pr	D	D	D	Pr	Pr	D	Pr	Pr	D	Pr	Pr

Appendix 5: Microbat species and species complex activity levels during the Summer 2024 survey period at the Bango Wind Farm.

Species and species complexes		Survey site, and the number of definite, probable, and possible call sequences															
Species names	Common names	WTG 01	WTG 04	WTG 06	WTG 07	WTG 09	WTG 18	WTG 24	WTG 26	WTG 27	WTG 33	WTG 35	WTG 38	WTG 39	WTG 42	WTG 43	Total
Austronomus australis	White-striped Free-tailed Bat	356	87	229	270	172	313	130	153	38	242	192	75	129	38	19	2443
Chalinolobus gouldii	Gould's Wattled Bat	716	123	68	371	167	60	295	129	62	689	90	109	40	34	102	3,055
Chalinolobus morio	Chocolate Wattled Bat	12	34	15	64	22	32	65	10	15	14	12	41	7	2	108	453
Falsistrellus tasmaniensis	**Eastern False Pipistrelle**	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2
Miniopterus orianae oceanensis	**Large Bent-winged Bat**	2	2	0	1	2	0	4	2	0	4	2	1	0	0	0	20
Myotis macropus	**Southern Myotis**	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
Ozimops planiceps	South-eastern Free-tailed Bat	20	11	5	55	43	19	97	69	0	5	16	8	5	5	1	359
Ozimops ridei	Eastern Free-tailed Bat	12	0	0	4	7	6	2	2	0	2	0	0	0	0	0	35
Scotorepens balstoni	Inland Broad-nosed Bat	0	0	1	1	0	0	4	0	0	0	1	2	0	0	0	9
Vespadelus darlingtoni	Large Forest Bat	14	6	12	20	586	24	74	17	2	30	7	42	9	14	26	883
Vespadelus vulturnus	Little Forest Bat	1	2	0	6	6	13	17	3	5	3	1	2	3	4	1	67

Species and species complexes		Survey site, and the number of definite, probable, and possible call sequences															
Species names	Common names	WTG 01	WTG 04	WTG 06	WTG 07	WTG 09	WTG 18	WTG 24	WTG 26	WTG 27	WTG 33	WTG 35	WTG 38	WTG 39	WTG 42	WTG 43	Total
Species complexes																	
Chalinolobus gouldii, *Ozimops planiceps* or *Ozimops ridei*	Gould's Wattled Bat, South-eastern Free-tailed Bat or Eastern Free-tailed Bat	19	1	2	15	8	6	14	27	1	8	0	53	2	1	0	157
Chalinolobus gouldii, Ozimops planiceps, or *Scotorepens balstoni*	Gould's Wattled Bat, South-eastern Free-tailed Bat, or Inland Broad-nosed Bat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Chalinolobus gouldii or *Ozimops ridei*	Gould's Wattled Bat or Eastern Free-tailed Bat	85	11	6	32	127	19	28	22	0	50	8	19	4	0	4	415
Chalinolobus gouldii or *Scotorepens balstoni*	Gould's Wattled Bat or Inland Broad-nosed Bat	10	4	1	7	3	0	1	0	2	1	2	2	0	2	6	37
Chalinolobus morio or Miniopterus orianae oceanensis or *Vespadelus vulturnus*	Chocolate Wattled Bat or Large Bent-winged Bat or Little Forest Bat	0	0	0	3	1	2	26	0	4	0	0	2	7	0	0	45

Species and species complexes		Survey site, and the number of definite, probable, and possible call sequences															
Species names	Common names	WTG 01	WTG 04	WTG 06	WTG 07	WTG 09	WTG 18	WTG 24	WTG 26	WTG 27	WTG 33	WTG 35	WTG 38	WTG 39	WTG 42	WTG 43	Total
Chalinolobus morio or *Vespadelus vulturnus*	Chocolate Wattled Bat or Little Forest Bat	12	6	2	18	6	23	17	2	17	6	2	2	5	3	7	128
Falsistrellus tasmaniensis or *Scotorepens greyii*	**Eastern False Pipistrelle** or Little Broad-nosed Bat	1	1	0	0	3	0	1	0	1	0	0	1	0	0	0	8
Falsistrellus tasmaniensis, *Scotorepens greyii*, or *Vespadelus darlingtoni*	**Eastern False Pipistrelle**, Little Broad-nosed Bat, or Large Forest Bat	2	0	0	2	274	1	3	1	0	2	0	1	1	1	2	290
Miniopterus orianae oceanensis or *Vespadelus* species (either *Vespadelus darlingtoni, Vespadelus regulus*, or *Vespadelus vulturnus*	**Large Bent-winged Bat** or Forest Bat Species (either Large Forest Bat, Southern Forest Bat or Little Forest Bat	109	35	54	312	158	142	2,701	160	38	107	200	49	45	17	49	4,176
Myotis macropus, *Nyctophilus geoffroyi*, or *Nyctophilus gouldi*	**Southern Myotis**, Lesser Long-eared Bat, or Gould's Long-eared Bat	9	6	3	10	5	5	12	8	1	3	5	7	9	3	6	92

Species and species complexes		Survey site, and the number of definite, probable, and possible call sequences															
Species names	Common names	WTG 01	WTG 04	WTG 06	WTG 07	WTG 09	WTG 18	WTG 24	WTG 26	WTG 27	WTG 33	WTG 35	WTG 38	WTG 39	WTG 42	WTG 43	Total
Myotis macropus, *Nyctophilus geoffroyi*, *Nyctophilus gouldi*, ***Falsistrellus tasmaniensis***, or *Scotorepens greyii*	**Southern Myotis**, Lesser Long-eared Bat, Gould's Long-eared Bat, **Eastern False Pipistrelle**, or Little Broad-nosed Bat	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	3
Nyctophilus geoffroyi or *Nyctophilus gouldi*	Lesser Long-eared Bat or Gould's Long-eared Bat	4	2	4	14	5	10	2	12	2	7	3	12	2	1	7	87
Nyctophilus geoffroyi, *Nyctophilus gouldi*, or ***Falsistrellus tasmaniensis***	Lesser Long-eared Bat, Gould's Long-eared Bat, or **Eastern False Pipistrelle**	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Ozimops planiceps, or *Ozimops ridei*	South-eastern Free-tailed Bat or Eastern Free-tailed Bat	3	3	0	3	0	2	3	4	0	0	0	0	0	0	0	18
Vespadelus darlingtoni or *Vespadelus regulus*	Large Forest Bat or Southern Forest Bat	24	11	7	83	37	13	87	11	32	23	31	7	1	3	8	378
Vespadelus regulus or *Vespadelus vulturnus*	Southern Forest Bat or Little Forest Bat	50	17	7	126	170	22	858	31	15	124	38	29	17	15	8	1,527

Species and species complexes		Survey site, and the number of definite, probable, and possible call sequences														
Species names	Common names	WTG 01	WTG 04	WTG 06	WTG 07	WTG 09	WTG 18	WTG 24	WTG 26	WTG 27	WTG 33	WTG 35	WTG 38	WTG 39	WTG 42	WTG 43	Total
Total number of identifiable call sequences		1,462	365	416	1,417	1,802	713	4,443	663	235	1,320	610	465	286	143	355	14,695

Bango Wind Farm Mortality Estimate - Year 2

Prepared for Nature Advisory, 08 September 2025, Ver. 1.0

This report outlines an analysis of mortality at Bango Wind Farm (BWF) from 2023-07-07 to 2025-07-09. The analysis is broken into the three related components below:

- Searcher efficiency / detectability – estimated from trials from May 2024 to April 2025.
- Scavenger loss rates – estimated from trials from September 2023 to February 2024
- Mortality estimates - from 2023-08-07 to 2025-07-09

1 Available data

Survey data was collected and provided by Nature Advisory. A brief summary of the data is provided below, and the ultimate focus of this report is a discussion of the potential mortality.

Turbine parameter data (rotor diameter and height) was provided by Nature Advisory.

Species archetype data was taken from Hull and Muir (2010).

1.1 Data cleaning

Survey data:

- Survey radius was filled in based on the survey type for some observations.
- Observations from March and April 2025 were removed because they were not surveyed.
- Survey IDs 644, 645, and 673 did not occur and were removed.

Carcass finds data:

- Duplicate carcass IDs were fixed.
- Capitalisation and hyphenation were made consistent.
- Unknown Bat sp. were recoded as Bat sp.
- Unknown Bird sp. were recoded as Bird sp.

Scavenger rate data:

- Renamed or classified proxy species as bats or birds.
- Unknown Bat spp. were recoded as Bat sp.

2 Statistical methodology overview

Mortality through collision is an ongoing environmental management issue for wind facilities. Different sites present different risk levels; consequently different sites have different monitoring requirements. In order to estimate the mortality loss at a given site (in a way that is comparable with other facilities) we must account for differences in survey effort, searcher and scavenger efficiency. We used a Monte Carlo method to achieve this.

Best practice estimators project the number of found carcasses (C) up to the number of actual mortalities (M), by accounting for:

- The probability a carcass will be detected by the searcher (p)
- The probability a carcass is not lost to scavenging or decay prior to the search (r)
- The probability a carcass falls within the searched area (a) - also known as the "coverage factor"
- The fraction of turbines searched (f)

Most mortality estimators, e.g. (M. M. Huso 2011), can be conceptualised as a ratio estimator:

$$\hat{M} = \frac{C}{\hat{p} \cdot \hat{r} \cdot \hat{a} \cdot f} \tag{1}$$

The terms in the denominator provide a "boost factor" to the number of carcasses found, C.

However, a limitation of analytical methods, is estimating r, when the time between surveys is not constant. In Australia, it is common for the time between searches to vary due to seasonal changes in effort, designs targeting specific species, logistical reasons, or the use of a pulsed design in which the turbine is searched monthly with a return visit a few days later. Additionally, ratio estimators cannot handle the cases when zero carcasses are found, as zero multiplied by any number still gives zero. This limits their ability to provide an estimate for very rare species that may collide infrequently.

To address this, Symbolix have developed a Monte Carlo algorithm. We have used this method for mortality estimates at over forty wind farms in Australia to date.

Monte Carlo methods (Sawilowsky (2003), Ripley (1987)) simulate a large set of possible survey results, by simulating the actual survey protocol, and sampling from empirical distributions for scavenge loss and searcher efficiency. This method allows us to directly sample the probability a carcass was lost before each survey, negating the need to calculate r analytically for each survey round.

We then estimate how many carcasses were truly generated, given the range of searcher and scavenger efficiencies, the survey frequency and coverage, and the true "found" details. After many simulations, we can estimate the likely range of mortalities that could have resulted in the recorded survey outcome (number of carcasses found).

This method has been benchmarked against analytical approaches (M. M. Huso (2011), Korner-Nievergelt et al. (2011))]. Its outputs are equivalent but it is able to robustly model more complex survey designs (e.g. pulsed surveys, rotating survey list).

Figure 1 provides an overview of the methodology. A detailed explanation can be found in Stark and Muir (2020).

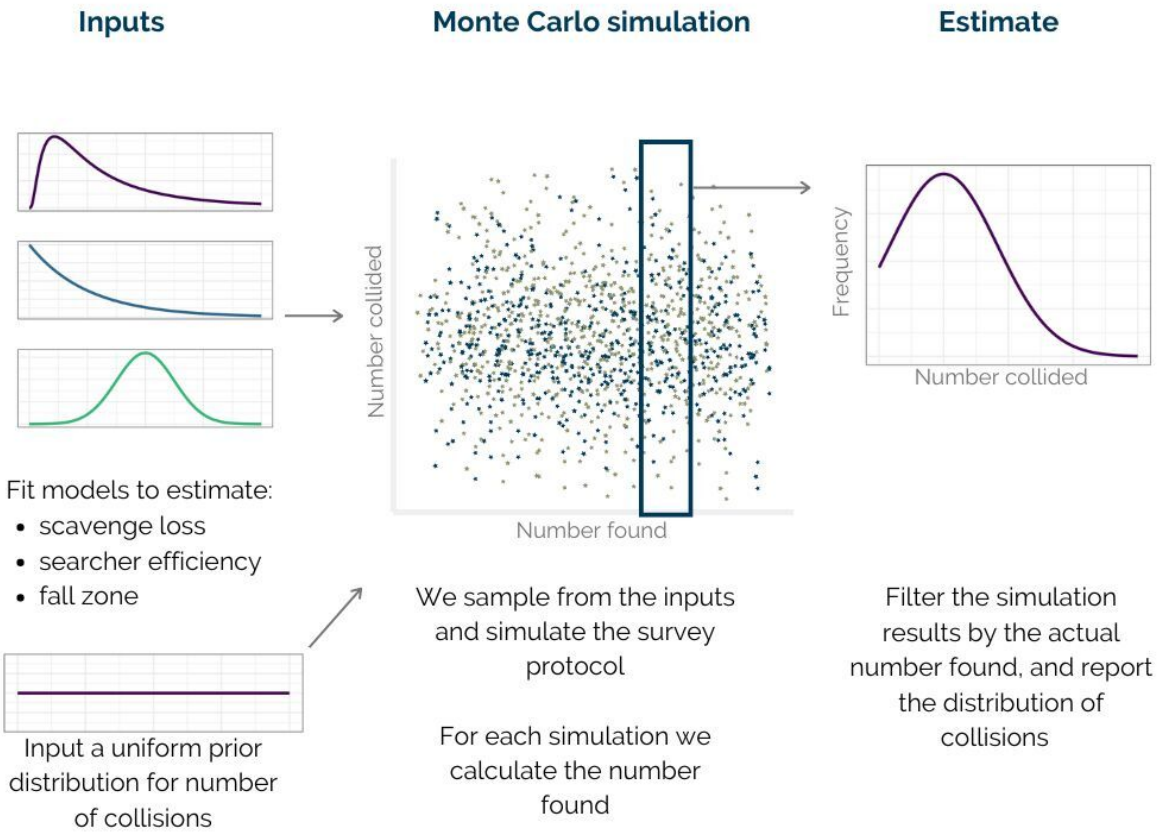

Figure 1: Overview of how the mortality estimation works.

The following sections outline how we estimate p, r and a. C is given by the field observation data for this site, and f is defined by the survey design.

3 Analysis and modelling

The survey program consisted of carcass searches, and adjunct scavenger and detection trials. We summarise the methods, field data and analysis results for each below.

3.1 Carcass search data

The carcass searches provide the C and f terms in Section 2.

3.1.1 Survey effort

Carcass searches were undertaken in accordance with the Bird and Bat Management Plan (BBMP)[1]. This included several different survey types:

- *Standard Surveys:* This included stratifying the site's turbines into three groups (e.g., cleared, open wooded, closed wooded) over which 17 turbines were searched. In total, 100% of turbines were searched at BWF over a two year period, between 2023-07-07 to 2025-07-09. The turbines were selected randomly within the strata, with the number searched being proportional to the number of turbines in the strata. Two main types of survey types were employed: 1) a initial survey out to 120m radius and 2) a follow-up "pulse" survey out to 60m radius.
- *Superb Parrot Targeted Surveys:* These surveys were meant to target the Superb Parrot breeding season (i.e., September to December). Each month, a total of 35 turbines were searched out to 100m, between 2023-09-12 to 2024-12-11.
- *White-throated Needletail (WTNT) Surveys:* Additional surveys for WTNT were implemented during their migration period, between 2025-03-17 to 2025-04-17, in which 28 turbines were searched out to 100m.
- *Impact Trigger Surveys:* These surveys occurred when a threatened bird or bat species was found dead or injured within the search area under the turbine or within 100m of it incidentally. A total of 46 turbines were searched out to 100m, between 2024-01-29 to 2024-03-01.

In the Monte Carlo algorithm, we explicitly simulate the survey design. The proportion of turbines sampled (f) is therefore accounted for in the simulation.

The mortality estimate was based on a dated list of turbine surveys. The survey frequency is summarised in Table 1.

[1] Nature Advisory (2021)

Table 1: Number of surveys per month.

Date	Initial	Pulse	Superb Parrot	Trigger	WTNT	YBST
2023 Aug	12					
2023 Sep	15	15	30			
2023 Oct	15	15	30			
2023 Nov	15	14	30			
2023 Dec	17	16				
2024 Jan	15	15	30	17		
2024 Feb	16	16		87		
2024 Mar	16	8		4		
2024 Apr	16	22				
2024 May	16					
2024 Jun	16					
2024 Jul	16					
2024 Aug	16					
2024 Sep	16	16	32			
2024 Oct	14	14	30			
2024 Nov	16	16	25			
2024 Dec	14	14	24			
2025 Jan	16	12				
2025 Feb	13	13				
2025 Mar	16	14			26	9
2025 Apr	14	14			24	61
2025 May	14					
2025 Jun	17					
2025 Jul	15					

3.1.2 Carcass finds

The breakdown of found carcasses per species are summarised in Table 2.

Table 2: Carcasses found during formal surveys (Standard = Initial and Pulse; Other = all other surveys).

Species	Species Type	Standard Surveys	Other Surveys	Total Surveys
Bat sp.	Bat	37	23	60
Broad-nosed Bat sp.	Bat	1	0	1
Chocolate Wattled Bat	Bat	1	0	1
Eastern Freetail-bat	Bat	1	1	2
Evening Bat sp.	Bat	0	2	2
Forest Bat sp.	Bat	19	4	23
Freetail Bat sp.	Bat	12	5	17
Gould's Wattled Bat	Bat	10	5	15
Large Forest Bat	Bat	1	1	2
Little Forest Bat	Bat	25	7	32
South-eastern Free-tailed Bat	Bat	1	1	2

Table 2: Carcasses found during formal surveys (Standard = Initial and Pulse; Other = all other surveys). *(continued)*

Species	Species Type	Standard Surveys	Other Surveys	Total Surveys
Southern Forest Bat	Bat	0	1	1
White-striped Freetail-bat	Bat	41	44	85
Yellow-bellied Sheathtail-bat	Bat	0	1	1
Australian Hobby	Bird	1	1	2
Australian King-parrot	Bird	1	0	1
Australian Magpie	Bird	13	2	15
Australian Raven	Bird	1	1	2
Australian Wood Duck	Bird	4	0	4
Bird sp.	Bird	19	7	26
Black-faced Cuckoo-shrike	Bird	1	1	2
Brown Falcon	Bird	0	2	2
Common Myna	Bird	1	0	1
Common Starling	Bird	1	2	3
Corvid sp.	Bird	1	1	2
Crimson Rosella	Bird	23	7	30
Eastern Barn Owl	Bird	1	0	1
Eastern Koel	Bird	1	0	1
Eastern Rosella	Bird	20	2	22
Fan-tailed Cuckoo	Bird	1	1	2
Galah	Bird	1	2	3
Golden Whistler	Bird	1	0	1
Grey Fantail	Bird	14	7	21
Honeyeater sp.	Bird	1	0	1
Little Corella	Bird	0	1	1
Magpie-lark	Bird	1	1	2
Nankeen Kestrel	Bird	9	22	31
Noisy Friarbird	Bird	0	1	1
Noisy Miner	Bird	0	1	1
Pardalote sp.	Bird	1	0	1
Red Wattlebird	Bird	0	1	1
Rock Dove	Bird	2	1	3
Silvereye	Bird	1	0	1
Spotted Pardalote	Bird	5	2	7
Striated Pardalote	Bird	2	1	3
Stubble Quail	Bird	1	0	1
Sulphur-crested Cockatoo	Bird	3	1	4
Wedge-tailed Eagle	Bird	7	10	17
White-throated Gerygone	Bird	1	0	1
White-throated Needletail	Bird	5	3	8
White-winged Chough	Bird	0	1	1

A number of carcasses were also found incidentally. These carcasses are not included in the data that produces the mortality estimate; however we report them here for completeness (Table 3).

Table 3: Incidental carcass finds.

Species	Number found
Australian Magpie	3
Australian Raven	1
Bird sp.	1
Crimson Rosella	2
Eastern Rosella	1
Forest Bat sp.	1
Freetail Bat sp.	2
Galah	1
Gould's Wattled Bat	1
Grey Butcherbird	1
Nankeen Kestrel	2
Silvereye	1
South-eastern Free-tailed Bat	1
Wedge-tailed Eagle	1

3.2 Searcher efficiency

The aim of searcher efficiency trials is the quantify the effectiveness of observers, at finding carcasses. They provide the p term in Equation 2.

3.2.1 Field methods

The searcher efficiency data is sourced from trials conducted from May 2024 to April 2025. Carcasses were laid out, searches for the carcasses undertaken using the same protocol as the main mortality survey (i.e. using a trained detection dog with a human handler). There were no human detectability trials but humans were used to survey the turbines. If the carcass was found, "success" was recorded, else "failure" was the dog missing the carcass.

The carcasses deployed for searcher efficiency trials included birds (14 replicates) and bats (15 replicates).

The number of carcasses for each group are summarised in Table 4.

Table 4: Count by species class and observer used during the detection trials.

Species type	Dog
Bat	15
Bird	14

3.2.2 Statistical methods

We estimated searcher efficiency by fitting binomial generalised linear models (GLMs). The optimal model was determined, guided by the small-sample corrected Akaike Information Criterion (AICc) (Anderson and Burnham 2004).

The theory of AICc is complex, the details of which are beyond the scope of this report. However, fundamentally AICc is a method for choosing the best approximating (i.e. best model fit) and parsimonious (a simpler model is preferable to a more complex model) model. For each model we fit to the data, we calculate the AICc. We compare the differences in AICc between models, which in turn informs us of the weight of evidence for that particular model.

We also consider the reliability and applicability of parameters in the model. For example, cloud cover may affect detection rates, but the ability of observers to accurately and consistently record cloud cover is likely to be poor and it is not feasible to incorporate cloud cover into a mortality estimate.

AICc is not the same as significance testing. We do not aim to state anything is significant at the 5% level, instead we aim to find a good model fit for the data.

3.2.3 Results

The most parsimonious model of searcher efficiency was the "intercept-only" model (i.e. all carcasses have the same expected searcher efficiency) according to AICc. Therefore, bat and bird detection efficiencies are aggregated in the following mortality estimate - see Table 5.

Table 5: Detection efficiencies for bats and birds by dogs.

Variable	Bats and Birds
Number found	28
Number placed	29
Mean detectability proportion	0.97
Detectability lower bound (95% CI)	0.82
Detectability upper bound (95% CI)	1

Overall detectability of bats and birds is 97%, with a 95% confidence interval of [82%, 100%].

3.3 Scavenger efficiency

In order to accurately estimate mortality, we must account for carcass loss to scavengers. Scavenger trials are performed to quantify the time until a carcass is completely lost as a result of scavenger activity.

This section estimates the r term in Section 2.

3.3.1 Field methods

Scavenger efficiency trials were conducted from September 2023 to February 2024. In total, 42 carcasses were used including a mixture of bats (11 replicates), bat proxies (mice; 10 replicates), and birds of various sizes (21 replicates). Motion sensor cameras were used to capture scavengers.

Table 6 summarises the species used in the trials.

Table 6: Count by species class used in the carcass persistence trials.

Species type	Species	Count
Bat	Gould's Wattled Bat	1
Bat	South-eastern Free-tailed Bat	4
Bat	Little Forest Bat	1
Bat	Bat sp.	1
Bat	Forest Bat sp.	4
Bat Proxy	House Mouse	10
Bird	Common Myna	11
Bird	Common Starling	6
Bird	Nankeen Kestrel	1
Bird	Grey Fantail	1
Bird	Laughing Kookaburra	1
Bird	Australian Magpie	1

3.3.2 Statistical methods

Survival analysis (Kaplan and Meier (1958), Kalbfleisch and Prentice (2011)) was used to determine the distribution of time until complete loss from scavenge (or decay). Survival analysis was required to account for the fact that we do not necessarily know the exact time of scavenge loss, only an interval in which the scavenge event happened. For example, any carcass which is unscavenged at the end of the trial, has its scavenge event in the interval $[x, \infty]$ (where x is the length of the trial).

By performing survival analysis we can estimate the time until carcass loss after a given length of time, despite these unknowns.

We fit parameterised models to analyse significant factors influencing time to scavenge (carcass species type etc.), and to find the most appropriate distribution to fit the time-to-loss curve (e.g. log-normal, exponential).

Time to carcass loss is influenced by the parameters discussed above and the distribution of the loss curve we fit to the data (M. M. P. Huso, Dalthorp, and Korner-Nievergelt 2015). The choice of loss function is important because it should capture the behaviours and relative time dependence of the various scavengers. Generally, the best distribution is the log-normal distribution (Stark and Muir 2020).

3.3.3 Results

AICc analysis of the survival regression models, showed the most parsimonious model was the model that combined bats, birds and proxies.

Figure 2 shows the survival curve fitted to the carcasses. The survival curve (smooth solid line for fitted regression curve, jagged step function for empirical removal rate) shows the estimated proportion of the set remaining at any given time. The shaded portions are the 95% confidence intervals on the estimate.

Under these assumptions, the median time to carcass removal via scavenge is 1.1 days, with a 95% confidence interval of [1, 1.8] days.

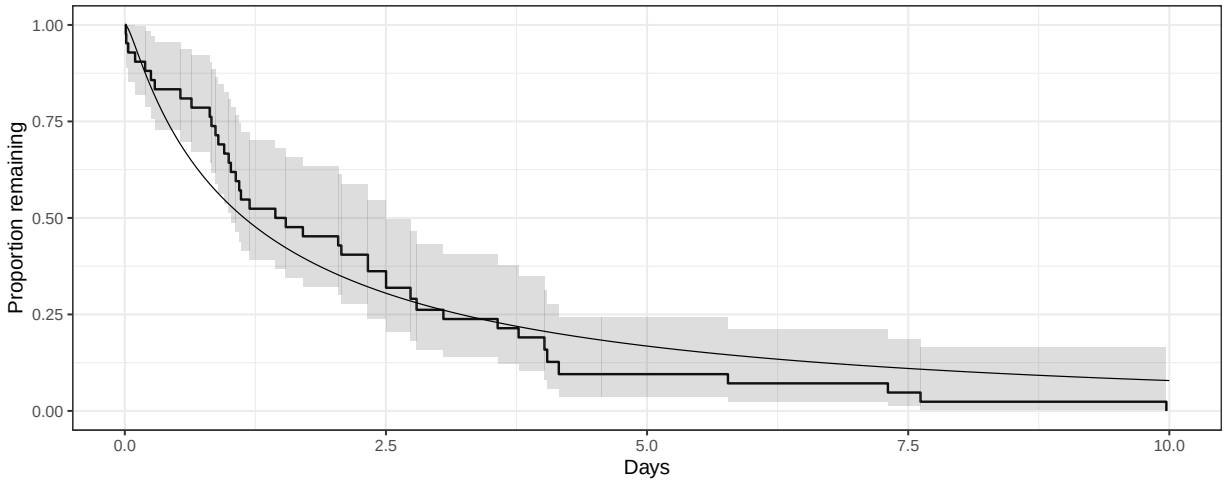

Figure 2: Empirical survival curve (the step function), with 95% confidence intervals shaded. The smooth curve presents the fitted model.

3.4 Coverage factor

The probability a carcass falls within the searched area (i.e. the "coverage factor") is calculated to provide the a term (Section 2).

3.4.1 Statistical methods

3.4.1.1 Fall zone simulation We generated a carcass fall-zone distribution for for each species class given the turbine size at the wind farm.

The fall-zone distribution is the end result of the simulation method detailed in Hull and Muir (2010). The simulation method is a ballistics model describing bird and bat strikes by turbine blades.

3.4.1.2 Coverage factor calculation The percentage of the fall zone not covered by the survey area, provides a correction factor in the mortality estimate. Because carcasses that fall outside the searched area have a zero probability of being detected by a survey, the likelihood of landing in this region is essential to understanding the relationship between detections and actual losses.

3.4.2 Simulation inputs

The fall zone simulation requires a set of turbine and bird specifications.

Table 7 displays the dimensions and RPM of the turbines at BWF Wind Farm. Table 8 shows the bird and bat physical parameters used. These archetypes were used as they represent a medium sized species for each species type and produce an estimate of the average fall zone.

[H]

Table 7: Turbine specifications for Bango Wind Farm

Rotor Diameter (m)	Tower Height (m)	RPM
158	121	9.4

[H]

Table 8: Species parameters used per group.

Species type	Archetype	Mass (kg)	Min. area (sq m)	Max. area (sq m)
Bat	Gould's Wattled Bat	0.014	0.0028	0.014
Bird	Forest Raven	0.680	0.0450	0.100

3.4.3 Results

Figure 3 displays the simulation results, given the factors specified above. We display the cumulative density function (CDF) on the y axis versus the distance from turbine on the x axis for each species type. The CDF describes the expected proportion of carcass which fall less than or equal to a certain distance from the turbine.

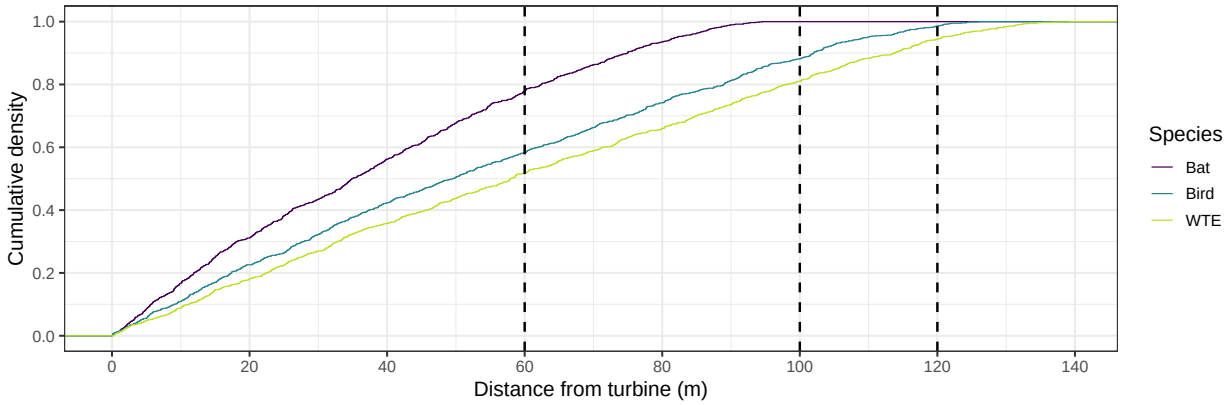

Figure 3: Cumulative distribution function of the fall zone simulation output for birds, bats, and WTE. Vertical lines indicate the survey radii.

Once the fall zone distribution is calculated, we generate a "coverage factor". The coverage factor represents the expected proportion of carcasses which fall within the searched area, given the search protocol.

On average, we expect about 78% of bats, 58% of birds, and 52% of WTE to fall within 60m of the turbine, 100% of bats, 88% of birds, and 81% of WTE to fall within 100m of the turbine, and 100% bats, 99% of birds, and 94% of WTE fall within 120m.

4 Mortality estimate

With estimates for scavenge loss, searcher efficiency, and survey coverage for BWF, we then converted the number of bat and bird carcasses detected into an estimate of overall mortality from 2023-07-07 to 2025-07-09 (we allow for collisions to occur up to a month prior to the first survey).

The mortality estimation is done via a Monte Carlo algorithm. We used 15000 simulations, with the survey design simulated each time. Random numbers of virtual mortalities were simulated, along with the scavenge time and searcher efficiency (based on the measured confidence intervals). The proportion of virtual carcasses that were "found" was recorded for each simulation. Finally, those trials that had the same outcome as the reported survey detections were collated, and the initial conditions (i.e. how many true losses there were) reported on.

The model assumptions are listed below:

- There were 46 turbines on site available to strike bats and birds.
- Search frequency for each turbine was taken from a list of actual survey dates (see Table 1 for a summary).
- Mortalities were allowed to occur from 2023-07-07 (approximately one month from the first survey), until 2025-07-09, the final surveyed date.
- Bats and birds are on-site at all times during this period.
- Bats and birds that are struck are immediately replaced (i.e. strikes one day do not affect the chance of strikes the next).
- We assume that all carcasses and all feather spots (regardless of size or composition) are attributable to the wind turbines.
- Finds are random and independent, and not clustered with other finds.
- There was equal chance of any turbine being involved in a collision / mortality.
- Scavenger loss and searcher efficiency rates are calculated as outlined above.
- We assumed a log-normal scavenge shape.
- We assumed coverage factors as outlined above.

4.1 Bats

4.1.1 All Surveys

During the two years of surveys, 244 bats were found. The resulting (median) estimate of total mortality is 3719 Bats lost on site over the two year period.

Based on the detected carcasses, measured detectability, scavenge rate, and survey effort, we expect that there was a total site loss of around 3719 Bats, and are 95% confident that fewer than 5985 individuals were lost, in the two year period across all surveys.

4.1.2 Standard Surveys

During the two years of standard surveys (i.e., initial and pulse), 149 bats were found. The resulting (median) estimate of total mortality is 4287 Bats lost on site over the two year period.

Based on the detected carcasses, measured detectability, scavenge rate, and survey effort, we expect that there was a total site loss of around 4287 Bats, and are 95% confident that fewer than 6345 individuals were lost, in the two year period across all standard surveys.

Table 9 and Figure 4 display the percentiles of the distributions, to show the confidence on the mortality estimate for All Surveys and Standard Surveys.

We note that the estimates using only standard surveys are higher than those using all surveys which is the opposite of what would be expected if the additional surveys were associated with increased risk. Instead, the additional surveys have fewer finds per survey (Table 2) which actually provides evidence of a lower mortality rate than is suggested by the standard surveys alone. Thus reducing the estimated mortality.

Table 9: Percentiles of estimated total bat losses in the two years of All Surveys and Standard Surveys.

Estimate	0%	50% (median)	90%	95%	99%
All	2096	3719	5278	5985	7009
Standard	2777	4287	6002	6345	6653

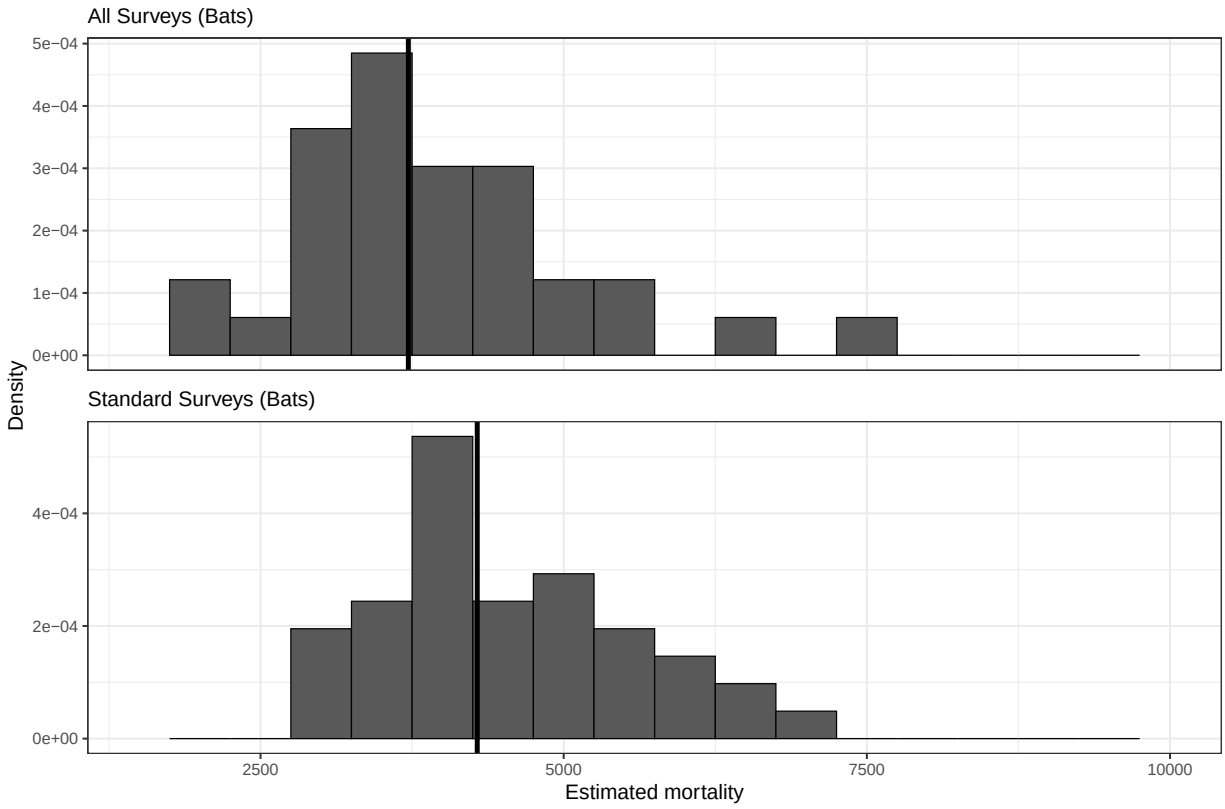

Figure 4: Histogram of the total losses distribution (bats) for All surveys and Standard surveys. The black solid line shows the median.

4.2 Birds

4.2.1 All Surveys

During the two years of surveys, 209 birds (excluding Wedge-Tailed Eagles) were found. The resulting (median) estimate of total mortality is 3084 birds lost on site over the two year period.

Based on the detected carcasses, measured detectability, scavenge rate, and survey effort, we expect that there was a total site loss of around 3084 birds, and are 95% confident that fewer than 4445 individuals were lost, in the two year period across all surveys.

4.2.2 Standard Surveys

During the two years of standard surveys (i.e., initial and pulse), 137 birds (excluding Wedge-Tailed Eagles) were found. The resulting (median) estimate of total mortality is 4277 birds lost on site over the two year period.

Based on the detected carcasses, measured detectability, scavenge rate, and survey

effort, we expect that there was a total site loss of around 4277 birds, and are 95% confident that fewer than 6584 individuals were lost, in the two year period across all standard surveys.

Table 10 and Figure 5 display the percentiles of the distributions, to show the confidence on the mortality estimate for All surveys and Standard surveys.

As with the bat estimates, the additional surveys provide evidence of lower mortality, reducing the overall mortality estimate.

Table 10: Percentiles of estimated total bird losses in the two years including All Surveys and Standard Surveys.

Estimate	0%	50% (median)	90%	95%	99%
All	2055	3084	3976	4445	4778
Standard	2220	4277	6181	6584	6716

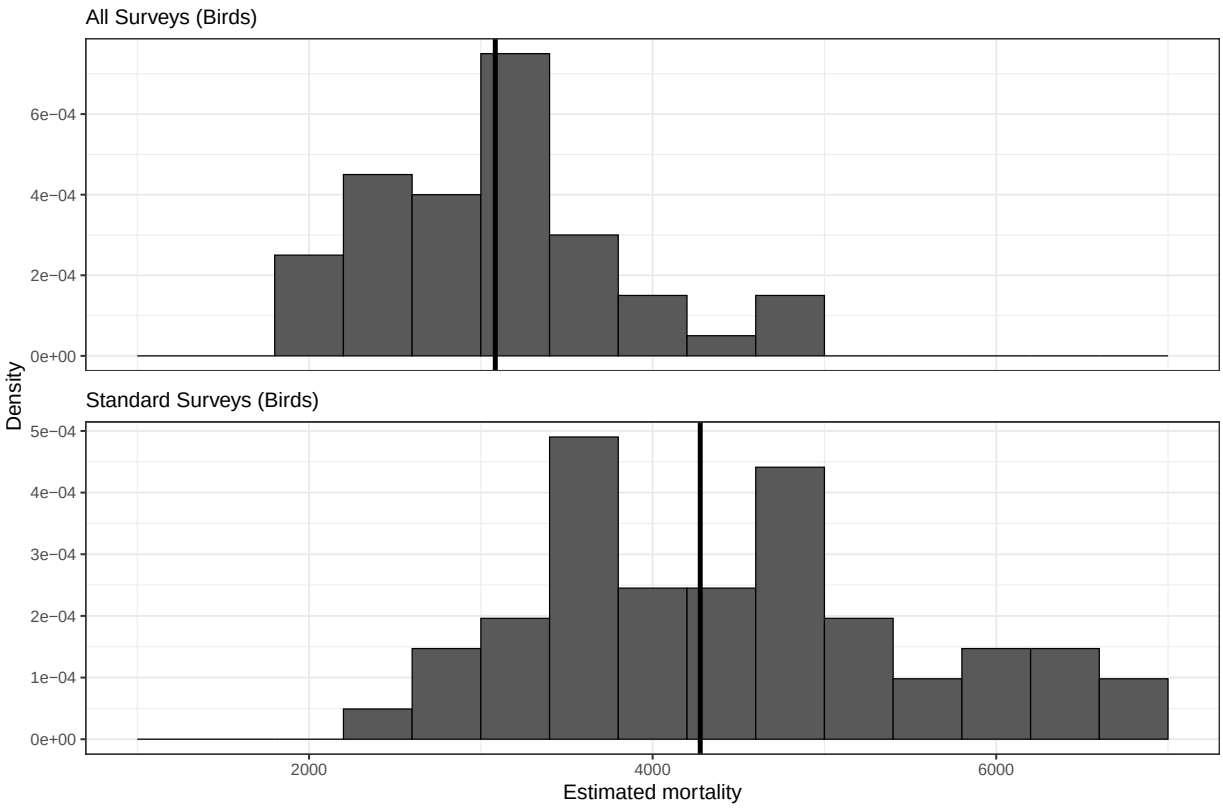

Figure 5: Histogram of the total losses distribution (birds) for All surveys and Standard surveys. The black solid line shows the median.

4.3 WTE

During the first year of surveys, 11 Wedge-Tailed Eagles were found. The resulting (median) estimate of total mortality is 13 WTE lost on site the first year. During the second year of surveys, six Wedge-Tailed Eagles were found. The resulting (median) estimate of total mortality is 8 WTE lost on site the second year.

Table 11 and Figure 6 display the percentiles of the distributions, to show the confidence on the mortality estimate.

Based on the detected carcasses, measured detectability, scavenge rate, and survey effort, we expect that in year 1 there was a total site loss of around 13 WTE, and are 95% confident that fewer than 16 individuals were lost. In year 2, we expect that there was a total site loss of around 8 WTE, and are 95% confident that fewer than 11 individuals were lost.

Table 11: Percentiles of estimated total bird losses in Year 1 and Year 2 of surveys.

Estimate	0%	50% (median)	90%	95%	99%
Year 1	11	13	15	16	18
Year 2	6	8	11	11	12

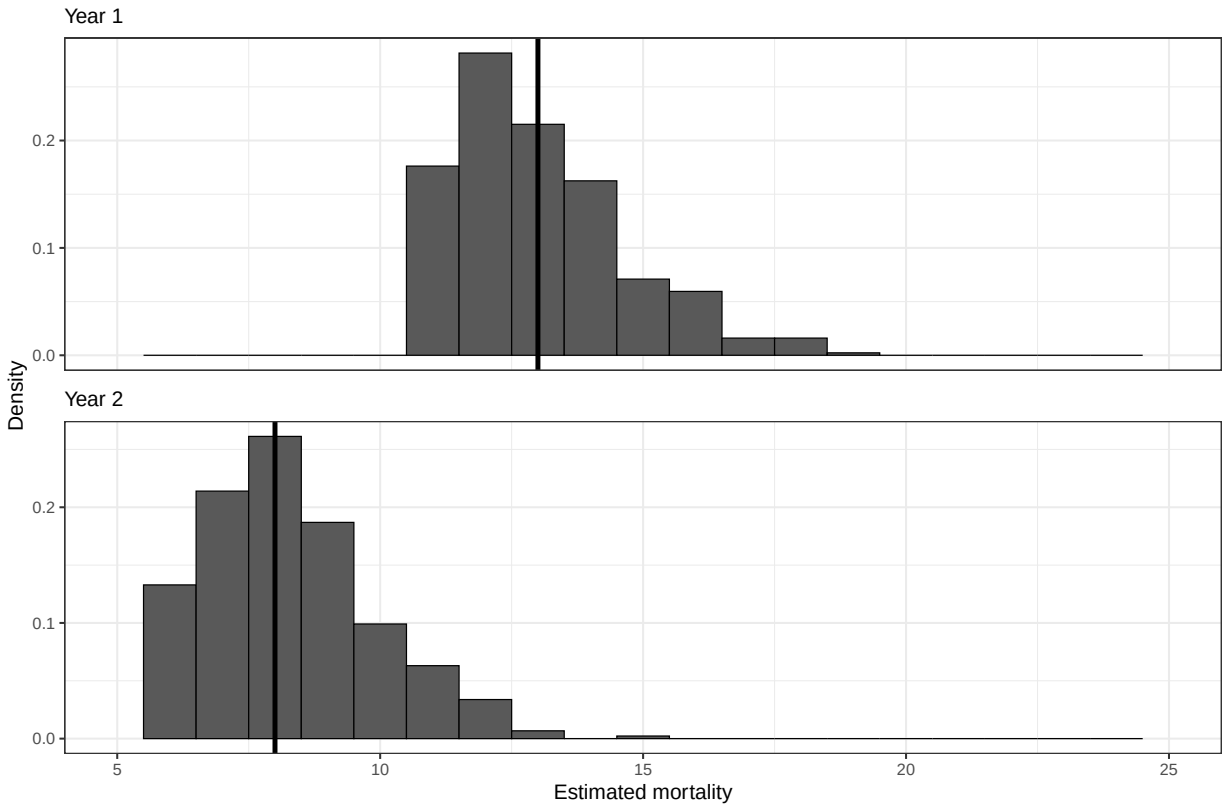

Figure 6: Histogram of the total losses distribution of WTE in Year 1 and Year 2. The black solid line shows the median.

Per-turbine relative risk

The purpose of this is the provide a per-turbine assessment of relative risk, for bats and birds. All 46 turbines were surveyed between September and December in 2023 and 2024, and these survey periods were included in the calculation of the mortality estimates.

Methodology

The methodology for the combined estimate is the same as above, with the exception of the number of simulations has been reduced to 1500, 2500, 2000, depending on the turbine. A simulation has been run for each individual turbine, and compared to the number of finds at each turbine.

Additionally, there are some assumptions and limitations to calculating a per turbine mortality estimate. The estimator assumes that at least one carcass was struck even if there are zero finds which is known to cause an upwards bias in mortality. By estimating for a single turbine over a shorter period of time there are a greater number of zero-find periods. Turbines 25 and 33 had zero bat finds and turbines 7, 8, 23 and 29 had zero bird finds over the period when all

turbines were surveyed. Therefore we expect that their estimates are somewhat biased high. As a result, per-turbine estimates are useful but should be interpreted with this limitation in mind, as well as considering the reported uncertainty.

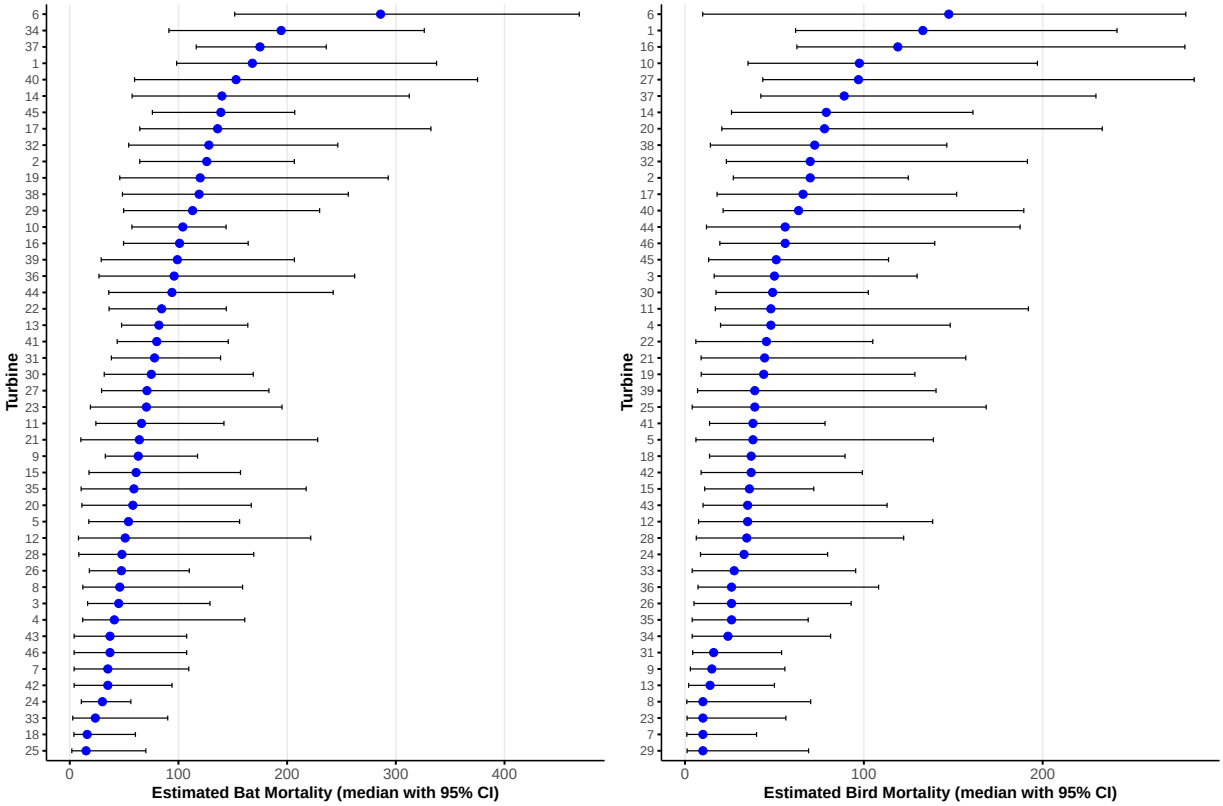

Figure 7: Estimated bat and bird mortality per turbine (median with 95% confidence intervals) based on simulation results. Error bars represent the 2.5th and 97.5th percentiles of predicted mortality, and points indicate the median value for each turbine.

Figure 7 shows the estimated bat and bird mortality per turbine, presented as median values with 95% confidence intervals based on simulation results.

To succinctly compare the quantity of data and look for spatial patterns, we have taken the median mortality estimate for each turbine and species class (bat/bird), and plotted them on a map. The medians have been grouped into bins: 15–82, 83–149, 150–217, 218–285 for bats and 10–43, 44–78, 79–113, 114–147 for birds, to examine broad patterns in relative risk. Figure 8 shows the relative risk for each turbine.

Figure 8: Relative risk of each turbine, for birds (left) and bats (right).

This indicates that:

- birds have a flat risk profile across the site, with weak evidence for the middle of the site having a higher risk profile.
- bats have a flat profile across most of the middle of the site, with the north-east and very south portions having a higher risk profile.

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