Dundonnell Wind Farm

Year 4 Operational Monitoring Annual Report – Bat and Avifauna Management Plan Implementation

Tilt Renewables

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Executive Summary

Aurecon Australasia Pty Ltd (Aurecon) was commissioned by Tilt Renewables Australia Pty Ltd (Tilt Renewables) to implement the operational bird and bat monitoring for Year 4 of operations at Dundonnell Wind Farm (DDWF) and prepare the annual monitoring report, as per the requirements of the DDWF Bat and Avifauna Management (BAM) Plan (BL&A 2018). The monitoring undertaken included a monthly bird and bat carcass monitoring program within DDWF, monthly Brolga wetland monitoring to within 5km of the DDWF and additional monitoring for White-throated Needletail, Peregrine Falcon and other raptors within the DDWF. The Year 4 operational monitoring period spans from November 2023 to October 2024.

Raptor monitoring

A high diversity of raptors were recorded within the DDWF (11 species), as well as one additional species (Spotted Harrier) being recorded within 5 km of DDWF. The most common recorded raptors within the wind farm were Wedge-tail Eagle (53 observed flights), Nankeen Kestrel (38 observed flights) and Brown Falcon (31 observed flights).

The pair of Peregrine Falcons at Mount Fyans Wildlife Reserve were observed to have successfully bred in late 2023 (at the start of the Year 4 monitoring period). As of October 2024, no evidence of breeding in the spring 2024 season had been observed. No Peregrine Falcon carcasses were detected in Year 4.

Brolga monitoring

Brolga were recorded at 18 of the 26 wetlands surveyed during Year 4, with Brolga being recorded within 5km of the DDWF within all 12 months of the Year 4 monitoring period. Brolgas were recorded from single individuals up to flocks of up to 46 individuals (as recorded in May 2024 at Lake Gellie). Observations of flocking Brolgas (flocks of >10 individuals) during seven out of 12 months triggered additional targeted Brolga flocking surveys. No Brolga breeding attempts were recorded during Year 4. The lack of breeding activity observed is largely thought to be due to the lack of rainfall during the winter period, and subsequent lack of water in the smaller breeding wetlands. The high activity and large size of Brolga flocks observed around the DDWF during Year 4 suggests the species is able to persist within the vicinity of operational wind farms.

Bird and bat carcass monitoring

Bird and bat carcass monitoring was undertaken monthly at 27 turbines at DDWF in Year 4 as per the BAM Plan. The carcass monitoring program detected a total of 162 individual bird/bat mortalities across 32 species/species groups. Of the 162 detected mortalities, 142 were recorded during formal searches and 20 were incidental finds.

BAM Plan impact triggers were met for one threatened species (Little Eagle - one individual detected in March 2024), and one non-threatened species (White-Striped Free-tailed Bat – four carcasses detected at the same turbine across consecutive months [two each month], in February and March 2024).

No Brolga or Southern Bent-wing Bat (SBWB) carcasses were detected in Year 4. No White-throated Needletail were observed within DDWF in Year 4.

Species-specific mortality estimates have been provided in this report for three species of interest, namely Brolga, SBWB and WSFB. Based on the detected carcasses, measured detectability, scavenge rate, and survey effort, it has been estimated that there was a total (median) mortality of one (1) Brolga, 17 SBWB and 217 WSFB at DDWF during the Year 4 monitoring period (Nov 23 to Oct 24). It is important to note that no Brolga or SBWB carcasses were detected at DDWF in Year 4. However, as the model used for estimating mortality has an assumption that at least one individual was struck, the estimate is biased high (i.e. a conservative estimate).

Key recommendations

Key recommendations based on the outcomes of the Year 4 monitoring are as follows:

- It is recommended that no change be made to the methods for the carcass and raptor monitoring program as outlined in the BAM Plan. Year 5 monitoring commenced in November 2024, and will continue for the duration of the Year 5 of operations (to October 2025).
- It is recommended that mortality estimates for Brolga, SBWB and WSFB be undertaken again in Year 5, in addition to undertaking general bird and bat mortality estimates for Year 5.
- It is recommended that the carrion removal program within DDWF is strengthened with the aim to reduce raptors being attracted to the area under turbines, so to reduce opportunities for collision. It is recommended that this could be achieved through formal notification of stock carcass presence to be undertaken concurrently with the existing bird and bat monitoring program, and deployment of a contractor to remove any stock carcasses present.
- Given the documented impacts to WSFB at wind farms across Victoria, localised mitigation methods are considered unlikely to affect regional scale populations numbers. Rather, Aurecon consider that a regional approach is required to implement effective mitigation measures to reduce impacts to the species population. Aurecon recommend further discussion with DEECA to determine an appropriate regional approach to reducing impacts to WSFB associated with turbine collision..
- It is recommended discussions are undertaken with DEECA to determine whether the need to continue additional triggered flocking surveys is required in Year 5, given the extensive information gathered on Brolga flocking movements around DDWF in Year 4.

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1 Introduction

1.1 Background

Aurecon Australasia Pty Ltd (Aurecon) was commissioned by Tilt Renewables Australia Pty Ltd (Tilt Renewables) to implement the operational bird and bat monitoring for Year 4 of operations at Dundonnell Wind Farm (DDWF), as per the requirements of the DDWF Bat and Avifauna Management (BAM) Plan (BL&A 2018). The BAM Plan fulfils Conditions 52, 53 and 55 of Planning Permit No. 105/23858 (Planning Permit), as part of the approval of DDWF. The DDWF consists of 80 turbines and key ancillary infrastructure including access tracks, substation and an operations and maintenance building. Turbines have a 189 metre maximum tip height, 39 metre minimum blade clearance.

Biosis Pty Ltd (Biosis) undertook implementation of the DDWF BAM Plan monitoring in Years 1 to 3, the results of which are documented in the Years 1 to 3 Annual Monitoring Reports (Biosis 2022; Biosis 2023; Biosis 2024).

The current report details the methods and findings of the Year 4 operational monitoring activities as required in DDWF BAM Plan. The Year 4 operational monitoring period spans from November 2023 to October 2024.

1.2 Scope and purpose

The scope of work for the implementation of the Year 4 operational monitoring at DDWF was undertaken as per the requirements of the DDWF BAM Plan, which include:

- Monthly carcass searching for birds and bats at a subset of turbines at DDWF (27 turbines).
- Recording of incidental observations of raptors (including Wedge-tail Eagle (*Aquila audax*)) and White-throated Needletail (*Hirundapus caudacutus*) within DDWF (incorporated into the monthly carcass monitoring program).
- Monthly monitoring of known Peregrine Falcon (*Falco peregrinus*) nesting site at Mount Fyans Wildlife Reserve during and after the Peregrine Falcon breeding season (from August to December).
- Monthly Brolga (*Antigone rubicunda*) carcass searching at all 80 turbines at DDWF
- Monthly Brolga behaviour monitoring, including:
  - Monitoring of Brolga flocking behaviour up to 5km from DDWF during the Brolga flocking season (from January to June); and
  - Monitoring of Brolga breeding behaviour up to 3.2km from DDWF during the Brolga breeding season (from July to December).
- Preparation of the Year 4 annual monitoring report (this report).

The DDWF BAM Plan requires the carcass search program, and surveying for raptors, White-throated Needletail and the Peregrine Falcon nesting site be undertaken for the first five years of operations. The Brolga monitoring (including behaviour and mortality monitoring) is required to be undertaken for the life of the project.

The carcass search program, Brolga carcass searches and monitoring of raptors and White-throated Needletail within DDWF was undertaken by Nature Advisory Pty Ltd (Nature Advisory) in Year 4. Carcass searching for birds and bats was undertaken using trained scent detection dogs. This method has been shown to be more effective and efficient compared to human-only spotters, and as such was noted as the preferred method for carcass searching in the addendum to the DDWF BAM Plan. Carcass searching for Brolga at all remaining turbines was undertaken by visual inspection using binoculars.

Brolga behaviour monitoring and Peregrine Falcon nest monitoring was undertaken by Aurecon. Aurecon also managed the collection of all digital data through Aurecon's Geoportal, and provided reporting as required for any BAM Plan triggers.

As per the DDWF BAM Plan, mortality estimates for birds and bats are only required at the end of Years 2 and 5. As such, mortality estimates for birds and bats have not been provided for this current (Year 4) monitoring period. Rather, three species-specific mortality estimates were calculated by Symbolix at the end of the DDWF Year 4 monitoring period for Brolga, Southern Bent-wing Bat (*Miniopterus orianae bassanii*) and White-striped Free-tailed Bat (*Austronomus australis*). Justification for undertaking mortality estimates for these species is provided as follows:

- Brolga (listed as endangered under the FFG Act):
  - The BAM Plan requires a species-specific mortality estimate to be calculated every year for Brolga.
- Southern Bent-wing Bat (SBWB) (listed as Critically endangered under the EPBC Act and FFG Act):
  - In response to a number of SBWB carcass finds at DDWF during the Year 3 monitoring period, Tilt have since offered to undertake a mortality estimate for SBWB to provide a better understanding of the actual number of individuals likely be impacted at DDWF across the project.
- White-striped Free-tailed Bat (WSFB) (common / not listed):
  - In a letter to Tilt dated 10th May 2024, DEECA requested that a species-specific mortality estimate for WSFB be included as part of the Year 3 report. Given the Year 3 monitoring report has already been delivered, a mortality estimate for WSFB was calculated at the end of the Year 4 monitoring period.

As per the requirements of the BAM Plan, this Year 4 Annual Monitoring Report is to be submitted to the Victorian Department of Energy, Environment and Climate Action (DEECA) within three months of completion of the Year 4 monitoring period.

1.3 Location

DDWF is located approximately 20 kms southeast of the township of Lake Bolac and 24 kms north east of the township of Mortlake in western Victoria (Figure 1). The DDWF area encompasses approximately 4,200 hectares of farming land, and is intersected by Darlington – Nerrin Road, which runs north-south through the eastern part of the DDWF boundary.

While the carcass search program was focused on the turbines within the DDWF project boundary, the Brolga behaviour monitoring was undertaken across a broader study area including a:

- 3.2 km buffer around the DDWF turbine layout to monitor Brolga breeding activity; and
- 5 km buffer around the DDWF turbine layout to monitor Brolga flocking activity.

The Mount Fyans Wildlife Reserve, located west of Darlington – Nerrin Road amidst the DDWF, was the focus of monitoring for Peregrine Falcon. The locations of the above survey areas are shown in Figure 1-1.

1.4 Limitations

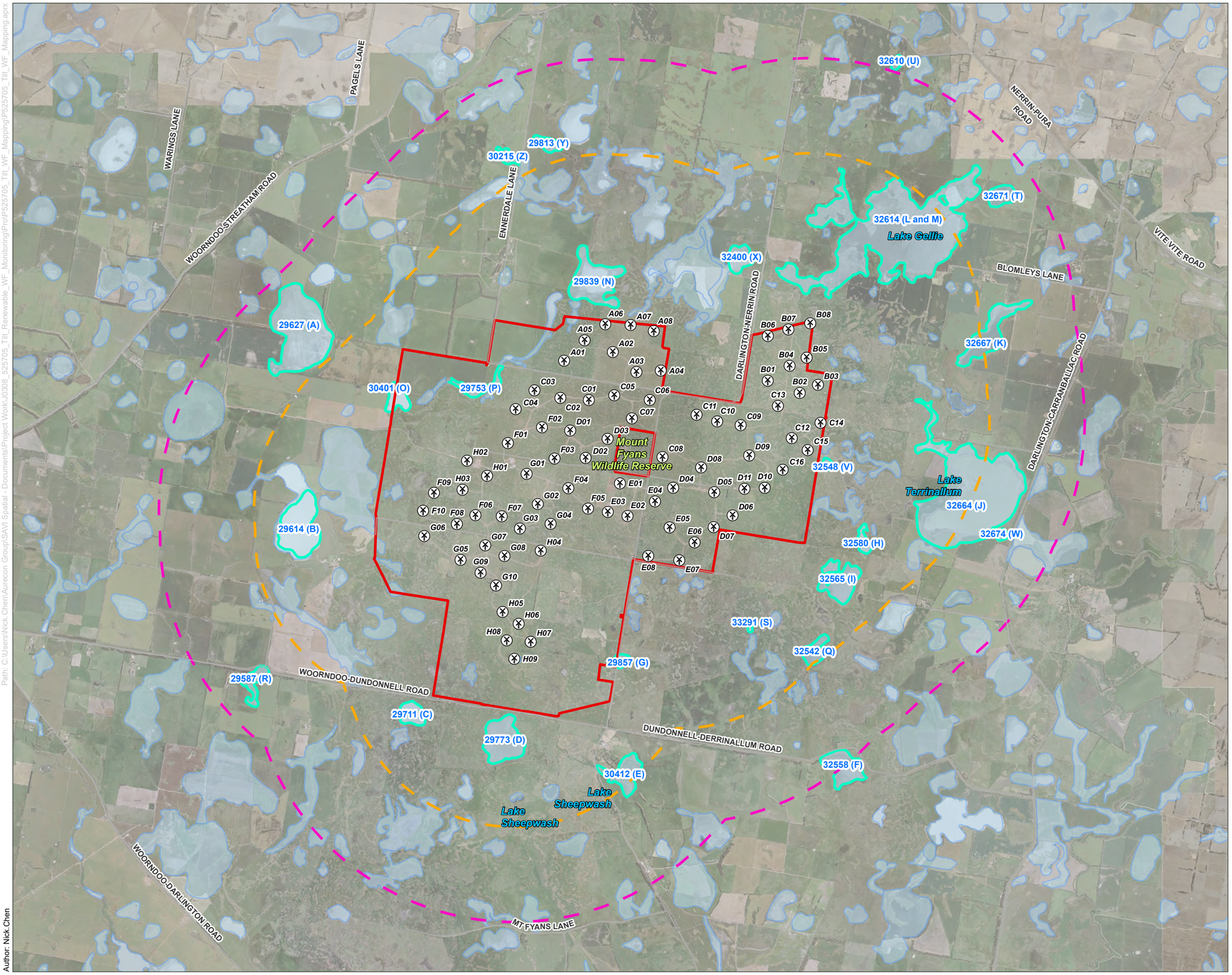
The operational monitoring activities undertaken for Year 4 at DDWF were limited to the requirements of the DDWF BAM Plan as per the scope defined in Section 1.2.

No searcher efficiency or scavenger trials were conducted during Year 4, and rather mortality estimates utilised scavenger factors from previous years, and searcher efficiency factors from Nature Advisory from similar sites where trials have been undertaken. Particularly, searcher efficiency for Year 4 has been factored based on data from trials conducted by Nature Advisory at another wind farm site in western Victoria (Bulgana Wind Farm) from July to October 2022 to more accurately reflect the detection rate of the Nature Advisory team. On this basis, Symbolix measured the overall detectability of bats and birds at DDWF for Year 4 as 98% (See Appendix B). A paper prepared by Symbolix (2020), which considered data from over 5000 surveys determined that there is no significant difference in searcher efficiency between similar sites. The searcher efficiency rate for the Year 4 monitoring at DDWF is therefore considered to be high. Given the BAM Plan only requires trials are undertaken in the first two years of operation, this approach is in line with the BAM Plan.

The model used by Symbolix to calculate mortality estimates for the three species of interest (Brolga, SBWB and WSFB) includes a number of assumptions (detailed in Appendix B). The main assumption/limitation of the mortality estimate model is that it relies on the assumption that at least one animal of each of the species of interest was struck (despite that no Brolga or SBWB carcasses were detected during Year 4 monitoring). As such, the resulting mortality estimate for SBWB and Brolga is likely to be biased high (i.e. a conservative estimate).

Monthly wetland Brolga behaviour surveys were undertaken during daylight hours to maximise the possibility of detection of Brolga activity in the study area. Targeted flocking and breeding surveys when triggered were undertaken at dusk and dawn to gather further information about the utilisation and movement patterns of Brolga in the study area. Local landholders were also consulted with regularly to gather information on any Brolga activity they had observed in the local area. The frequency, timing and survey effort for Brolga behaviour monitoring was undertaken as per the BAM Plan, and was considered appropriate to allow for maximum detection of the species activity in the study area.

All data collected during operational monitoring activities undertaken for Year 4 at DDWF was captured using a hand-held device with built in GPS capability accurate to ± 5 metres.



Legend

- Turbine layout
- Road
- Dundonnell wind farm project area
- Brolga breeding study area (3.2 km buffer from turbine layout)
- Brolga flocking study area (5 km buffer from turbine layout)
- Surveyed wetlands
- Mapped wetlands

Notes:

Basemap: Vicmap, Esri, TomTom, Garmin, FAO, NOAA, USGS

Other data: DELWP, Aurecon, Nature Advisory

Date: 20/12/2024 Version: 2

A3 scale: 1:70,000

0 2 4 Kilometers

Job No: P525705

Coordinate System: GDA2020 MGA Zone 54

Tilt Renewables Dundonnell Wind Farm Carcass Survey

Figure 1: DDWF Study Area and Locality Map

Path: C:\Users\Nick.Chen\Aurecon Group\SAVI Spatial - Documents\Project Work\J0308_525705_Tilt_Renewable_WF_Monitoring\Proj\P525705_Tilt_WF_Mapping\P525705_Tilt_WF_Mapping.aprx

Author: Nick.Chen

2 Methods

2.1 Carcass monitoring

2.1.1 General bird and bat carcass monitoring

As per the DDWF BAM Plan, general bird and bat carcass monitoring is to be undertaken for the first five years of operations.

Bird and bat carcass monitoring was undertaken by dog handler teams at Nature Advisory using trained scent detection dogs. Searches were carried out using a pulsed monthly program at a selection of 27 turbines as specified in the BAM Plan (BL&A 2018). Carcass searches for Year 4 commenced in November 2023 and were undertaken monthly until October 2024 as per the schedule outlined below:

- 20th to 23rd and 28th to 29th November 2023
- 4th to 8th December 2023
- 22nd to 26th January 2024
- 5th to 8th February 2024
- 4th to 7th March 2024
- 15th to 18th April and 29th April to 1st May 2024
- 27th to 30th May 2024
- 24th to 27th June and 1st to 4th July 2024
- 22nd to 26th July 2024
- 5th to 9th August 2024
- 3rd to 6th September 2024
- 28th to 31st October 2024

Within each survey period listed above, both an initial search and a second follow-up search (pulse search) was undertaken. The pulse searches were undertaken at least 24 hours after the initial search to detect additional mortality of bats and birds.

Detection dogs were used for the carcass search program. Dogs were sent in 20m transects across the search radius. In the initial search of each month the area under 27 turbines was searched out to a 120 metre radius of the turbine base. In the second (pulse) search of each month the area out to a 60 metre radius of the turbine base was searched.

In a small number of instances, where scent detection dogs experienced fatigue, human observers undertook the carcass survey. This involved human observers walking 4m transects in the inner radius for initial and pulse searches (to 60m radius), and 12m transects in the outer circle for initial searches (to 120m radius).

All carcasses detected were documented and stored as per the BAM Plan. For each carcass, the following information was recorded, consistent with the requirements of the BAM Plan:

- Date and time of find, co-ordinates, turbine number, distance and bearing from the nearest turbine, and observer name
- Details on the vegetation and substrate at the location of the carcass found, including vegetation height and density
- Species, age and sex (if possible), signs of injury and estimated carcass age (i.e. time since strike)
- Photographs of the carcass in situ, and additional photos to assist in identification where necessary

All data was collected and verified monthly by Nature Advisory. Species identifications were made on site by Nature Advisory. Where additional work was required to provide identification to species, the specimen was collected and identification undertaken with the assistance of additional specialists/ecologists at Nature Advisory and Aurecon.

No scavenger or searcher efficiency trials were conducted as part of the Year 4 carcass monitoring program as detailed in Section 1.4.

For the vast majority of carcass searches undertaken, 100% of the search area was surveyed, though in a number of surveys access to 100% of the search area was not possible due to one or more of the following limitations:

- Terrain: While DDWF consists mostly of pasture, some areas consist of rocky outcrops, some of which are quite steep. These areas were avoided by searches during wet weather to avoid risk of slips and falls, and also during summer months when snake activity was noted as high in these areas.
- Stock: The presence of cattle during the searches occasionally restricted the percentage of the search area accessible for safe surveying. Additionally, it is noted that no carcass surveys were undertaken at Turbines B01, B02, B03, B05, B06 or C13 during the months of May or June, due to sheep lambing and direction from the relevant landowner to avoid this area during this time.
- Fencing: The presence of fencing or other barriers within the search area/radius restricted the ability to access some portions of the search area. Turbines with fencing and/or other barriers within the search area included B01, B05, B06, C13, E01, E04, E06, E07, E08, G04, G05 and G10.

Where the search area surveyed for any given survey was <100%, the percentage was noted and has been incorporated into the model to inform the mortality estimates provided in this report.

2.1.2 Brolga carcass monitoring

As per the BAM Plan, all turbines at the DDWF were subject to Brolga carcass monitoring by Nature Advisory. No additional surveying was undertaken at the 27 turbines subject to general bird and bat carcass monitoring, for which detection dogs was used. Following general bird and bat carcass monitoring at the 27 turbines, all remaining turbines at DDWF were inspected out to 120m radius from the turbine by a zoologist through the aid of binoculars. This method was identified as the preferred Brolga mortality monitoring method in a trial undertaken by Biosis and presented in the Year 1 annual monitoring report (Biosis 2022).

Brolga carcass monitoring was undertaken within the survey periods noted in Section 2.1.1.

2.1.3 Threatened and non-threatened species impact triggers

The DDWF BAM Plan defines ‘impact triggers’ for both threatened and non-threatened birds and bats. The BAM Plan also outlines a decision-making framework which must be followed if an impact trigger is met. This includes notification to DEECA, investigation into the cause of the impact, and determination as to whether the event was likely to be a one-off occurrence or a regular event.

The detection of any impact triggers during the Year 4 carcass monitoring program, initiated the implementation of the decision-making framework as per the BAM Plan.

Definitions of impact triggers as per the BAM Plan are provided as follows:

- **Impact trigger for threatened species**: A threatened bird/bat species (or recognisable parts thereof) listed under the EPBC Act, FFG Act (including Brolga) or on the Advisory List of Threatened Vertebrate Fauna in Victoria 2013 (DSE 2013) is found dead or injured under or close to a wind turbine during any mortality search or incidentally by wind farm personnel. *(Note: as the Advisory List no longer exists, this is not considered to be relevant).*
- **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 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).

2.2 Raptor and White-throated Needletail monitoring

The DDWF BAM Plan requires monthly monitoring of raptors and White-throated Needletail at DDWF for the first five years of operation. This was undertaken during the Year 4 monitoring period as outlined below.

2.2.1 Monitoring of raptor and White-throated Needletail movements

Monitoring of raptor (including Wedge-tailed Eagle) and White-throated Needletail movements was undertaken by Nature Advisory incidentally while on site at DDWF during monthly carcass monitoring surveys. The following details were recorded:

- Date, time and location of observation
- Number of birds, and age (where possible)
- Time and duration of observed flight
- Flight distance, direction and proximity to turbines
- Flight height above ground
- Habitat over which the flight was observed
- Flight behaviour observed, as well as other occasional behaviours

Importantly, flight paths were plotted as accurately as possible using a hand-held device with built in GPS capability.

2.2.2 Peregrine Falcon nest monitoring

The known nest site of Peregrine Falcon, situated in Mount Fyans Wildlife Reserve in the centre of DDWF, was monitored for breeding activity by Aurecon during Year 4 of the DDWF operations. The nest location was visited monthly from August to December as per the requirements of the BAM Plan to determine the stage of breeding and breeding success, to give an indication of possible impacts on this species from the operation of the wind farm. Given the timing of the Year 4 monitoring period (November 2023 to October 2024), Peregrine Falcon nest monitoring for the Year 4 monitoring period was undertaken by Aurecon in November and December 2023, and August, September and October 2024.

Surveys for Peregrine Falcon were conducted at the Mount Fyans Wildlife Reserve for a minimum of 30 minutes, by two Aurecon ecologists using binoculars. Surveys involved observing the location, movements and behaviour of any adult or juvenile Peregrine Falcon individuals in and around the quarry nesting site. Survey dates undertaken for Peregrine Falcon nest monitoring were as follows:

- 22nd November 2023
- 12th December 2023
- 22nd August 2024
- 18th September 2024
- 14th October 2024

2.3 Brolga behaviour monitoring

2.3.1 Monthly wetland monitoring

As per the DDWF BAM Plan, all wetland habitat suitable for use by Brolga is to be surveyed monthly, within five kilometres of the wind farm during the Brolga flocking season (January to June) and within 3.2 kilometres of the wind farm during the Brolga breeding season (July to December). All wetland habitat suitable for use by Brolga within five kilometres of DDWF was surveyed monthly during the Year 4 monitoring period.

Wetlands surveyed included those identified in the DDWF BAM Plan as well as additional wetlands identified and assessed by Biosis in Years 1-3. Where additional suitable habitat or incidental Brolga observations were recorded, additional wetlands were added to the monthly surveys thereafter. Wetlands were either assessed from public vantage points (ie roadsides) or from private land, where access was obtained from relevant landowners. Landowner observations of Brolga were also recorded.

Monthly Brolga wetland monitoring was undertaken from November 2023 to October 2024, with surveys being undertaken during daylight hours over three consecutive days per month. All Brolga behaviour monitoring surveys were undertaken by two Aurecon ecologists with appropriate skills in bird identification and behaviour. Surveys included the use of binoculars and spotting scope.

Dates of monthly Brolga wetland monitoring surveys are outlined in Table 1.

The following information was recorded during the monthly wetland surveys:

- Wetland ID
- Survey date, as well as start and end time of wetland survey
- Weather conditions (including temperature, wind speed and direction, humidity, cloud cover and rain)
- Waterbird species recorded
- Brolga recorded (including number of birds) and details on behaviour including movements, flights, foraging or breeding behaviour.
- Water Level (recorded from 0 to 4, where 0 = No Standing Water, 1 = Some shallow standing water, not covering entire wetland, 2 = Shallow standing water covering entire wetland, no/minimal deep water, 3 = Deep water covering entire wetland, no/minimal shallow water, and 4 = Wetland overflowing usual boundary, flooding).

Additional targeted Brolga flocking and breeding surveys were triggered based on thresholds recorded during the monthly wetland surveys, as detailed below and outlined in Table 1.

2.3.2 Targeted Brolga flocking surveys

Targeted Brolga flocking surveys were triggered based on the observation of a flock of at least 10 Brolga within 5km of the DDWF during the monthly wetland surveys. Where this threshold was met, an additional four continuous days of survey was undertaken as per the DDWF BAM Plan, to observe the flock movements. Targeted flocking surveys were undertaken throughout the day with particular focus of survey at dawn and dusk. These surveys were undertaken by two Aurecon ecologists using binoculars. Flocking surveys aimed to locate the Brolga flock, and observe movement patterns between roosting and foraging sites. When the location of the flock was unknown, surveys were conducted at key wetlands within 5km of DDWF to locate the flock.

Targeted flocking surveys were triggered and conducted on seven occasions during the Year 4 monitoring period, in December 2023, and February, March, April, May, June and July 2024. Dates of targeted flocking surveys and associated triggers are outlined in Table 1.

2.3.3 Targeted Brolga breeding surveys

No Brolga breeding activities were observed within 3.2 km of the DDWF during the monthly wetland surveys in the Year 4 monitoring period. As such, no targeted Brolga breeding surveys were triggered during the Year 4 monitoring period.

Table 1: Summary of all Brolga behaviour monitoring undertaken at DDWF in Year 4

Survey type	Survey Date	Duration	Trigger thresholds met during monthly wetland survey?
Monthly Wetland Survey (November)	22-24 November 2023	3 days	No trigger thresholds met
Monthly Wetland Survey (December)	12-14 December 2023	3 days	Flocking survey trigger met by observation of flock of 14 Brolga at Wetland 32667 on 13th December 2023
Targeted Brolga Flocking Survey (December)	18-21 December 2023	4 days	N/A
Monthly Wetland Survey (January)	16-18 January 2024	3 days	No trigger thresholds met
Monthly Wetland Survey (February)	13-15 February 2024	3 days	Flocking survey trigger met by observation of flock of 24 Brolga at Wetland 32614 (Lake Gellie) on 14th February 2024
Targeted Brolga Flocking Survey (February)	19-22 February 2024	4 days	N/A
Monthly Wetland Survey (March)	13-15 March 2024	3 days	Flocking survey trigger met by observation of flock of 12 Brolga at Wetland 30412 (Lake Sheepwash) on 14th March 2024
Targeted Brolga Flocking Survey (March)	18-21 March 2024	4 days	N/A
Monthly Wetland Survey (April)	9-11 April 2024	3 days	Flocking survey trigger met by observation of flock of 17 Brolga at Wetland 32614 (Lake Gellie) on 9th April 2024
Targeted Brolga Flocking Survey (April)	15-18 April 2024	4 days	N/A
Monthly Wetland Survey (May)	14-16 May 2024	3 days	Flocking survey trigger met by observation of flock of 46 Brolga at Wetland 32400 on 16th May 2024
Targeted Brolga Flocking Survey (May)	20-23 May 2024	4 days	N/A
Monthly Wetland Survey (June)	18-20 June 2024	3 days	Flocking survey trigger met by observation of flock of 18 Brolga at Wetland 30412 (Lake Sheepwash) on 19th June 2024
Targeted Brolga Flocking Survey (June)	24-27 June 2024	4 days	N/A
Monthly Wetland Survey (July)	16-18 July 2024	3 days	Flocking survey trigger met by observation of flock of 15 Brolga at Wetland 30412 (Lake Sheepwash) on 17th July 2024
Targeted Brolga Flocking Survey (July)	23-26 July 2024	4 days	N/A
Monthly Wetland Survey (August)	21-23 August 2024	3 days	No trigger thresholds met
Monthly Wetland Survey (September)	16-18 September 2024	3 days	No trigger thresholds met
Monthly Wetland Survey (October)	14-16 October 2024	3 days	No trigger thresholds met

3 Results

3.1 Carcass monitoring

3.1.1 General bird and bat carcass monitoring

Bird and bat carcass monitoring was undertaken monthly at 27 turbines at DDWF in Year 4 from November 2023 to October 2024. During this period a total of 142 individual finds were detected (inclusive of carcass finds and feather spots) during formal surveys. Of the 142 individuals detected, 111 were birds and 31 were bats. An additional 20 finds (19 birds and one bat) were detected incidentally.

Of the 111 bird carcass finds/feather spots detected during formal surveys, 88 were identified to species/genus level, as well as 23 additional finds being unable to be identified (due to limited remains available). A single carcass find of one threatened bird species was detected at DDWF during the Year 4 carcass monitoring surveys, namely a Little Eagle, recorded in March 2024. This find met the threatened species impact trigger under the BAM Plan. Further details of this carcass find are provided in Section 5.1.

Of the 31 bat carcass finds detected in formal surveys, 25 were identified to species level (including 20 WSFBs), three finds were identified to genus level (as a Free-tailed Bat), and three finds were unable to be identified (due to limited remains available). No threatened bat species were detected during carcass monitoring at DDWF during Year 4.

Details of all bird and bat carcass finds detected during the Year 4 monitoring period (including incidental finds) is provided in Appendix A.

Details of carcass finds detected that resulted in an impact trigger being met in accordance the DDWF BAM Plan are provided in Section 5.

3.1.2 Brolga carcass monitoring

No Brolga carcasses were recorded at DDWF during the Year 4 monitoring period.

3.2 Raptor and White-throated Needletail monitoring

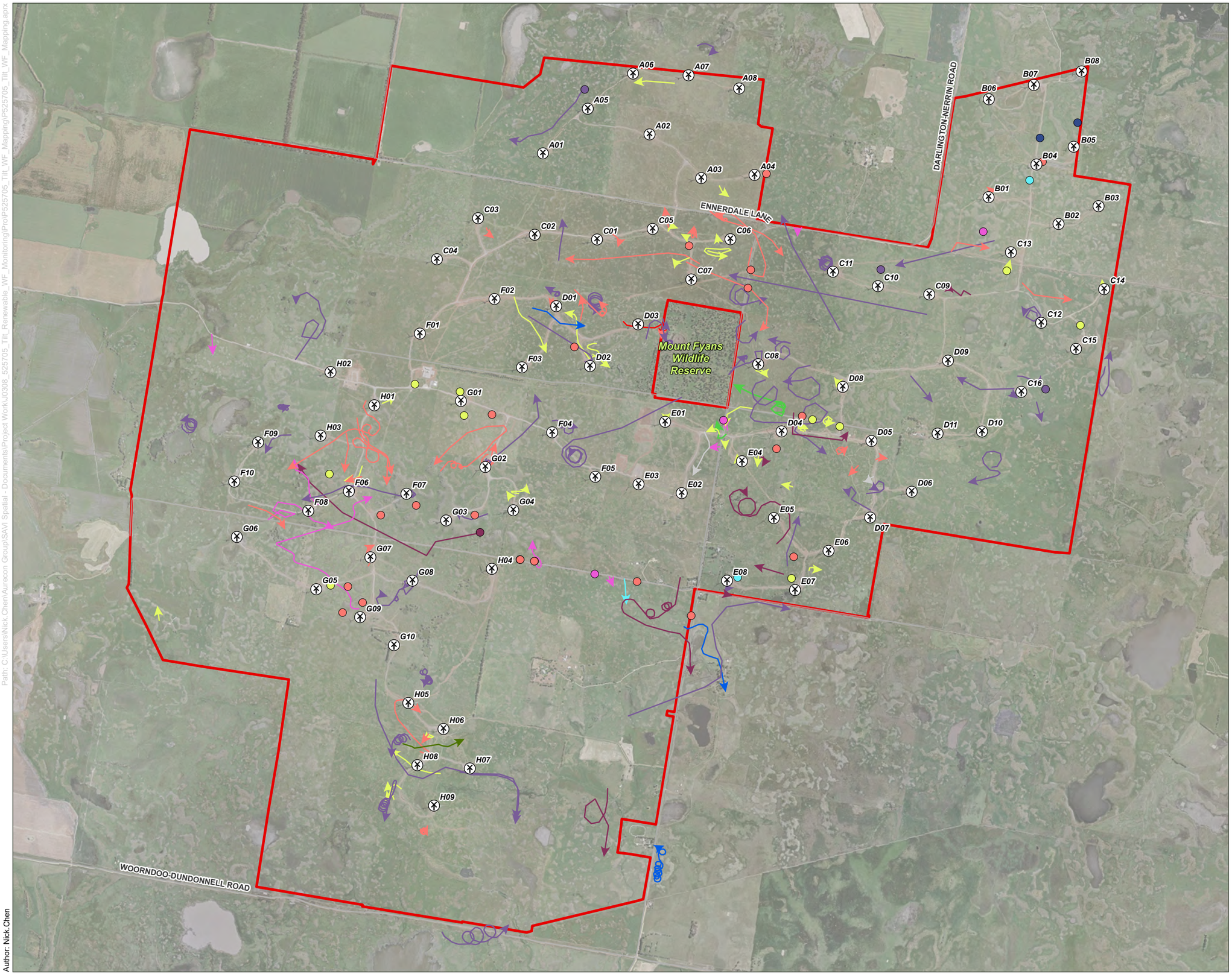
3.2.1 Raptor monitoring

A total of 147 raptor flights were recorded during the monthly carcass monitoring surveys during the Year 4 monitoring period at DDWF. This included observations of flights from 10 species of raptors, including one threatened species, Black Falcon (two flights observed). Two additional raptor species were recorded within 5km of DDWF during the monthly wetland monitoring undertaken by Aurecon (Brown Goshawk and Spotted Harrier). Brown Goshawk was also recorded perched (not in flight) on one instance within DDWF. Raptor species observed during Year 4 is provided in Table 2.

The raptor species with the highest number of observed flights within DDWF during Year 4 was Wedge-tailed Eagle (53 observed flights), followed by Nankeen Kestrel (38) and Brown Falcon (31). Full details of all raptor flights recorded are detailed in Appendix C and shown in Figure 2.

Table 2: List of raptor species observed within DDWF during Year 4

Common Name	Scientific name	Recorded within 5km of DDWF during wetland monitoring	Recorded within DDWF during carcass monitoring	Number of flights observed within DDWF during carcass monitoring
Australian Hobby	*Falco longipennis*	Yes	Yes	1
Black Falcon	*Falco subniger*	Yes	Yes	2
Black Kite	*Milvus migrans*	Yes	Yes	3
Black-shouldered Kite	*Elanus axillaris*	Yes	Yes	9
Brown Falcon	*Falco berigora*	Yes	Yes	31
Brown Goshawk	*Accipiter fasciatus*	Yes	Yes (perched only)	None
Nankeen Kestrel	*Falco cenchroides*	Yes	Yes	38
Peregrine Falcon	*Falco peregrinus*	Yes	Yes	1
Spotted Harrier	*Circus assimilis*	Yes	No	None
Swamp Harrier	*Circus approximans*	Yes	Yes	1
Wedge-tailed Eagle	*Aquila audax*	Yes	Yes	53
Whistling Kite	*Haliastur sphenurus*	Yes	Yes	8



Legend

- Turbine layout
- Road
- Dundonnell wind farm project area

Raptor point observations

- Australian Hobby
- Black-shouldered Kite
- Brown Falcon
- Brown Goshawk
- Nankeen Kestrel
- Swamp Harrier
- Whistling Kite
- Wedge-tailed Eagle

Raptor flight observations

- Australian Hobby
- Black-shouldered Kite
- Brown Falcon
- Black Falcon
- Black Kite
- Nankeen Kestrel
- Peregrine Falcon
- Swamp Harrier
- Whistling Kite
- Wedge-tailed Eagle

Notes:

Basemap: Vicmap, Esri, TomTom, Garmin, FAO, NOAA, USGS

Other data: DELWP, Aurecon, Nature Advisory

Date: 19/12/2024 Version: 1

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Author: Nick.Chen

A3 scale: 1:32,000

0 0.75 1.5 Kilometers

Job No: P525705

Coordinate System: GDA2020 MGA Zone 54

Tilt Renewables Dundonnell Wind Farm Carcass Survey

Figure 2: Raptor flight observations at DDWF during Year 4

3.2.2 Peregrine Falcon nest monitoring

Peregrine Falcon activity was observed at Mount Fyans Wildlife Reserve in Years 1 and 2 by Biosis (2022; 2023), however no Peregrine Falcons were recorded at Mount Fyans Wildlife Reserve in Year 3 (Biosis 2024).

Nest monitoring surveys for Peregrine Falcon were undertaken by Aurecon at Mount Fyans Wildlife Reserve in Year 4 from November to December 2023, and August to October 2024. A summary of the Peregrine Falcon activity recorded at Mount Fyans Wildlife Reserve during the Year 4 monitoring period is provided in Table 3.

Table 3: Peregrine Falcon survey results at Mount Fyans Wildlife Reserve during Year 4

Month	Number of Peregrine Falcon individuals observed	Peregrine Falcon behaviour observed
2023		
22nd November 2023	3 (2 adults and 1 juvenile)	Adult pair of Peregrine Falcons observed perched on trees overlooking quarry. One juvenile Peregrine Falcon observed flying out of quarry rock face and landing on quarry wall.
12th December 2023	4 (2 adults and 2 juveniles)	Female adult circling and calling. Male flying up and down, flying through trees at the top of the quarry. One juvenile flying. Second juvenile flying for short time also.
2024		
22nd August 2024	1 adult	One adult Peregrine Falcon observed perched in tree overlooking the quarry.
18th September 2024	2 adults	One Peregrine Falcon observed flying around the quarry, then sat in quarry. Second adult (partner) later joined other bird, and they fed together on a tree branch.
16th October 2024	2 adults	A male bird observed perched and flying around the site. The female bird sitting in the cliff face.

The Peregrine Falcon breeding period is from August to December, which extends across two monitoring years of operations at DDWF. The Year 4 monitoring period noted successful breeding from the 2023 breeding season, based on the presence of two fledged juvenile birds observed in November and December 2023.

Observations of adult Peregrine Falcons were made in the early part of the 2024 breeding season (August to October). As at October 2024, no evidence of successful breeding has been observed this season. No Peregrine Falcon carcasses were detected in the Year 4 carcass monitoring program.

The successful breeding observed in late 2023, presence of adults in 2024, and lack of detected carcasses of Peregrine Falcons in Year 4, suggests the operation of DDWF has had limited impact on the species during the Year 4 monitoring period.

3.2.3 White-throated Needletail monitoring

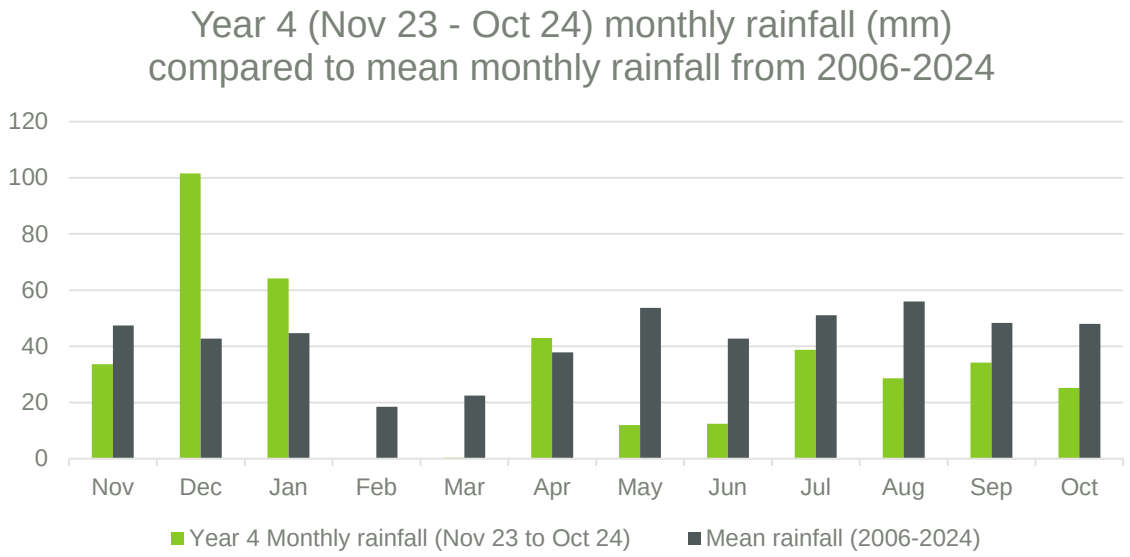
No White-throated Needletails were observed at DDWF during the Year 4 monitoring period.

3.3 Brolga behaviour monitoring

Monthly Brolga wetland surveys were undertaken as part of the Year 4 DDWF monitoring program by Aurecon from November 2023 to October 2024 at 26 wetlands within 5 kilometres of the DDWF.

3.3.1 Weather conditions

Temperature and other climatic conditions recorded during wetland monitoring is provided for all surveys in Appendix G. It is noted that seasonal and annual fluctuations in climatic conditions can severely impact wetland habitat quality and water availability in the landscape, which in turn can have a large effect on the level of utilisation of Brolga. The monthly rainfall data from the nearest weather station (Westmere) over the Year 4 monitoring period (November 2023 to October 2024) showed Year 4 as having a wetter than usual summer (December and January), but a much drier than usual winter and spring (when compared to the mean monthly rainfall data from 2006 to 2024). Data taken from the Bureau of Meteorology is shown in the graph below.



3.3.2 Bird species richness

During the Year 4 wetland monitoring, a total of 112 bird species were recorded within 5km of DDWF. A full list of the bird species recorded during the Year 4 monitoring period within 5 km of DDWF is provided in Appendix D. Of the 112 bird species recorded during the Year 4 Brolga wetland monitoring, 10 were threatened species, including three species listed as threatened on the EPBC Act, and seven listed as threatened on the FFG Act (Table 4). Details of bird species recorded in all wetland monitoring surveys in Year 4 is provided in Appendix G.

Table 4: Threatened bird species recorded within 5km of DDWF in Year 4

Common Name	Scientific Name	EPBC Status	FFG Status
Australasian Shoveler	*Spatula rhynchotis*		VU
Australian Gull-billed Tern	*Gelochelidon macrotarsa*		E
Black Falcon	*Falco subniger*		CE
Blue-billed Duck	*Oxyura australis*		VU
Blue-winged Parrot	*Neophema chrysostoma*	VU	
Brolga	*Antigone rubicunda*		E
Eastern Great Egret	*Ardea alba modesta*		VU
Latham's Snipe	*Gallinago hardwickii*	VU, M	
Musk Duck	*Biziura lobata*		VU
Sharp-tailed Sandpiper	*Calidris acuminata*	VU, M	

Legend: CE = Critically Endangered, E = Endangered, Vu = Vulnerable, Mi = Migratory.

3.3.3 Brolga observations

Over the Year 4 monitoring period, Brolga were recorded at 18 of the 26 wetlands surveyed (Figure 3). A total of 195 Brolga observations were recorded throughout the Year 4 monitoring period within 5 kms of the DDWF. This included observations of up to 46 individuals of Brolga (recorded on 16th May 2024 at Lake Gellie). Details of all Brolga observations are provided in Appendix E.

Locations of Brolga observations recorded throughout the Year 4 DDWF monitoring program are shown in Figure 3, with month-by-month Brolga observations across the Year 4 monitoring period shown in Figure 4. A summary of Brolga observations recorded at each of the surveyed wetlands during Year 4 (as well as a summary of details from targeted flocking and breeding surveys) is provided in Table 4. Further details of Brolga observations from targeted flocking and breeding surveys are provided in Sections 3.3.4 and 3.3.5.

Wetland numbers presented refer to published DEECA wetland numbers. The wetland labelling previously adopted by Biosis (A to U) is also shown in brackets to provide consistency with the previous annual monitoring reports. Wetlands V to Z were added following recorded observation of Brolgas at these wetlands by Aurecon during Year 4.

Photos of Brolga observations from Year 4 are shown below in Photos 1 to 4.

Photo 1: Flock of Brolgas taking off west of Lake Gellie in June 2024

Photo 2: Three Brolgas walking through wheat crop south of Lake Gellie in February 2024

Photo 3: Flock of Brolga flying east from Wetland 32400 (X) in February 2024

Photo 4: Large flock of Brolga south of Lake Gellie in February 2024

3.3.4 Brolga flight observations

134 flights of Brolga (either flights of single Brolga or flights of groups/flocks of Brolga) were observed during the Year 4 survey period within the 5 km of DDWF. The largest flock flight observed comprised a flight of 46 Brolga. Brolga flight paths observed throughout Year 4 are shown in Figure 3, and by month in Figure 4. Flight heights observed ranged from 2 metres above the ground up to 50 metres above the ground, with 95% of all flights recorded below the minimum turbine blade height of 39m above the ground.

Brolga flight distance recorded ranged from 60 m to approximately 5km, and 55% of Brolga flights observed were less than 1km in distance. The closest observed Brolga flights to a turbine was recorded on 21st May 2024 when five Brolga flew to within approximately 200m from turbine B08 in the north east of the DDWF. Of all Brolga flights recorded over the Year 4 period, the average proximity to turbines observed was 2.2km. Details of all Brolga flights recorded are provided in Appendix F.

The high activity and large size of Brolga flocks observed around the DDWF during Year 4 suggests the species is able to persist within the vicinity of operational wind farms. Several Brolga flights observed during

the Year 4 monitoring period suggested avoidance behaviours with Brolga flying around, or stopping short of the wind farm turbines. Particular examples of such behaviours were observed as followed:

- In November 2023, a group of four (4) Brolga were observed flying south towards the wind farm from Wetland O, though stopped short in pasture. Shortly after, the group were observed turning around and flying back to the north, away from the wind farm (See Figure 4a).
- Flights recorded in May and June 2024 from Lake Gellie and Wetland X follow a pattern of avoidance around the turbines in the north east of the DDWF, when flying to the south east (See Figures 4g and 4h).
- An extensive number of flights observed between Lake Gellie and Wetland X in February 2024, including flights of large flocks, all avoided flying into DDWF (See Figure 4d).

3.3.5 Brolga flocking observations

Flocks of Brolga (defined as a flock of ≥10 Brolga individuals) were recorded at four wetlands during Year 4 including Lake Sheepwash (Wetland 30412; E), Lake Gellie (Wetland 32614; L and M), Wetland 32667 (K) and Wetland 32400 (X). Brolga flock sizes varied over the Year 4 survey period, reaching as high as 46 individuals in May 2024 at Lake Gellie (L and M) and Wetland 32400 (X). Flocking was commonplace throughout the Year 4 period, triggering additional targeted Brolga flocking surveys in seven out of 12 months of the year, namely in December 2023, and each month from February to July 2024. Details of Brolga flock movements are provided in Table 5.

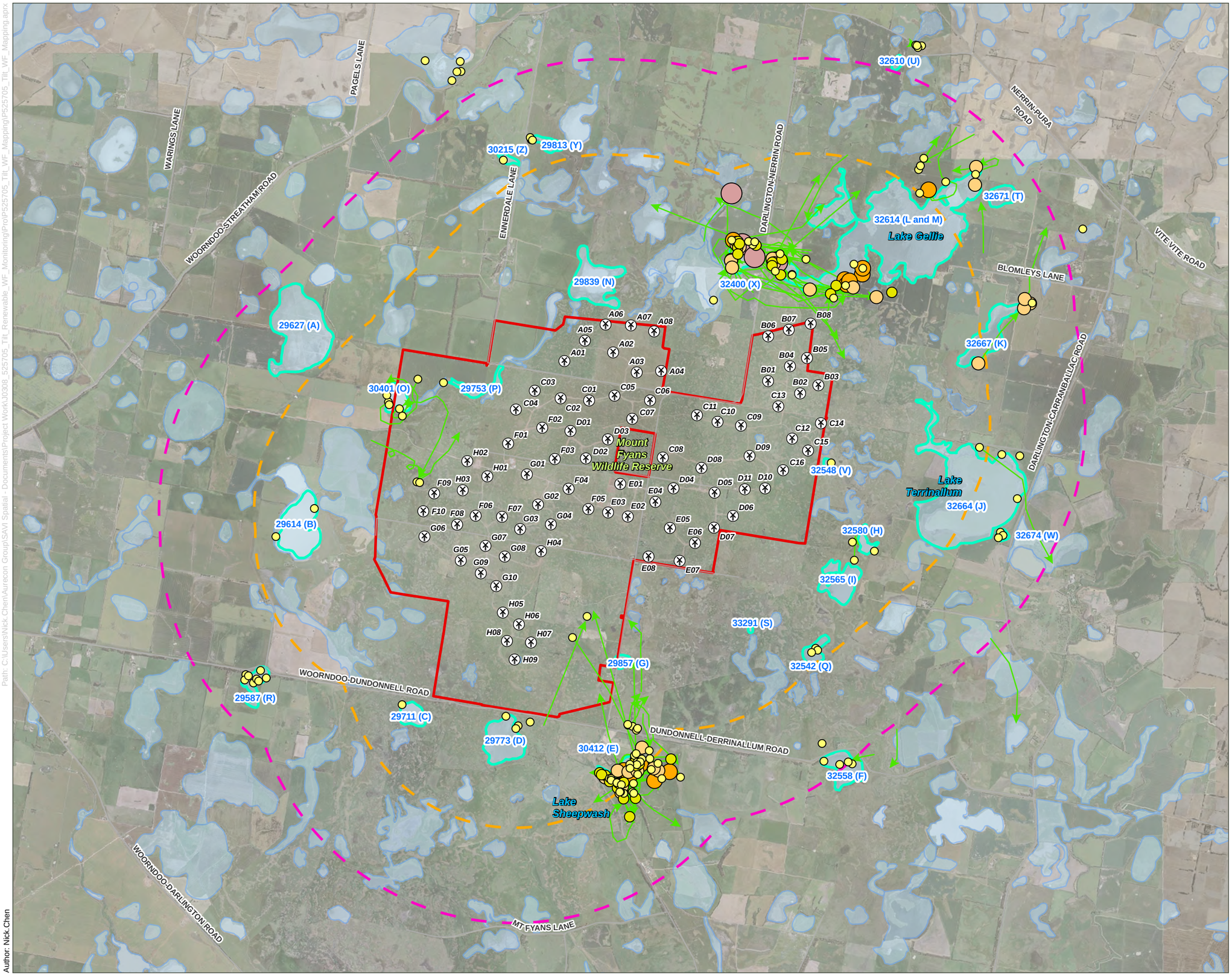
Table 5: Brolga observations recorded for each surveyed wetland during Year 4 (including summary from targeted flocking surveys)

Wetland reference	Brolga activity recorded
29627 (A)	No Brolga observed at this wetland during Year 4 monitoring.
29614 (B)	14/02/24 – Two Brolga foraging on the north east edge of the wetland 19/02/24 – Landowner reported four Brolga; two Brolga seen foraging on the western edge of the wetland
29711 (C)	13/03/24 – Two Brolga foraging in grass on the north east side of wetland
29773 (D)	22/11/23 – One Brolga observed walking towards north east corner of wetland from adjacent pasture 17/01/24 – Two Brolga foraging on northern edge of wetland 16/09/24 – Two Brolga standing in pasture to north east of wetland
30412 (E) Lake Sheepwash	Dec 23 – 6 Brolga feeding in long reeds in centre of wetland Feb 24 – 3 Brolga foraging in pasture on eastern edge of wetland Mar 24 – Flock of up to 12 Brolga foraging in and around wetland, roosting in wetland. Monitored during target flocking survey Apr 24 – 6 Brolga feeding and foraging in and around wetland May 24 – Up to 10 Brolga foraging in and around wetland, roosting in wetland. Monitored during target flocking survey Jun 24 – Flock of up to 21 Brolga foraging in and around wetland, roosting in wetland. Monitored during target flocking survey Jul 24 – Flock of up to 22 Brolga foraging in and around wetland, roosting in wetland. Monitored during target flocking survey Sep 24 – 2 Brolga foraging in pasture to south west of wetland 16/10/24 - 2 Brolga observed in field adjacent to lake.
32558 (F)	11/04/24 – Three Brolga feeding in pasture to north of wetland. Two adults, one juvenile 26/06/24 – Three Brolga observed standing in the centre of wetland. Two Brolga exhibited a short (5 second) dance 27/06/24 – Two Brolga standing in centre of wetland 16/09/24 – Two Brolga walking in pasture on north west side of wetland 14/10/24 - 2 brolga walking in dry wetland. One brolga loafing
29857 (G)	No Brolga observed at this wetland during Year 4 monitoring.
32580 (H)	23/11/23 – Two Brolga foraging in pasture to west of wetland 15/02/24 – Two Brolga flew from dry paddock to the south of wetland to north west edge of wetland 15/05/24 – Two Brolga standing in pasture to south east of wetland
32565 (I)	No Brolga observed at this wetland during Year 4 monitoring.
32664 (J) Lake Terrinallum	26/06/24 – Two Brolga standing on northern edge of wetland 6/09/24 – One Brolga standing on eastern edge of wetland 14/10/24 – 2 Brolga flying over wetland.

Wetland reference	Brolga activity recorded
32667 (K)	13/12/23 – 14 Brolga standing and foraging on eastern edge of wetland 20/12/23 – 14 Brolga flew into north eastern corner of wetland from south west 16/01/24 – 2 Brolga standing on eastern edge of wetland
32614 (L and M) Lake Gellie	21/12/23 – 2 Brolga observed in south west of Lake Gellie. Feb 2024 – Flock of up to 24 Brolga foraging, loafing in and around wetland, particularly in crop stubble to south west of wetland April 2024 – Flock of up to 21 Brolga foraging in and around wetland and pasture surrounding wetland May 2024 – Flock of up to 46 Brolga foraging in pasture to south west of wetland June 2024 – Flock of up to 15 Brolga foraging in and around wetland 23/8/24 - Two Brolga standing in water, short looping flight and returned
29839 (N)	No Brolga observed at this wetland during Year 4 monitoring.
30401 (O)	23/11/24 – 4 Brolga seen flying towards wetland, turned and flew south towards wind farm, stopping short at a dry wetland. Foraged shortly, then flew back to north. 13/03/24 – Two Brolga walking on western edge of the wetland. Circled wetland 15/05/24 – Two Brolga foraging in pasture to the west of the wetland 17/07/24 – Two adult Brolga foraging in pasture to the south of the wetland
29753 (P)	22/08/24 – Two Brolga feeding in drainage line to the west of the wetland
32542 (Q)	19/06/24 – Two Brolga foraging in dry wetland area 17/07/24 – Two Brolga standing in dry wetland area 17/09/24 – Two Brolga foraging in dry wetland
29587 (R)	23/11/23 – Two Brolga walking in centre of wetland 13/12/23 – Two Brolga foraging in centre of wetland 18/12/23 – Two Brolga foraging in centre of wetland 20/12/23 – Two Brolga foraging on north east side of wetland 16/01/24 – Two Brolga standing in pasture to north west of wetland 13/02/24 – Two Brolga standing on western edge of wetland 13/03/24 – Two Brolga foraging in wetland 16/09/24 – Two Brolga foraging on the edge of wetland
33291 (S)	No Brolga observed at this wetland during Year 4 monitoring.
32671 (T)	No Brolga observed at this wetland during Year 4 monitoring.
32610 (U)	No Brolga observed at this wetland during Year 4 monitoring. However a pair of Brolga was observed at wetland 32632 (Deep Lake) to the north of this wetland and outside the project area on six occasions between November 2023 and February 2024.
32548 (V) *	21/12/24 – Two Brolga standing in water 17/09/24 – Two Brolga standing in water

Wetland reference	Brolga activity recorded
32674 (W) *	13/02/24 – Two Brolga walking in water 20/02/24 – Two Brolga standing in water 21/02/24 – Two Brolga standing in water 22/02/24 – Two Brolga walking in water
32400 (X) *	Feb 2024 – Flock of up to 16 Brolga foraging in and around wetland, and roosting in wetland May 2024 – Flock of up to 46 Brolga foraging in and around wetland. 9 individuals recorded roosting in this wetland overnight on 21/05/24 18/06/24 – 2 Brolga standing in paddock to north August 2024 – Four Brolga foraging in pasture to the north of the wetland
29813 (Y) *	13/03/24 – Two Brolga walking in pasture to west of wetland 19/06/24 – Two Brolga foraging in pasture to west of wetland
30215 (Z) *	15/12/24 – Two Brolga standing on eastern edge of wetland

** Wetlands V to Z added following recorded observation of Brolgas at these wetlands by Aurecon during Year 4 monitoring period.*



Legend

- Turbine layout
- Brolga flight observations
- Road
- Dundonnell wind farm project area
- Brolga breeding study area (3.2 km buffer from turbine layout)
- Brolga flocking study area (5 km buffer from turbine layout)
- Surveyed wetlands
- Mapped wetlands

Brolga point observations

Number of brolgas

- 1 - 5
- 6 - 10
- 11 - 20
- 21 - 35
- 36 - 50

Notes:

Basemap: Vicmap, Esri, TomTom, Garmin, FAO, NOAA, USGS

Other data: DELWP, Aurecon, Nature Advisory

Date: 20/12/2024 Version: 2

A3 scale: 1:70,000

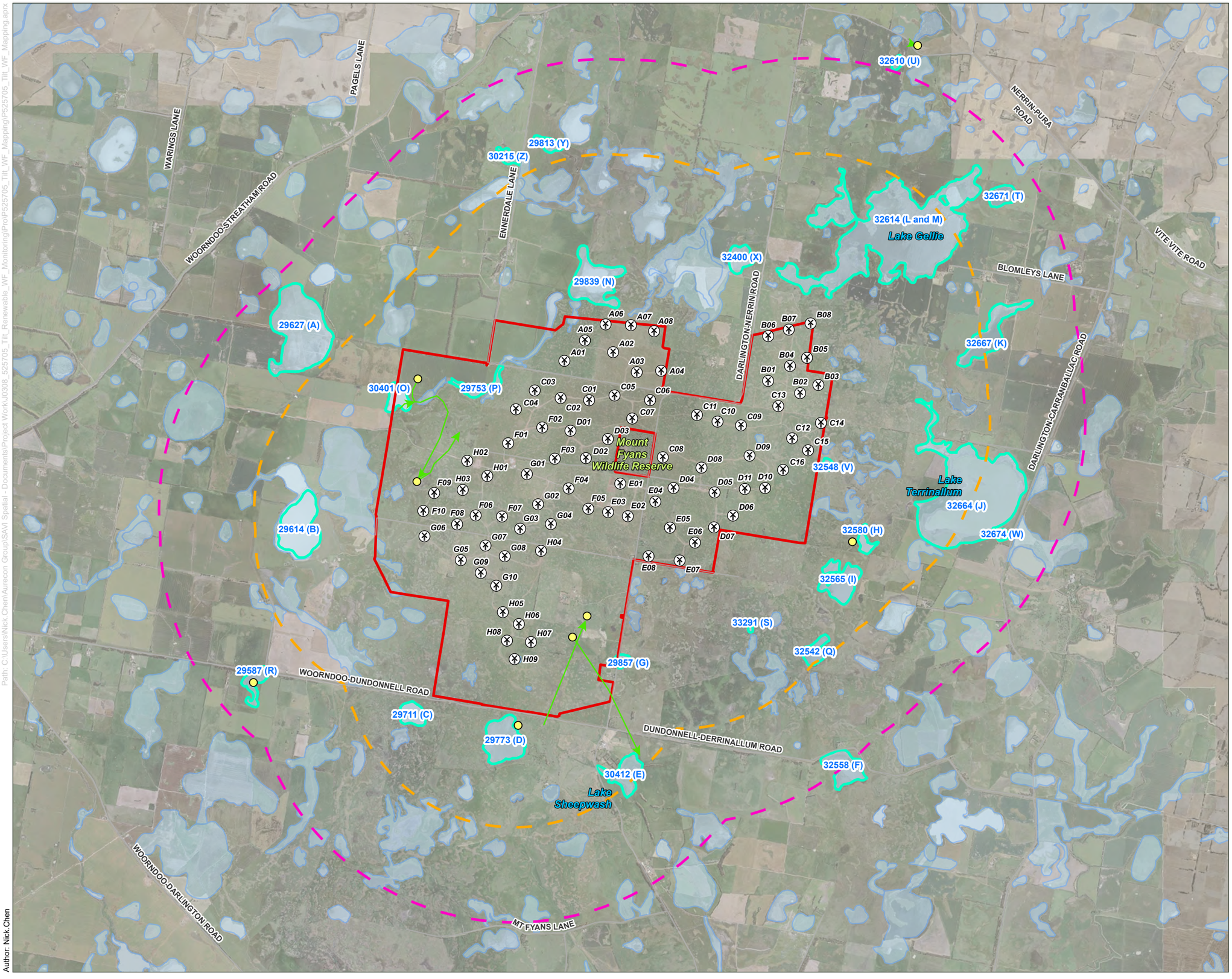
0 2 4 Kilometers

Job No: P525705

Coordinate System: GDA2020 MGA Zone 54

Tilt Renewables Dundonnell Wind Farm Carcass Survey

Figure 3: Brolga observations from wetlands surrounding DDWF during Year 4



Legend

- Turbine layout
- Brolga flight observations
- Road
- Dundonnell wind farm project area
- Brolga breeding study area (3.2 km buffer from turbine layout)
- Brolga flocking study area (5 km buffer from turbine layout)
- Surveyed wetlands
- Mapped wetlands

Brolga point observations

Number of brolgas

- 1 - 5

Notes:

Basemap: Vicmap, Esri, TomTom, Garmin, FAO, NOAA, USGS

Other data: DELWP, Aurecon, Nature Advisory

Date: 20/12/2024 Version: 2

A3 scale: 1:70,000

0 2 4 Kilometers

Job No: P525705

Coordinate System: GDA2020 MGA Zone 54

Tilt Renewables Dundonnell Wind Farm Carcass Survey

Fig 4a: Brolga observations from wetlands surrounding DDWF (November 2023)

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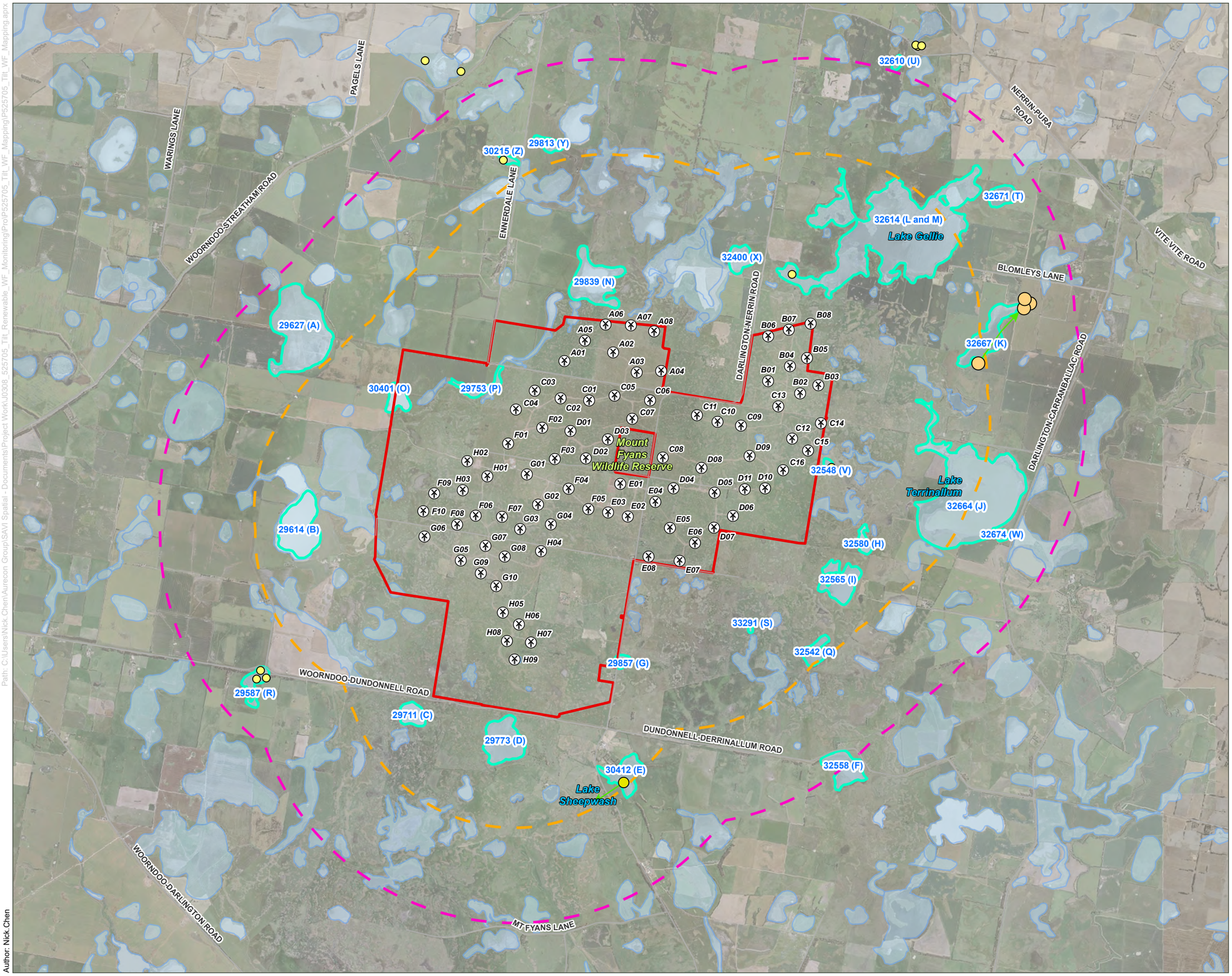
Author: Nick.Chen



Legend

- Turbine layout
- Brolga flight observations
- Road
- Dundonnell wind farm project area
- Brolga breeding study area (3.2 km buffer from turbine layout)
- Brolga flocking study area (5 km buffer from turbine layout)
- Surveyed wetlands
- Mapped wetlands

Brolga point observations

Number of brolgas

- 1 - 5
- 6 - 10
- 11 - 20

Notes:

Basemap: Vicmap, Esri, TomTom, Garmin, FAO, NOAA, USGS

Other data: DELWP, Aurecon, Nature Advisory

Date: 20/12/2024 Version: 2

A3 scale: 1:70,000

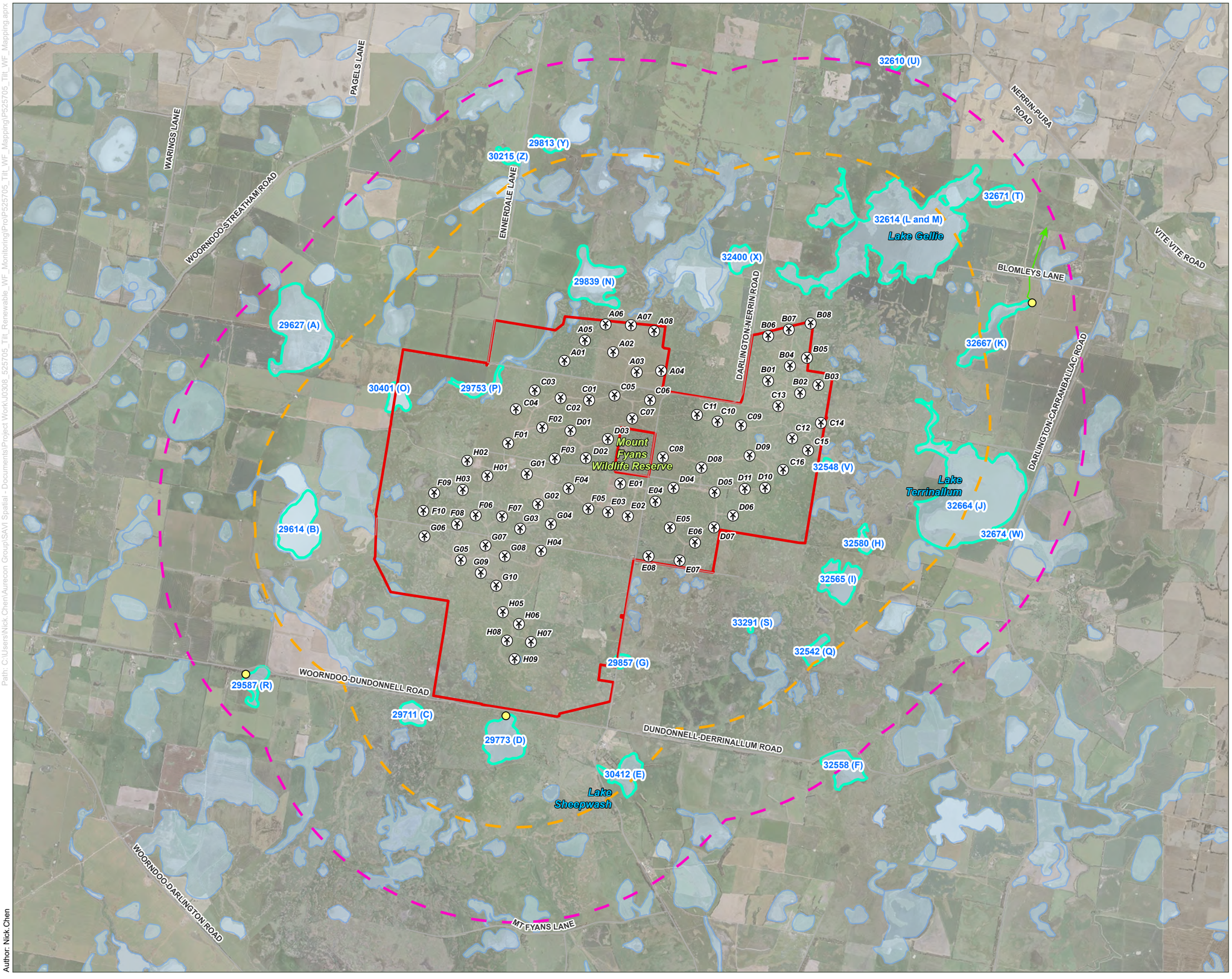
0 2 4 Kilometers

Job No: P525705

Coordinate System: GDA2020 MGA Zone 54

Tilt Renewables Dundonnell Wind Farm Carcass Survey

Fig 4b: Brolga observations from wetlands surrounding DDWF (December 2023)



Legend

- Turbine layout
- Brolga flight observations
- Road
- Dundonnell wind farm project area
- Brolga breeding study area (3.2 km buffer from turbine layout)
- Brolga flocking study area (5 km buffer from turbine layout)
- Surveyed wetlands
- Mapped wetlands

Brolga point observations

Number of brolgas

- 1 - 5

Notes:

Basemap: Vicmap, Esri, TomTom, Garmin, FAO, NOAA, USGS

Other data: DELWP, Aurecon, Nature Advisory

Date: 20/12/2024 Version: 2

A3 scale: 1:70,000

0 2 4 Kilometers

Job No: P525705

Coordinate System: GDA2020 MGA Zone 54

Tilt Renewables Dundonnell Wind Farm Carcass Survey

Fig 4c: Brolga observations from wetlands surrounding DDWF (January 2024)

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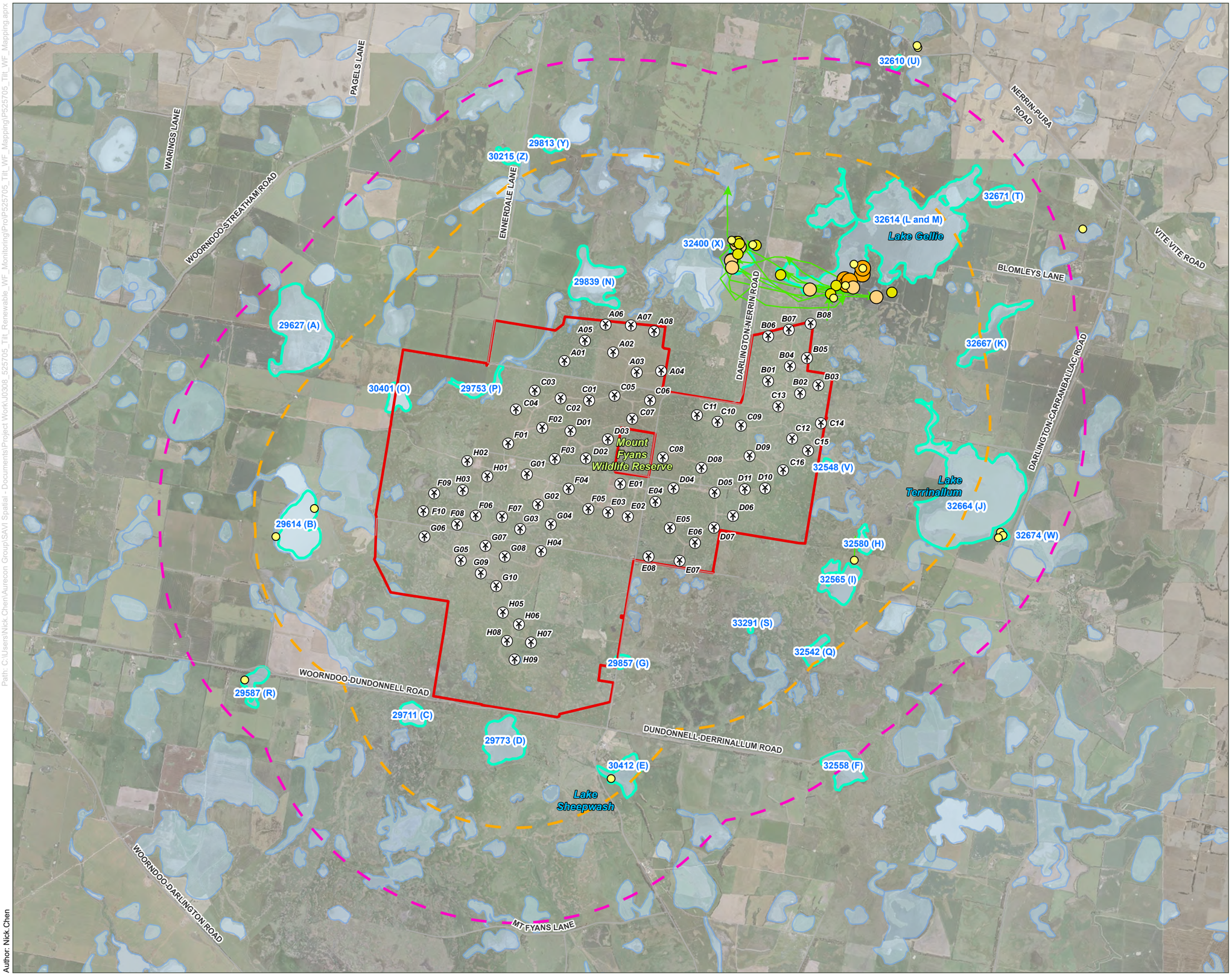


Legend

- Turbine layout
- Brolga flight observations
- Road
- Dundonnell wind farm project area
- Brolga breeding study area (3.2 km buffer from turbine layout)
- Brolga flocking study area (5 km buffer from turbine layout)
- Surveyed wetlands
- Mapped wetlands

Brolga point observations

Number of brolgas

- 1 - 5
- 6 - 10
- 11 - 20
- 21 - 35

Notes:

Basemap: Vicmap, Esri, TomTom, Garmin, FAO, NOAA, USGS

Other data: DELWP, Aurecon, Nature Advisory

Date: 20/12/2024 Version: 2

A3 scale: 1:70,000

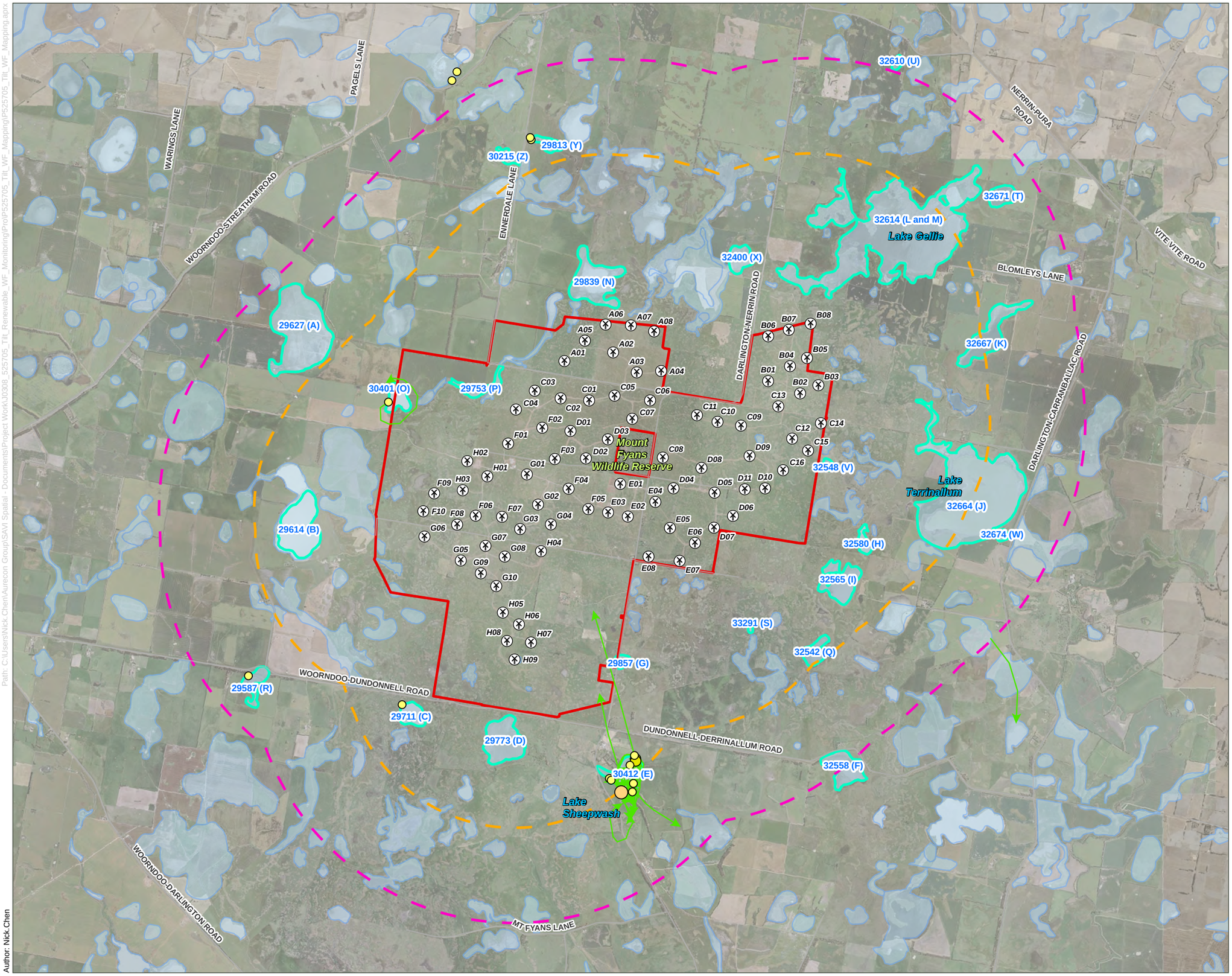
0 2 4 Kilometers

Job No: P525705

Coordinate System: GDA2020 MGA Zone 54

Tilt Renewables Dundonnell Wind Farm Carcass Survey

Fig 4d: Brolga observations from wetlands surrounding DDWF (February 2024)



Legend

- Turbine layout
- Brolga flight observations
- Road
- Dundonnell wind farm project area
- Brolga breeding study area (3.2 km buffer from turbine layout)
- Brolga flocking study area (5 km buffer from turbine layout)
- Surveyed wetlands
- Mapped wetlands

Brolga point observations

Number of brolgas

- 1 - 5
- 6 - 10
- 11 - 20

Notes:

Basemap: Vicmap, Esri, TomTom, Garmin, FAO, NOAA, USGS

Other data: DELWP, Aurecon, Nature Advisory

Date: 20/12/2024 Version: 2

A3 scale: 1:70,000

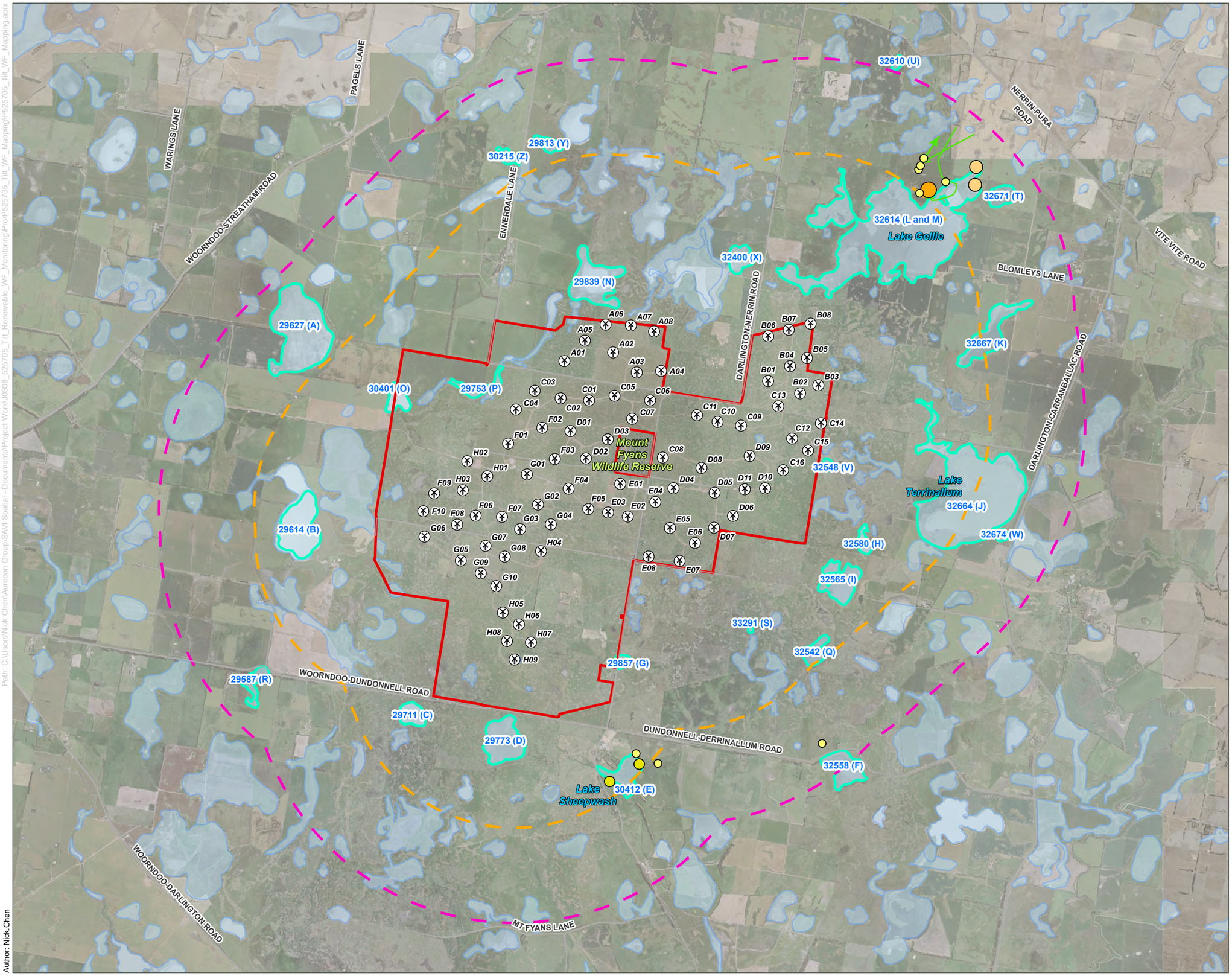
0 2 4 Kilometers

Job No: P525705

Coordinate System: GDA2020 MGA Zone 54

Tilt Renewables Dundonnell Wind Farm Carcass Survey

Fig 4e: Brolga observations from wetlands surrounding DDWF (March 2024)



Legend

- Turbine layout
- Brolga flight observations
- Road
- Dundonnell wind farm project area
- Brolga breeding study area (3.2 km buffer from turbine layout)
- Brolga flocking study area (5 km buffer from turbine layout)
- Surveyed wetlands
- Mapped wetlands

Brolga point observations

Number of brolgas

- 1 - 5
- 6 - 10
- 11 - 20
- 21 - 35

Notes:

Basemap: Vicmap, Esri, TomTom, Garmin, FAO, NOAA, USGS

Other data: DELWP, Aurecon, Nature Advisory

Date: 20/12/2024 Version: 2

A3 scale: 1:70,000

0 2 4 Kilometers

Job No: P525705

Coordinate System: GDA2020 MGA Zone 54

Tilt Renewables Dundonnell Wind Farm Carcass Survey

Fig 4f: Brolga observations from wetlands surrounding DDWF (April 2024)

Author: Nick.Chen

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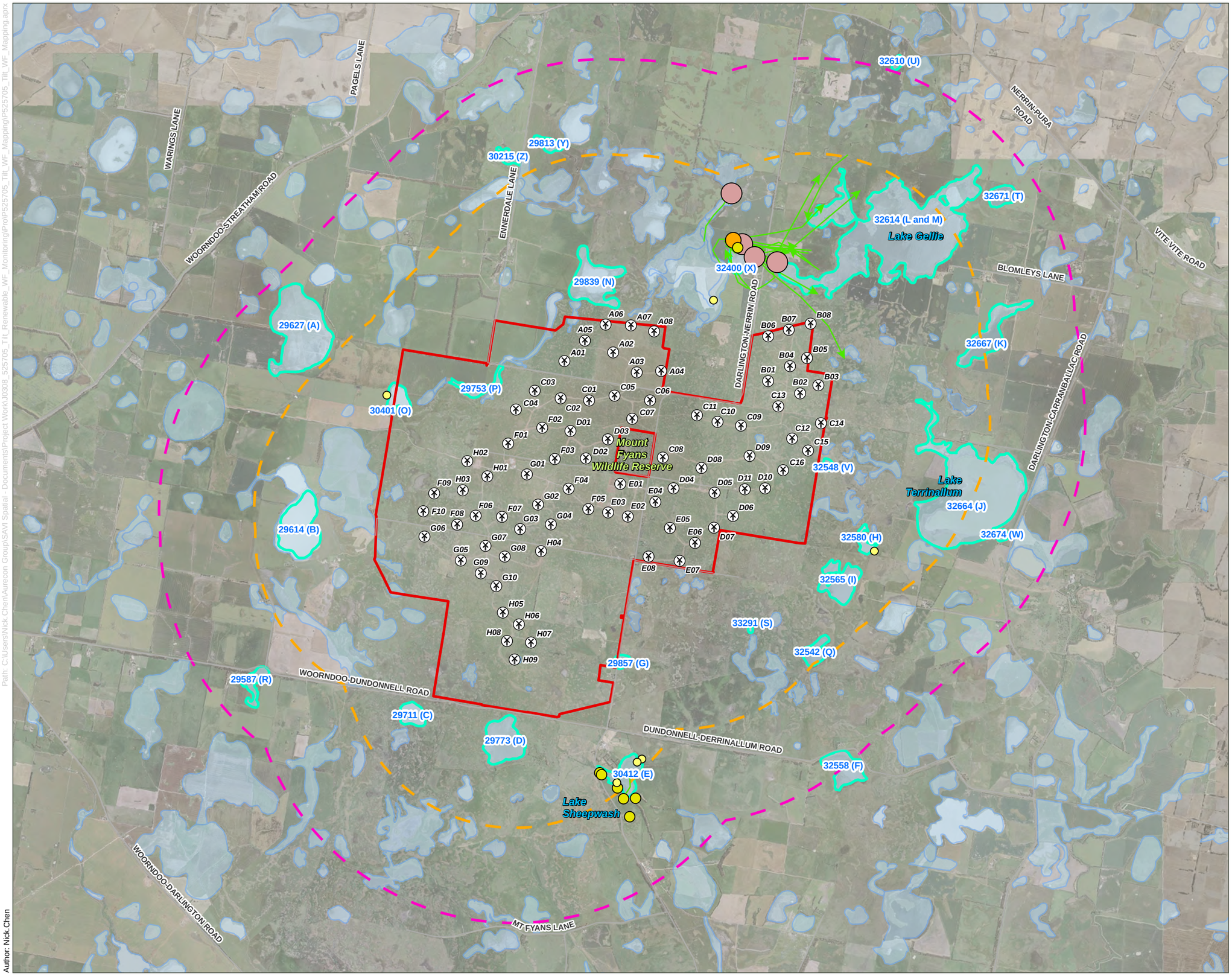


Legend

- Turbine layout
- Brolga flight observations
- Road
- Dundonnell wind farm project area
- Brolga breeding study area (3.2 km buffer from turbine layout)
- Brolga flocking study area (5 km buffer from turbine layout)
- Surveyed wetlands
- Mapped wetlands

Brolga point observations

Number of brolgas

- 1 - 5
- 6 - 10
- 21 - 35
- 36 - 50

Notes:

Basemap: Vicmap, Esri, TomTom, Garmin, FAO, NOAA, USGS

Other data: DELWP, Aurecon, Nature Advisory

Date: 20/12/2024 Version: 2

A3 scale: 1:70,000

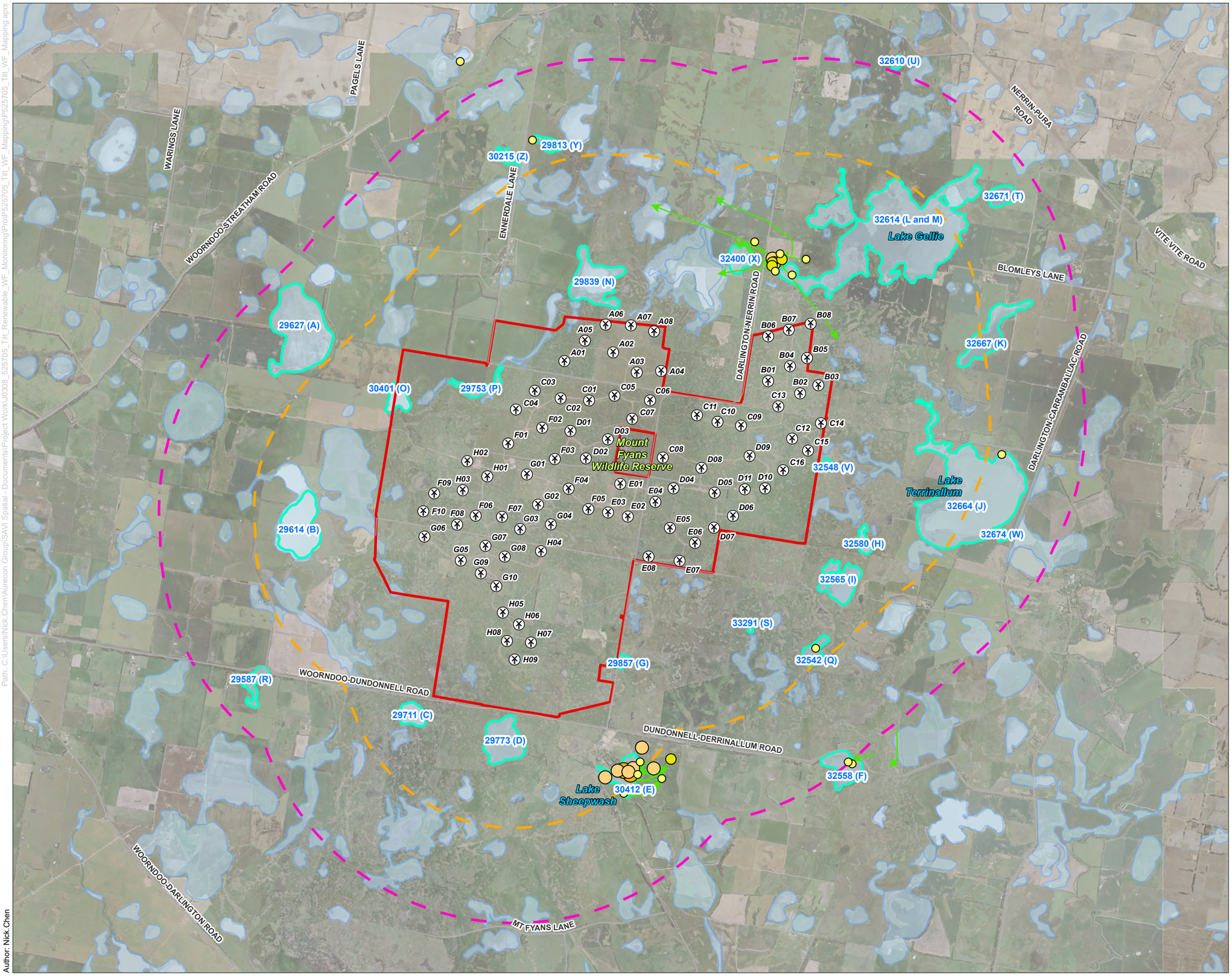
0 2 4 Kilometers

Job No: P525705

Coordinate System: GDA2020 MGA Zone 54

Tilt Renewables Dundonnell Wind Farm Carcass Survey

Fig 4g: Brolga observations from wetlands surrounding DDWF (May 2024)



Legend

- Turbine layout
- Brolga flight observations
- Road
- Dundonnell wind farm project area
- Brolga breeding study area (3.2 km buffer from turbine layout)
- Brolga flocking study area (5 km buffer from turbine layout)
- Surveyed wetlands
- Mapped wetlands

Brolga point observations

Number of brolgas

- 1 - 5
- 6 - 10
- 11 - 20
- 21 - 35

Notes:

Basemap: Vicmap, Esri, TomTom, Garmin, FAO, NOAA, USGS

Other data: DELWP, Aurecon, Nature Advisory

Date: 20/12/2024 Version: 2

A3 scale: 1:70,000

0 2 4 Kilometers

Job No: P525705

Coordinate System: GDA2020 MGA Zone 54

Tilt Renewables Dundonnell Wind Farm Carcass Survey

Fig 4h: Brolga observations from wetlands surrounding DDWF (June 2024)

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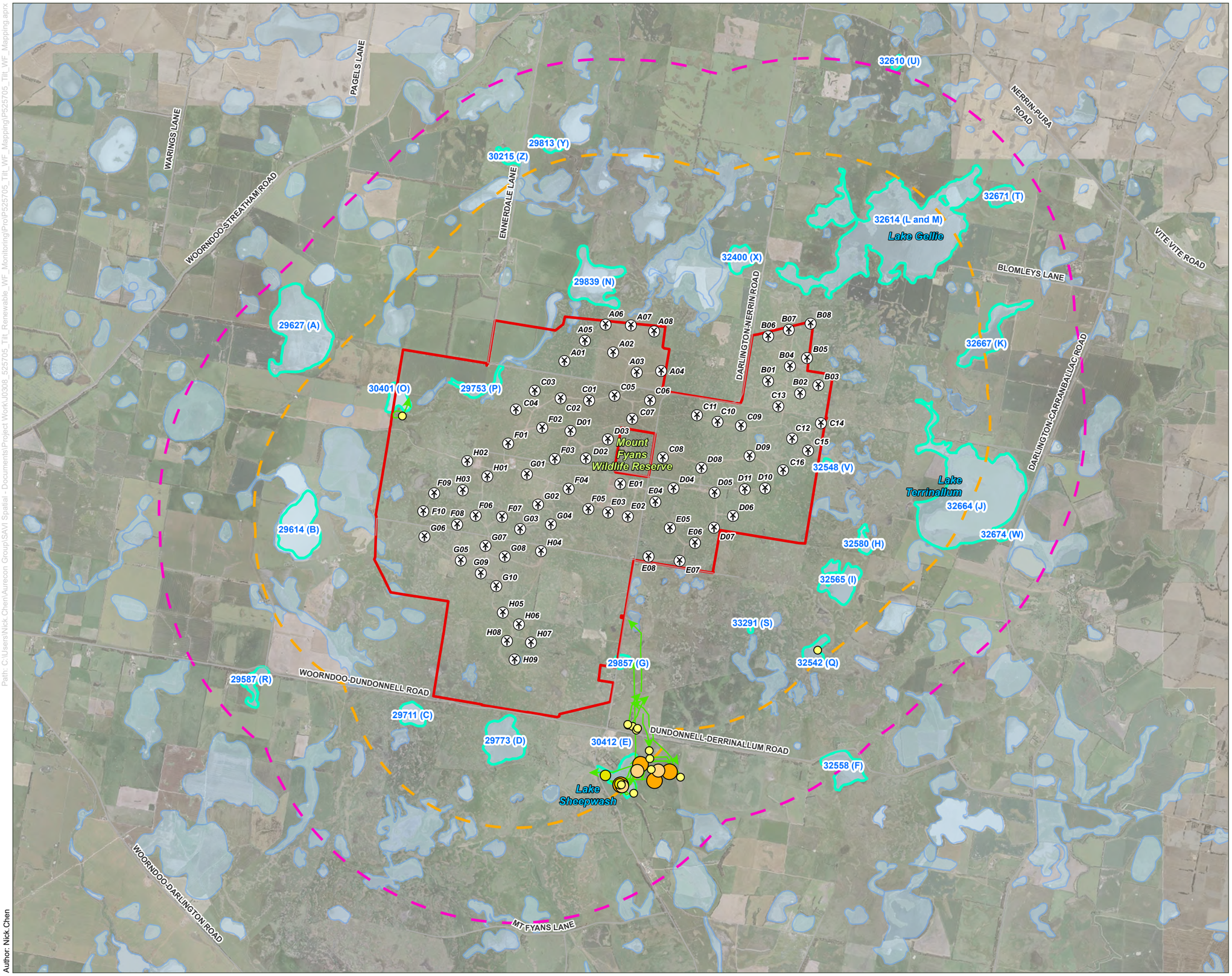
Author: Nick.Chen



Legend

- Turbine layout
- Brolga flight observations
- Road
- Dundonnell wind farm project area
- Brolga breeding study area (3.2 km buffer from turbine layout)
- Brolga flocking study area (5 km buffer from turbine layout)
- Surveyed wetlands
- Mapped wetlands

Brolga point observations

Number of brolgas

- 1 - 5
- 6 - 10
- 11 - 20
- 21 - 35

Notes:

Basemap: Vicmap, Esri, TomTom, Garmin, FAO, NOAA, USGS

Other data: DELWP, Aurecon, Nature Advisory

Date: 20/12/2024 Version: 2

A3 scale: 1:70,000

0 2 4 Kilometers

Job No: P525705

Coordinate System: GDA2020 MGA Zone 54

Tilt Renewables Dundonnell Wind Farm Carcass Survey

Fig 4i: Brolga observations from wetlands surrounding DDWF (July 2024)

Author: Nick.Chen

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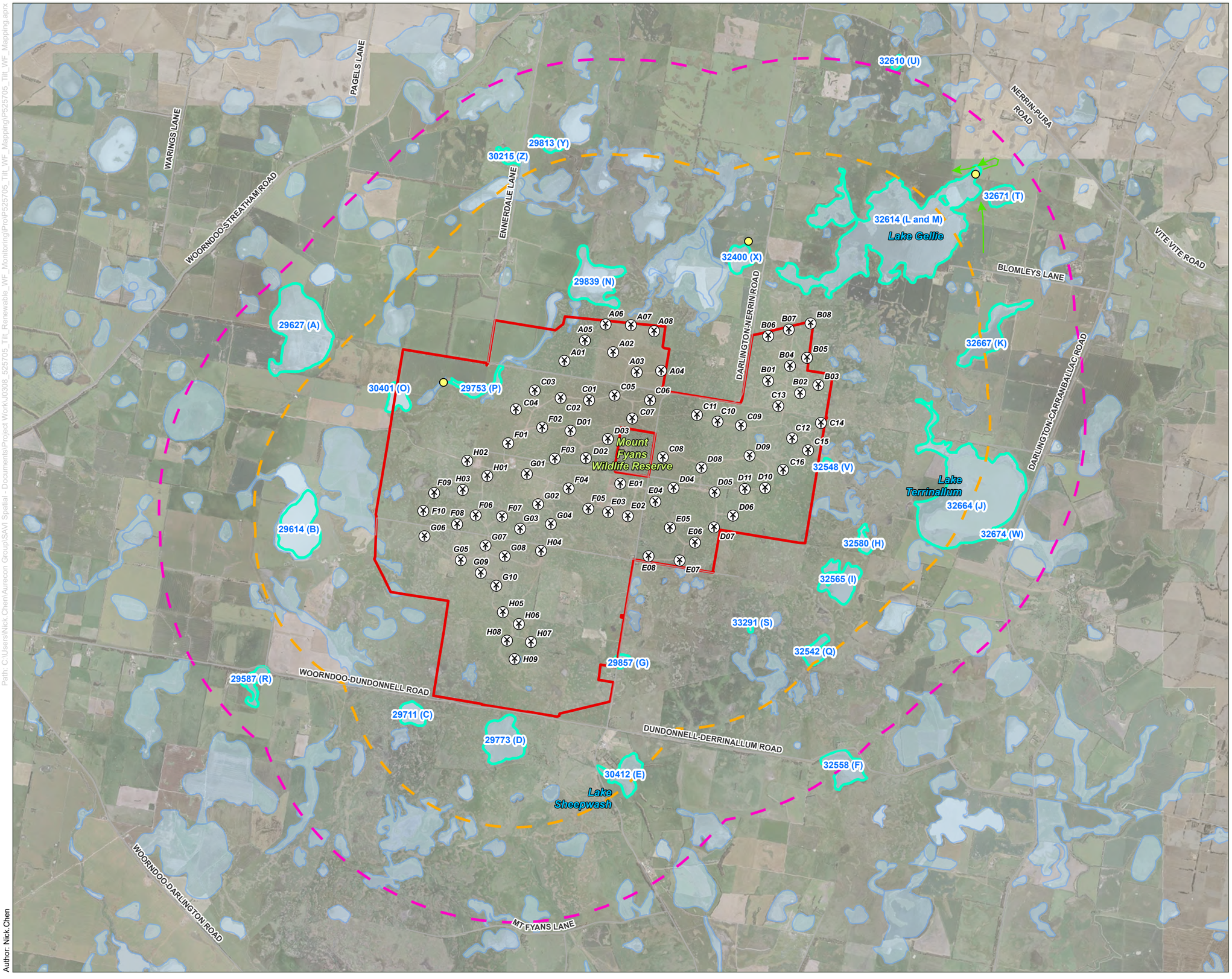


Legend

- Turbine layout
- Brolga flight observations
- Road
- Dundonnell wind farm project area
- Brolga breeding study area (3.2 km buffer from turbine layout)
- Brolga flocking study area (5 km buffer from turbine layout)
- Surveyed wetlands
- Mapped wetlands

Brolga point observations

Number of brolgas

- 1 - 5

Notes:

Basemap: Vicmap, Esri, TomTom, Garmin, FAO, NOAA, USGS

Other data: DELWP, Aurecon, Nature Advisory

Date: 20/12/2024 Version: 2

A3 scale: 1:70,000

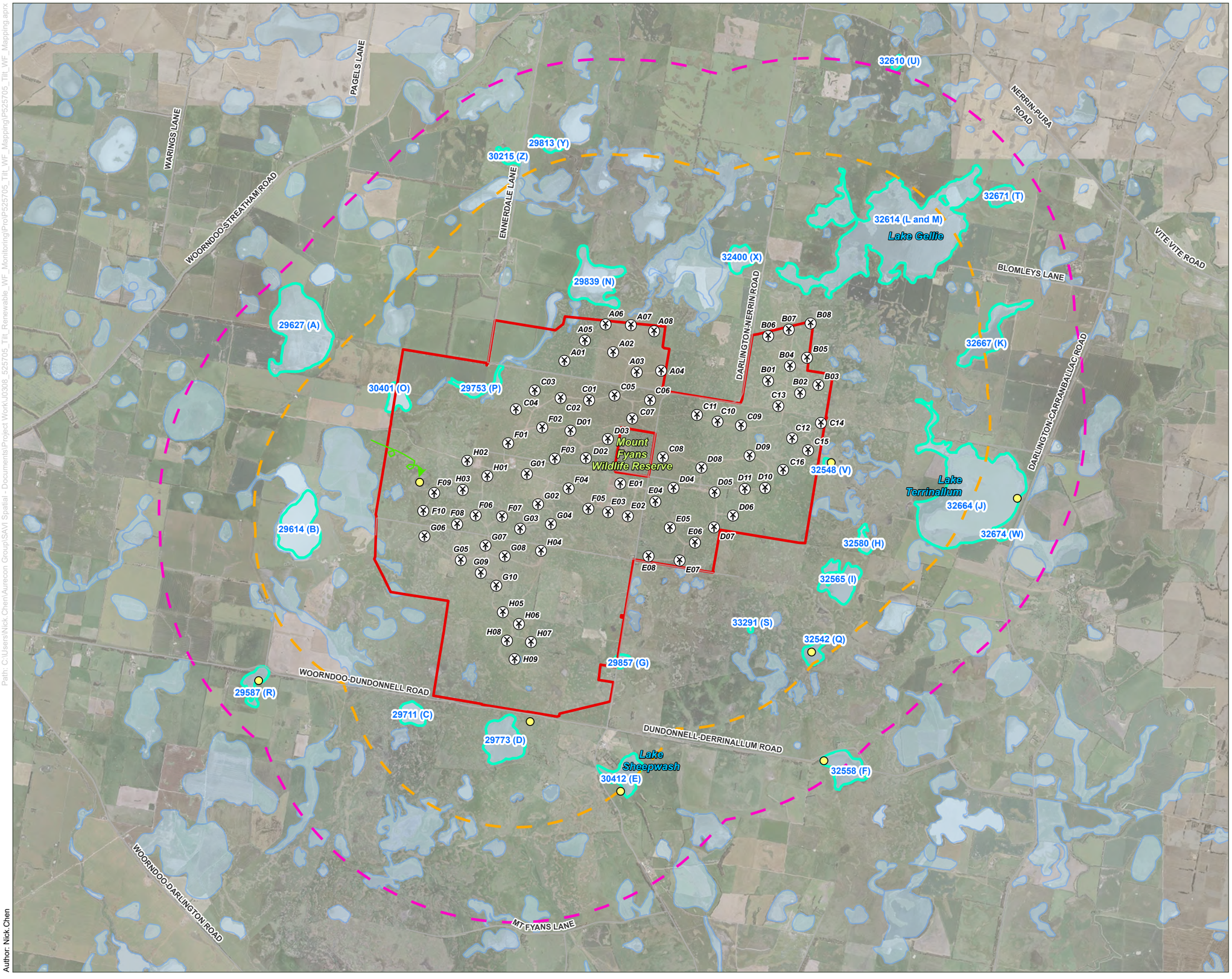
0 2 4 Kilometers

Job No: P525705

Coordinate System: GDA2020 MGA Zone 54

Tilt Renewables Dundonnell Wind Farm Carcass Survey

Fig 4j: Brolga observations from wetlands surrounding DDWF (August 2024)



Legend

- Turbine layout
- Brolga flight observations
- Road
- Dundonnell wind farm project area
- Brolga breeding study area (3.2 km buffer from turbine layout)
- Brolga flocking study area (5 km buffer from turbine layout)
- Surveyed wetlands
- Mapped wetlands

Brolga point observations

Number of brolgas

- 1 - 5

Notes:

Basemap: Vicmap, Esri, TomTom, Garmin, FAO, NOAA, USGS

Other data: DELWP, Aurecon, Nature Advisory

Date: 20/12/2024 Version: 2

A3 scale: 1:70,000

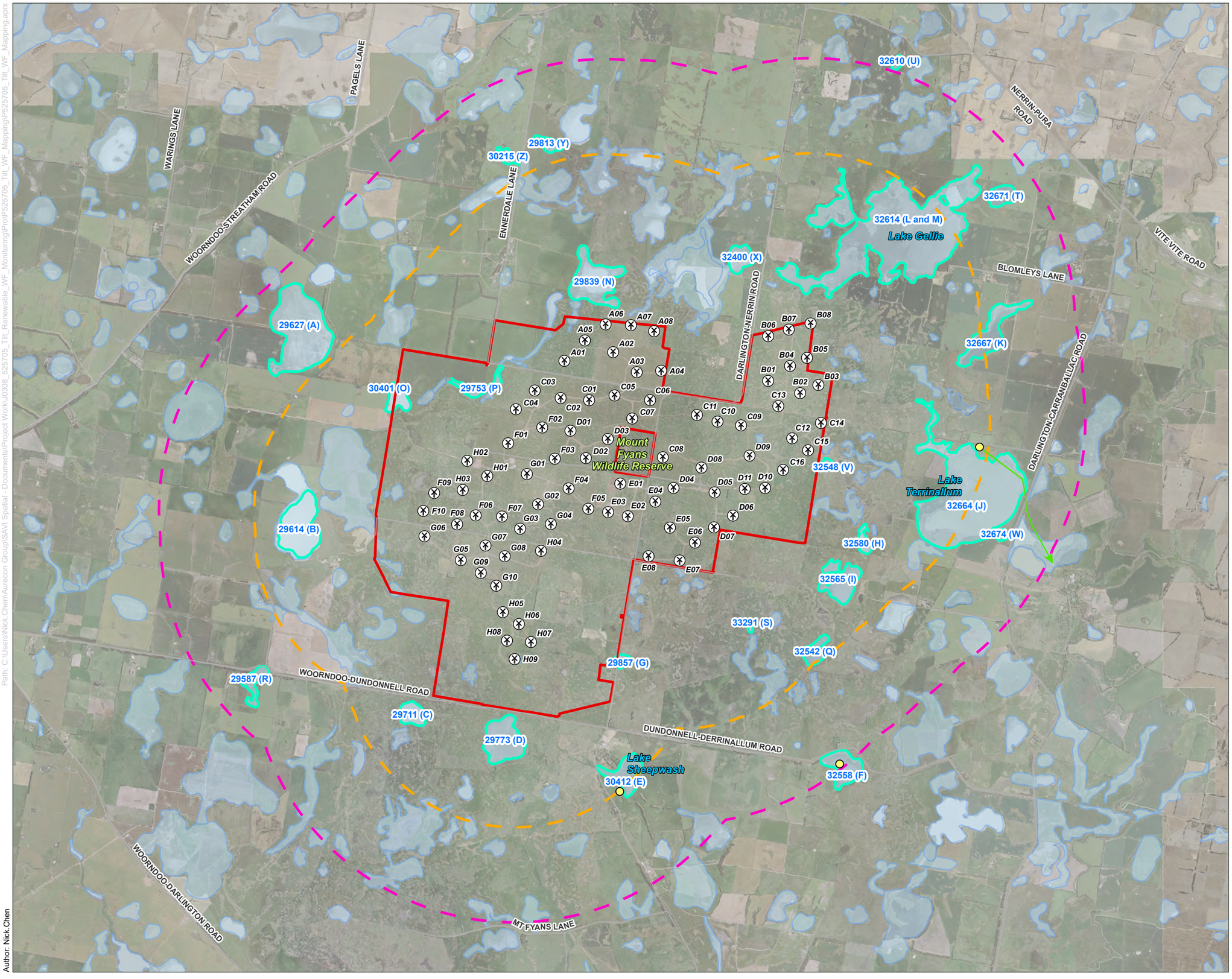
0 2 4 Kilometers

Job No: P525705

Coordinate System: GDA2020 MGA Zone 54

Tilt Renewables Dundonnell Wind Farm Carcass Survey

Fig 4k: Brolga observations from wetlands surrounding DDWF (September 2024)



Legend

- Turbine layout
- Brolga flight observations
- Road
- Dundonnell wind farm project area
- Brolga breeding study area (3.2 km buffer from turbine layout)
- Brolga flocking study area (5 km buffer from turbine layout)
- Surveyed wetlands
- Mapped wetlands

Brolga point observations

Number of brolgas

- 1 - 5

Notes:

Basemap: Vicmap, Esri, TomTom, Garmin, FAO, NOAA, USGS

Other data: DELWP, Aurecon, Nature Advisory

Date: 20/12/2024 Version: 2

A3 scale: 1:70,000

0 2 4 Kilometers

Job No: P525705

Coordinate System: GDA2020 MGA Zone 54

Tilt Renewables Dundonnell Wind Farm Carcass Survey

Fig 4l: Brolga observations from wetlands surrounding DDWF (October 2024)

3.3.6 Brolga breeding observations

No Brolga breeding attempts were recorded during Year 4 Brolga monitoring at Dundonnell WF. No breeding behaviour was observed within the 3.2km radius of the windfarm boundary, therefore no targeted Brolga breeding surveys were triggered. The lack of breeding activity observed is largely thought to be due to the lack of rainfall during the winter period, and subsequent lack of water in the smaller breeding wetlands.

Table 6 below details the wetlands where Brolga were recorded breeding during Years 1,2 and 3 monitoring and provides comments on observations during the Year 4 monitoring period.

Table 6: Brolga breeding wetland descriptions and breeding use history

Wetland	Distance from DDWF boundary	Brolga breeding history from Years 1,2 and 3 monitoring (Biosis, 2024)	Brolga breeding observations Year 4 (Aurecon)
32558 (F)	3.8 kilometres	▪ Breeding from 2002 – 2012, listed in BL&A preconstruction Brolga assessment report. ▪ Successful breeding attempt Year 1 breeding season, with pair of adults and one juvenile observed in October 2021. ▪ First breeding attempt in late Year 2 failed due to nest flooding in October 2022. ▪ Successful breeding in late Year 2 – early Year 3 breeding season, one chick hatched by December 2022. ▪ Unsuccessful breeding in late Year 3 breeding season, nest flooded in September 2023.	2 Brolga observed dancing for approximately 5 seconds in June 2024. No further activity. Wetland remained dry for entire breeding season.
29587 (R)	1.8 kilometres	▪ Wetland not surveyed during DDWF preconstruction Brolga assessment. Landholder reports that the wetland has a long history of Brolga breeding activity. ▪ Successful breeding attempt in 2021/22 (late Year 1 – early Year 2) breeding season, with pair of adults and one juvenile observed in October 2021. ▪ Successful breeding attempt in late Year 2, with pair of adults and one juvenile observed in October 2022. ▪ Successful breeding in late Year 2 – early Year 3 season, two chicks hatched by January 2023. ▪ Unsuccessful breeding in late Year 3 breeding season, nest flooded in September 2023.	None observed during Year 4 monitoring. Wetland remained dry throughout breeding season.
32542 (Q)	3 kilometres	▪ Breeding from 2008 – 2013, listed in BL&A preconstruction Brolga assessment report. ▪ Successful breeding attempt in Year 1 – early Year 2 breeding season, with pair of adults and one juvenile observed in November 2021. ▪ First breeding attempt in late Year 2 failed due to nest flooding in October 2022. ▪ Successful hatching of one chick in late Year 2 – early Year 3 season, October 2022. ▪ No nesting attempt observed in late Year 3 breeding season.	None observed during Year 4 monitoring. Wetland remained dry throughout breeding season.

Wetland	Distance from DDWF boundary	Brolga breeding history from Years 1,2 and 3 monitoring (Biosis, 2024)	Brolga breeding observations Year 4 (Aurecon)
29839 (N)	500 metres	▪ No recorded breeding history. Wetland was not included in targeted breeding surveys in Year 1. ▪ First breeding attempt in late Year 2 failed due to nest flooding in October 2022. ▪ No Brolga were observed during Year 3	None observed during Year 4 monitoring. Wetland remained dry throughout breeding season.
32610 (U)	5.1 kilometres	▪ Wetland was drained until restoration in early 2022. No recorded historic breeding use. ▪ Wetland was not included in targeted breeding surveys in Year 1. ▪ Successful breeding attempt in late Year 2, with nesting concluded by October 2022 (pair of adults and one juvenile observed in January 2023). ▪ Successful breeding in late ▪ Year 2 – early Year 3 season, one chick hatched by January 2023. ▪ Unsuccessful breeding in late Year 3 breeding season, nest abandoned in September 2023.	None observed during Year 4 monitoring. Wetland remained dry throughout breeding season.

4 Mortality estimates

As per the DDWF BAM Plan, mortality estimates for birds and bats are only required at the end of Years 2 and 5. As such, mortality estimates for birds and bats have not been provided for this current (Year 4) monitoring period. Rather, species-specific mortality estimates were calculated by Symbolix at the end of the DDWF Year 4 monitoring period for three species of interest – Brolga, SBWB and WSFB, as per the reasons provided in Section 1.2. Mortality estimates for these three species are presented in the below sub-sections. Full details of the methods and results of the mortality estimates are provided in Appendix B.

4.1 Brolga mortality estimate

During the four years of operational monitoring at DDWF (Year 1 to Year 4), one Brolga carcass was detected during formal surveys, in October 2022, during Year 2 (Biosis 2023). No Brolga carcasses were detected at DDWF in Years 1, 3 or 4.

Based on the detected carcasses, measured detectability, scavenge rate, and survey effort, it has been estimated that there was a total median mortality of one (1) Brolga at DDWF during the Year 4 monitoring period (Nov 23 to Oct 24). As the model used for estimating mortality has an assumption that at least one individual was struck, the estimate is biased high (i.e. a conservative estimate) (See Appendix B).

Aurecon note that no Brolga carcasses were detected at DDWF in Year 4. The lack of carcass data to input into the model to calculate mortality estimates results in a conservative estimate. Given that only one Brolga carcass has been detected within the four years of operations, it is considered that the impacts to Brolga are less than the predicted annual collision rate of 0.49 Brolga, as reported in Section 7.2 of the DDWF BAM Plan (BL&A 2018).

4.2 Southern Bent-wing Bat mortality estimate

During the four years of operational monitoring at DDWF (Year 1 to Year 4), a total of three SBWB carcasses were detected during formal surveys, all three being recorded in 2023 (Year 3). No SBWB carcasses were detected at DDWF in Years 1, 2 or 4.

Based on the detected carcasses, measured detectability, scavenge rate, and survey effort, it has been estimated that there was a total median mortality of 17 SBWB at DDWF during the Year 4 monitoring period (Nov 23 to Oct 24). As noted for Brolga, the model used for estimating mortality has an assumption that at least one individual was struck, the estimate is biased high (See Appendix B).

Aurecon note that no SBWB carcasses were detected at DDWF in Year 4. Similar to the mortality estimate for Brolga in Section 4.1 above, the lack of carcass data to input into the model to calculate mortality estimates results in a conservative estimate.

4.3 White-striped Freetail Bat mortality estimate

A total of 119 WSFB carcasses have been detected at DDWF across the four years of monitoring, including 34 in Year 1, 25 in Year 2, 40 in Year 3 (Biosis 2024), and 20 during the current Year 4 monitoring period.

Based on the detected carcasses, measured detectability, scavenge rate, and survey effort, it has been estimated that there was a total median mortality of 217 WSFB at DDWF during the Year 4 monitoring period (Nov 23 to Oct 24) (See Appendix B).

The detection of WSFB carcasses in February and March 2024 met the non-threatened species impact trigger defined in the DDWF BAM Plan, as detailed further in 5.2.

5 BAM Plan species impact triggers

The DDWF BAM Plan defines 'impact triggers' for both threatened and non-threatened birds and bats. Further background and definitions of impact triggers are provided in Section 2.1.3.

A total of two impact triggers were met at DDWF during the Year 4 monitoring period, including:

- Threatened species triggers:
  - Little Eagle (listed under FFG Act): one carcass found in March 2024 at Turbine G05; and
- Non-threatened species triggers:
  - White-striped Free-tailed Bat (WSFB) (non-threatened): two carcasses found in February 2024 and two carcasses found in March 2024, at Turbine E04.

Investigation of these impact triggers was undertaken by Aurecon with reports submitted to DEECA as per the requirements of the DDWF BAM Plan. Locations of all impact triggers detected during Year 4 are shown in Figure 5. Further details of each of the impact triggers, as summarised from the relevant investigations undertaken, as provided in the below sub-sections.

5.1 Little Eagle

A single carcass of Little Eagle (*Hieraaetus morphnoides*) was found during routine carcass monitoring in March 2024, beneath turbine G05. Little Eagle is listed as Vulnerable under the FFG Act. This was the first instance of a Little Eagle carcass being recorded at DDWF across all years of operation to date, with only one other observation of Little Eagle having been recorded within the DDWF study area (during Year 2).

The Little Eagle carcass was found in three parts between 9.10am and 10.30am on the 6th of March 2024 in the search zone beneath Turbine G05. The three parts were determined as belonging to the one individual as all three parts were within 45m of each other, there were no multiples of the same body part (the finds consisted of two legs, one head and one tail), all parts were of the same level of deterioration, and all parts were from a dark morph Little Eagle, which are less common than light morph individuals.

The detected carcass was an adult individual, with collision likely having occurred in mid-February, outside the breeding period for the species. It was therefore considered that the individual likely was occurring singly, rather than with a mate, and was likely dispersing through the area, on its migratory journey.

Given the single previous record of the species in the area over the past four years of monitoring, the likelihood that the species was dispersing through the area and the lack of previous carcasses recorded at Dundonnell WF, it was concluded that this event is likely to be a one-off occurrence. Despite the lack of current population figures for Little Eagle, the one-off impact was not considered to be significant at a regional population scale. No additional mitigation measures were required as a result of this impact trigger.

5.2 White-striped Free-tailed Bat

A total of four carcasses of WSFB were found beneath Turbine E04 across two consecutive months in February and March 2024 (two carcasses detected under the same turbine each month). These mortalities constitute an impact trigger for non-threatened species in accordance with the DDWF BAM Plan. WSFB is a common and widely distributed species of microbat, which occurs across most habitats in Victoria, including urban and alpine environments (Churchill, 2008).

A total of 119 WSFB carcasses have been detected at DDWF across the four years of monitoring, including 34 in Year 1, 25 in Year 2, 40 in Year 3 (Biosis 2024), and 20 during the current Year 4 monitoring period.

It is noted that of the 20 of the 31 (65%) bat carcasses found during formal carcass monitoring at DDWF in Year 4 were positively identified as WSFB.

Based on the high number of carcasses detected in Year 3, DEECA requested that a species-specific mortality estimate for WSFB be undertaken. This has been provided in this report (Appendix B). Based on the detected carcasses, measured detectability, scavenge rate, and survey effort, it has been estimated that

there was a total median mortality of 217 WSFB at DDWF during the Year 4 monitoring period (Nov 23 to Oct 24).

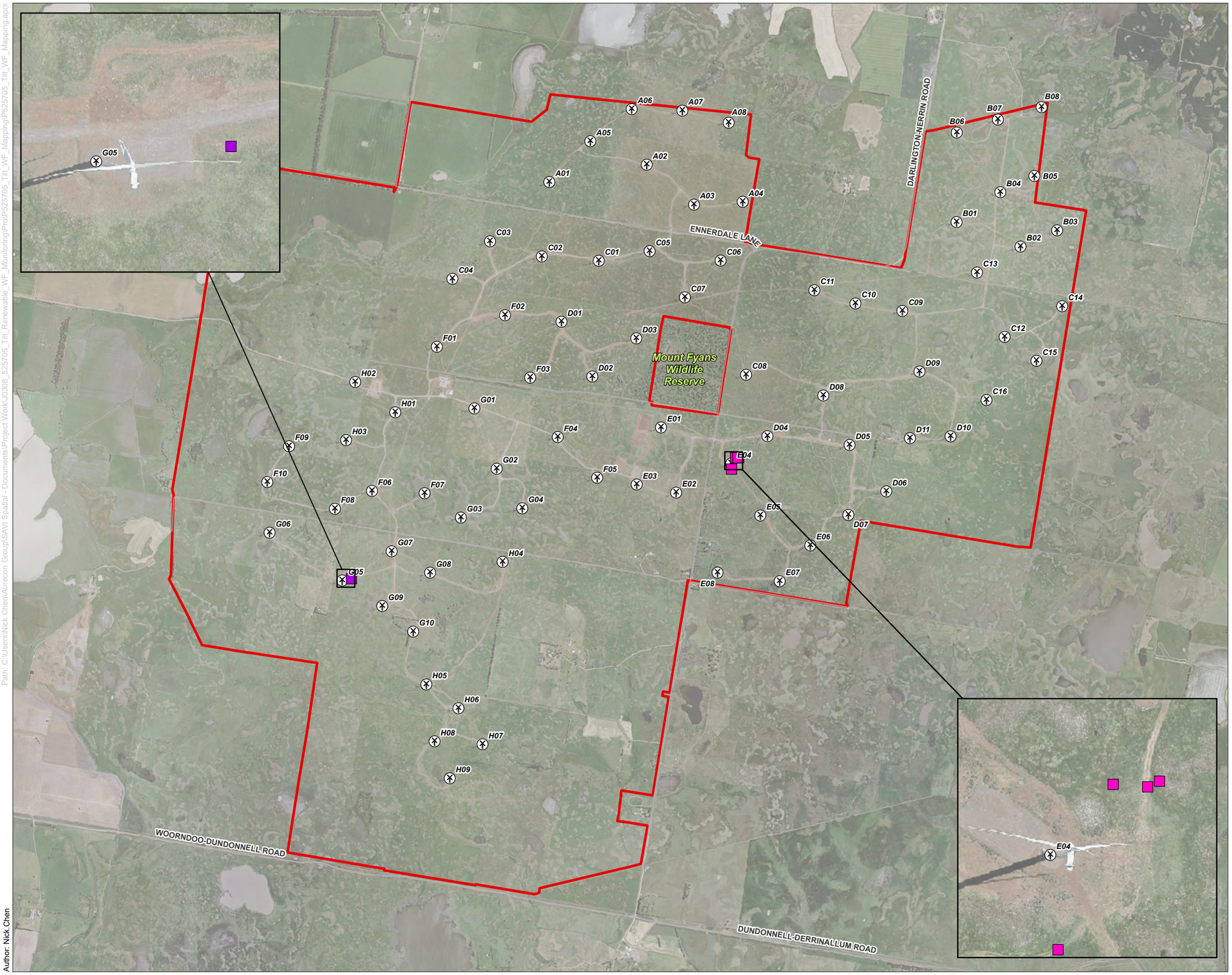
In Year 4, carcasses of WSFB was limited to January (two carcasses detected), February (1 carcass), March (16 carcasses) and April (1 carcass) (See Appendix A). This pattern of detection aligns with the summer migration of the WSFB to the southern part of the country (Churchill 2008).

Due to several mortalities of WSFB recorded at DDWF during Years 1 to 4 of operational monitoring, WSFB mortality is expected to occur into future years, with mortality expected in the summer to autumn months during the species southern migration period.

The DDWF BAM Plan states that if impacts to non-threatened species are likely to be significant at a relevant population scale, mitigation measures should be developed in consultation with DEECA. Given the lack of population information on the species, it is unable to conclude on the significance of the impacts on WSFB.

WSFB mortality from turbine collision is commonly detected at wind farms across Victoria. An investigation into post construction mortality monitoring by the Arthur Rylah Institute noted that of the mortality data available from Victorian wind farms as at February 20218, the majority (67%) of the bat carcasses detected were WSFB (Moloney, *et al.* 2019). Aurecon understand that DEECA have been recently undertaking further analysis of mortality data for WSFB from a wide range of wind farms in Victoria, with preliminary results indicating a similar trend.

Localised mitigation methods are therefore unlikely to affect regional scale populations numbers. Rather, Aurecon consider that a regional approach is required to implement effective mitigation measures to reduce impacts to the species population. Aurecon recommend further discussion with DEECA to determine an appropriate regional approach to reducing impacts to WSFB associated with turbine collision.



Legend

- Turbine layout
- Road
- Dundonnell wind farm project area

Threatened species impact trigger carcass finds

- Little Eagle

Non-threatened species impact trigger carcass finds

- White-striped Free-tailed Bat

Notes:

Basemap: Vicmap, Esri, TomTom, Garmin, FAO, NOAA, USGS

Other data: DELWP, Aurecon, Nature Advisory

Date: 15/12/2024 Version: 1

A3 scale: 1:35,000

0 1 2 Kilometers

Job No: P525705

Coordinate System: GDA2020 MGA Zone 54

Tilt Renewable Dundonnell Wind Farm Carcass Survey

Figure 4: Location of BAM Plan impact trigger carcass finds

Author: Nick.Chen

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6 Conclusion and recommendations

This section provides a summary of the findings from the Year 4 monitoring at DDWF. Recommendations are provided in italics at the end of each subsection.

6.1 Carcass monitoring and mortality estimates

6.1.1 Carcass monitoring

Bird and bat carcass monitoring was undertaken monthly at 27 turbines at DDWF in Year 4 from November 2023 to October 2024. The carcass monitoring program detected a total of 162 individual bird/bat mortalities across 32 species/species groups. Of the 162 detected mortalities, 142 were recorded during formal searches and 20 were incidental finds.

BAM Plan impact triggers were met for one threatened species (Little Eagle - one individual detected in March 2024), and one non-threatened species (WSFB – four carcasses detected, two in February and two in March 2024, under Turbine E04).

No Brolga or SBWB carcasses were detected in Year 4.

It is recommended that no change be made to the methods for the carcass monitoring program as outlined in the BAM Plan. Year 5 monitoring commenced in November 2024, and will continue for the duration of the Year 5 of operations (to October 2025).

6.1.2 Mortality estimates

The BAM Plan requires that mortality estimates are undertaken for all birds and bats at the completion of Years 2 and 5, therefore this was not undertaken for Year 4. Rather, species-specific mortality estimates were undertaken for three species of interest, namely Brolga, SBWB and WSFB. Importantly, no Brolga or SBWB carcasses were detected at DDWF in Year 4. As the model used for estimating mortality has an assumption that at least one individual was struck, the estimate provided for both these species is biased high (i.e. a conservative estimate).

Based on the detected carcasses, measured detectability, scavenge rate, and survey effort, it has been estimated that there was a total median mortality of one (1) Brolga, 17 SBWB and 217 WSFB at DDWF during the Year 4 monitoring period (Nov 23 to Oct 24). For the reason provided above, the estimates for Brolga and SBWB are considered to be biased high, given none were detected in Year 4.

It is recommended that mortality estimates for Brolga, SBWB and WSFB be undertaken again in Year 5, in addition to undertaking general bird and bat mortality estimates for Year 5.

Aurecon consider that a regional approach is required to implement effective mitigation measures to reduce impacts to the WSFB population. ***Aurecon recommend further discussion with DEECA to determine an appropriate regional approach to reducing impacts to WSFB associated with turbine collision.***

6.2 Raptor and White-throated Needletail monitoring

A total of 147 raptor flights were recorded within DDWF during Year 4 carcass monitoring. A high diversity of raptors were recorded within the DDWF (11 species), as well as one additional species (Spotted Harrier) being recorded within 5 km of DDWF. The most common recorded raptors within the wind farm were Wedge-tail Eagle (53 observed flights), Nankeen Kestrel (38 observed flights) and Brown Falcon (31 observed flights). These three raptor species represented 35% of the bird mortalities detected at DDWF during Year 4, with 29 Nankeen Kestrel, 11 Wedge-tail Eagle and five Brown Falcon mortalities detected (total of 45 mortalities out of all 130 detected bird mortalities).

No White-throated Needletail were observed within DDWF in Year 4.

Based on the incidental raptor flight data collected during monthly monitoring, raptor activity remains high within DDWF, with regular observations of raptors, particularly Wedge-tail Eagle and Nankeen Kestrel recorded throughout the Year 4 monitoring period. Raptor flight monitoring will continue into Year 5.

Regular carrion removal is required as part of the BAM Plan, to ensure stock and kangaroo carcasses are removed from within 250m of all wind turbines on a regular basis (to reduce attraction to birds of prey under turbines). However, dead stock (sheep/lambs) were observed under turbines on a number of times during Year 4, including the following documented occasions:

- 23rd August 2024 - Two dead sheep/lambs were observed under Turbine C12, at the same time a Wedge-tail Eagle carcass was incidentally detected.
- 29th October 2024 - Two Wedge-tail Eagles were observed feeding on a sheep carcass under Turbine C16 in the eastern part of DDWF in late October 2024.

Given the high incidence of raptors (particularly Nankeen Kestrels, Wedge-tailed Eagles and Brown Falcons) recorded at DDWF in Year 4 (both in observed flights and in detected mortalities***), Aurecon recommend that the carrion removal program within DDWF is strengthened with the aim to reduce raptors being attracted to the area under turbines***, so to reduce opportunities for collision. It is recommended that this could be achieved through formal notification of stock carcass presence to be undertaken concurrently with the existing bird and bat monitoring program, and deployment of a contractor to remove any stock carcasses present.

The pair of Peregrine Falcons at Mount Fyans Wildlife Reserve were observed to have successfully bred in late 2023 (at the start of the Year 4 monitoring period). As of October 2024, no evidence of breeding in the spring 2024 season had been observed. The successful breeding observed in late 2023, presence of adults in 2024, and lack of detected carcasses of Peregrine Falcons in Year 4, suggests the operation of DDWF has had limited impact on the species during the Year 4 monitoring period. Monitoring of the Peregrine Falcons at Mount Fyans Wildlife Reserve has continued into Year 5 with monitoring in November and December 2024, and will continue from August to October 2025.

6.3 Brolga behaviour monitoring

Brolga were recorded at 18 of the 26 wetlands surveyed during Year 4, with Brolga being recorded within 5km of the DDWF within all 12 months of the Year 4 monitoring period. Brolgas were recorded from single individuals to flocks of up to 46 individuals (as recorded in May 2024 at Lake Gellie). Observations of flocking Brolgas (flocks of >10 individuals) during seven out of 12 months triggered additional targeted Brolga flocking surveys. Observations of flocking Brolgas (flocks of >10 individuals) were limited to four wetlands during Year 4, detailed below.

- Lake Gellie (Wetland 32614; L and M), to the north east of the DDWF, for which flocks of Brolga of >10 individuals were recorded in February, April, May and June 2024.
- Wetland 32400 (X), which is located nearby to the western side of Lake Gellie, west of Darlington-Nerrin Road. Flocks of Brolga of >10 individuals were observed moving between Lake Gellie and this wetland in February and May 2024. In both February and May 2024, Brolga were recorded roosting in this wetland overnight (16 Brolga in February, and at least 9 Brolga in May).
- Lake Sheepwash (Wetland 30412; E), to the south east of the DDWF, for which flocks of Brolga of >10 individuals were recorded in March, May, June and July 2024.
- Wetland 32667 (K), located to the east of DDWF, for which flocks of Brolga of >10 individuals was recorded in December 2023.

All remaining Brolga observations were of groups of <10 individuals.

No Brolga breeding attempts were recorded during Year 4. The lack of breeding activity observed is largely thought to be due to the lack of rainfall during the winter period, and subsequent lack of water in the smaller breeding wetlands.

Furthermore, while smaller wetlands ran dry, the abundance of water in the larger, more permanent waterbodies (namely Lake Gellie and Lake Sheepwash) resulted in a high activity Brolga flocking movements within 5 km of DDWF, with the flocking season extending into July 2024. Year 4 saw the highest

activity of Brolga within 5km of DDWF since the commencement of operational monitoring with Brolga flocking (flocks of >10 individuals) being observed in seven months. This is compared to Brolga flocking being observed in 3 months in Year 2, and not at all in Years 1 and 3.

The high activity and large size of Brolga flocks observed around the DDWF during Year 4 suggests the species is able to persist within the vicinity of operational wind farms. Several Brolga flights observed during the Year 4 monitoring period suggested avoidance behaviours with Brolga flying around, or stopping short of the wind farm turbines.

Brolga behaviour monitoring will continue into Year 5 as per the BAM Plan. ***However Aurecon suggest discussions are undertaken with DEECA to determine whether the need to continue additional triggered flocking surveys is required in Year 5, given the extensive information gathered on Brolga flocking movements around DDWF in Year 4.***

7 References

Biosis 2022, *Dundonnell Wind Farm: First Year Annual Report – Bat and Avifauna Management Plan*, prepared 13th May 2022.

Biosis 2023, *Dundonnell Wind Farm: Year 2 Annual Report – Bat and Avifauna Management Plan Implementation*, prepared 20th October 2023.

Biosis 2024, *Dundonnell Wind Farm: Year 3 Annual Report – Bat and Avifauna Management Plan Implementation*, prepared 2nd May 2024.

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Appendix A: Carcass finds recorded at DDWF (Year 4)

Date found	Turbine	Scientific Name	Common Name	Type	Distance from turbine (m)	Sex	Age	Threatened Species Status	Carcass ID
20/11/2023	G05	*Carduelis carduelis*	European Goldfinch	Bird	30	Unknown	Adult	Non-threatened	INC01-201123-G05
21/11/2023	G05	*Anthus australis*	Australian Pipit	Bird	120	Unknown	Unknown	Non-threatened	C01-211123-G05
21/11/2023	G04	*Falco chenchroides*	Nankeen Kestrel	Bird	37	Unknown	Unknown	Non-threatened	C02-211123-G04
22/11/2023	C08	*Cacatua tenuirostris*	Long-Billed Corella	Bird	95	Unknown	Unknown	Non-threatened	C02-2211232-C08
22/11/2023	E07	*Falco berigora*	Brown Falcon	Bird	92	Male	Unknown	Non-threatened	C02-221123-E07
22/11/2023	C06	*Anthus australis*	Australian Pipit	Bird	178	Unknown	Unknown	Non-threatened	C03-221123-C06
22/11/2023	C07	*Alauda arvensis*	Eurasian Skylark	Bird	170	Unknown	Unknown	Non-threatened	C04-231123-C07
22/11/2023	D04	*Cacatua sp.*	Corella sp.	Bird	20	Unknown	Unknown	Non-threatened	FS01-221123-D04
22/11/2023	E08	*Corvus sp.*	Raven sp.	Bird	123	Unknown	Adult	Non-threatened	FS02-221123-E08
22/11/2023	E04	*Corvus sp.*	Raven sp.	Bird	132	Unknown	Unknown	Non-threatened	FS03-221123-E04
22/11/2023	E04	*Cacatua sp.*	Corella sp.	Bird	152	Unknown	Unknown	Non-threatened	FS04-221123-E04
22/11/2023	E01	*Corvus sp.*	Raven sp.	Bird	226	Unknown	Unknown	Non-threatened	I01-221123-E01
23/11/2023	F09	*Falco berigora*	Brown Falcon	Bird	11	Unknown	Unknown	Non-threatened	C05-231123-F09
23/11/2023	G04	*Cacatua sanguinea*	Little Corella	Bird	49	Unknown	Unknown	Non-threatened	C06-231123-G04
23/11/2023	G04	*Corvus sp.*	Raven sp.	Bird	10	Unknown	Adult	Non-threatened	C07-231123-G04
30/11/2023	G05	*Anthus australis*	Australian Pipit	Bird	119	Unknown	Unknown	Non-threatened	INC02-301123-G05
4/12/2023	F09	*Falco berigora*	Brown Falcon	Bird	113	Unknown	Adult	Non-threatened	C01-041223-F09
5/12/2023	B03	*Gymnorhina tibicen*	Australian Magpie	Bird	112	Unknown	Unknown	Non-threatened	FS01-051223-B03
7/12/2023	F09	*Corvus sp.*	Raven sp.	Bird	46	Unknown	Unknown	Non-threatened	C02-071223-F09
22/01/2024	H01	*Coturnix pectoralis*	Stubble Quail	Bird	49	Male	Adult	Non-threatened	INC2401-01-H01
23/01/2024	G04	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	20	Unknown	Adult	Non-threatened	C03-230124-G04
23/01/2024	G04	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	34	Unknown	Unknown	Non-threatened	C04-230124-G04
23/01/2024	G05	*Alauda arvensis*	Eurasian Skylark	Bird	59	Unknown	Adult	Non-threatened	C01-23012401-G05
23/01/2024	D08	*Aquila audux*	Wedge-Tailed Eagle	Bird	36	Male	Unknown	Non-threatened	C01-230124-D08
23/01/2024	G05	*Falco cenchroides*	Nankeen Kestrel	Bird	43	Unknown	Unknown	Non-threatened	C02-230124-G05
23/01/2024	B02	*Petrochelidon nigricans*	Tree Martin	Bird	52	Male	Adult	Non-threatened	FS01-230124-B02
23/01/2024	G10	*Unknown*	Unknown	Bird	63	Unknown	Unknown	Non-threatened	FS01-230124-G10
23/01/2024	G04	*Carduelis carduelis*	European Goldfinch	Bird	66	Unknown	Adult	Non-threatened	FS02-230124-G04
24/01/2024	E08	*Aquila audux*	Wedge-Tailed Eagle	Bird	69	Unknown	Unknown	Non-threatened	C01-240124-E08
24/01/2024	E07	*Unknown*	Unknown	Bird	28	Unknown	Unknown	Non-threatened	C02-240124-E07
24/01/2024	E04	*Cacatua sp.*	Corella sp.	Bird	44	Unknown	Unknown	Non-threatened	FS01-240124-E04
24/01/2024	C08	*Falco cenchroides*	Nankeen Kestrel	Bird	82	Unknown	Unknown	Non-threatened	I01-240124-C08

Date found	Turbine	Scientific Name	Common Name	Type	Distance from turbine (m)	Sex	Age	Threatened Species Status	Carcass ID
25/01/2024	E08	*Unknown bat sp.*	Unknown Bat sp.	Bat	7	Unknown	Unknown	Non-threatened	C01-250124-E08
25/01/2024	C06	*Falco cenchroides*	Nankeen Kestrel	Bird	43	Unknown	Unknown	Non-threatened	C05-250124-C06
25/01/2024	B02	*Gymnorhina tibicen*	Australian Magpie	Bird	82	Unknown	Unknown	Non-threatened	I01-250124-B02
30/01/2024	H09	*Aquila audux*	Wedge-Tailed Eagle	Bird	25	Unknown	Unknown	Non-threatened	INC01-300124-H09
5/02/2024	B06	*alauda arvensis*	Eurasian Skylark	Bird	45	Unknown	Adult	Non-threatened	C01-050224-B06
5/02/2024	B04	*Falco cenchroides*	Nankeen Kestrel	Bird	28	Unknown	Unknown	Non-threatened	I01-050224-B04
6/02/2024	E04	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	88	Female	Unknown	Non-threatened	C01-060224-E06
6/02/2024	E04	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	74	Unknown	Adult	Non-threatened	C02-060224-E04
6/02/2024	F09	*Falco cenchroides*	Nankeen Kestrel	Bird	58	Unknown	Unknown	Non-threatened	C01-060224-F09
6/02/2024	F09	*Falco cenchroides*	Nankeen Kestrel	Bird	31	Unknown	Unknown	Non-threatened	C02-060224-F09
6/02/2024	E04	*Falco cenchroides*	Nankeen Kestrel	Bird	70	Unknown	Unknown	Non-threatened	C03-060224-E04
6/02/2024	B02	*Gymnorhina tibicen*	Australian Magpie	Bird	93	Unknown	Juvenile	Non-threatened	FS01-060224-B02
7/02/2024	C07	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	47	Unknown	Unknown	Non-threatened	C03-070224-C07
7/02/2024	C08	*Cacatua sp.*	Corella sp.	Bird	112	Unknown	Adult	Non-threatened	FS01-070224-C08
7/02/2024	G02	*Unknown*	Unknown	Bird	120	Unknown	Unknown	Non-threatened	FS01-070224-G02
8/02/2024	G04	*Chalinolobus gouldii*	Gould's Wattled Bat	Bat	77	Female	Adult	Non-threatened	C04-080224-G04
8/02/2024	G10	*Anas superciliosa*	Pacific Black Duck	Bird	119	Male	Juvenile	Non-threatened	FS02-080224-G10
4/03/2024	D01	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	29	Male	Unknown	Non-threatened	C01-040324-D01
4/03/2024	D01	*Chalinolobus gouldii*	Gould's Wattled Bat	Bat	24	Unknown	Unknown	Non-threatened	C02-040324-D01
4/03/2024	B03	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	46	Unknown	Adult	Non-threatened	C03-040324-B03
4/03/2024	B06	*Aquila audux*	Wedge-Tailed Eagle	Bird	45	Unknown	Unknown	Non-threatened	C01-040324-B06
4/03/2024	B01	*Unknown*	Unknown	Bird	16	Unknown	Adult	Non-threatened	C02-040324-B01
4/03/2024	D01	*Falco berigora*	Brown Falcon	Bird	81	Unknown	Adult	Non-threatened	FS01-040324-D01
5/03/2024	C07	*Unknown bat sp.*	Unknown Bat sp.	Bat	22	Unknown	Unknown	Non-threatened	C01-050324-C07
5/03/2024	E08	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	66	Unknown	Unknown	Non-threatened	C01-050324-E08
5/03/2024	C07	*Molossidae sp.*	Free-Tailed Bat	Bat	53	Unknown	Unknown	Non-threatened	C02-050324-C07
5/03/2024	E08	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	26	Unknown	Unknown	Non-threatened	C02-050324-E08
5/03/2024	C03	*Unknown bat sp.*	Unknown Bat sp.	Bat	16	Unknown	Unknown	Non-threatened	C03-050324-C03
5/03/2024	E08	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	77	Unknown	Unknown	Non-threatened	C03-050324-E08
5/03/2024	E08	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	47	Female	Unknown	Non-threatened	c04-050324-e08
5/03/2024	E07	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	8	Unknown	Unknown	Non-threatened	C06-050324-E07
5/03/2024	E04	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	61	Unknown	Unknown	Non-threatened	C07-050324-E04
5/03/2024	E04	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	79	Male	Adult	Non-threatened	C08-050324-E04

Date found	Turbine	Scientific Name	Common Name	Type	Distance from turbine (m)	Sex	Age	Threatened Species Status	Carcass ID
5/03/2024	E04	*Chalinolobus gouldii*	Gould's Wattled Bat	Bat	55	Female	Unknown	Non-threatened	C09-050324-E04
5/03/2024	E07	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	68	Unknown	Juvenile	Non-threatened	FS01-050324-E07
5/03/2024	E08	*Chloris chloris*	European Greenfinch	Bird	30	Unknown	Adult	Non-threatened	C05-050324-E08
5/03/2024	D04	*Falco cenchroides*	Nankeen Kestrel	Bird	60	Unknown	Unknown	Non-threatened	FS02-050324-D04
5/03/2024	E01	*Falco cenchroides*	Nankeen Kestrel	Bird	83	Unknown	Unknown	Non-threatened	FS03-050324-E01
6/03/2024	C08	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	58	Unknown	Unknown	Non-threatened	C01-060324-C08
6/03/2024	E01	*Chalinolobus gouldii*	Gould's Wattled Bat	Bat	13	Female	Unknown	Non-threatened	C03-060324-E01
6/03/2024	G05	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	21	Unknown	Unknown	Non-threatened	C03-060324-G05
6/03/2024	F09	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	36	Unknown	Unknown	Non-threatened	C04-060324-F09
6/03/2024	F09	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	31	Unknown	Unknown	Non-threatened	C05-060324-F09
6/03/2024	C07	*Molossidae sp.*	Free-Tailed Bat	Bat	89	Unknown	Adult	Non-threatened	INC03-060324-C07
6/03/2024	D08	*Falco cenchroides*	Nankeen Kestrel	Bird	44	Female	Unknown	Non-threatened	C02-060324-D08
6/03/2024	G10	*Gymnorhina tibicen*	Australian Magpie	Bird	62	Unknown	Juvenile	Non-threatened	FS01-060324-G10
6/03/2024	G05	*Hieraaetus morphnoides*	Little Eagle	Bird	89	Unknown	Unknown	Threatened	INC01-060324-G05
7/03/2024	E07	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	18	Unknown	Adult	Non-threatened	C01-070324-E07
7/03/2024	G04	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	30	Male	Adult	Non-threatened	C01-070324-G04
7/03/2024	G02	*Unknown*	Unknown	Bird	41	Unknown	Adult	Non-threatened	FS03-070324-G02
16/04/2024	C01	*Falco cenchroides*	Nankeen Kestrel	Bird	21	Unknown	Adult	Non-threatened	C01-160424-C01
16/04/2024	C06	*Falco cenchroides*	Nankeen Kestrel	Bird	32	Unknown	Unknown	Non-threatened	FS01-160424-C06
16/04/2024	C07	*Platycerus elegans*	Crimson Rosella	Bird	38	Unknown	Unknown	Non-threatened	FS02-160424-C07
16/04/2024	F09	*Falco cenchroides*	Nankeen Kestrel	Bird	59	Unknown	Unknown	Non-threatened	FS03-160424-F09
16/04/2024	E01	*Corvus sp.*	Raven sp.	Bird	94	Unknown	Unknown	Non-threatened	FS04-160424-E01
16/04/2024	F08	*Aquila audux*	Wedge-Tailed Eagle	Bird	61	Unknown	Unknown	Non-threatened	INC01-160424-F08
17/04/2024	E04	*Chalinolobus gouldii*	Gould's Wattled Bat	Bat	88	Unknown	Unknown	Non-threatened	C01-170424-E04
17/04/2024	G05	*Austronomus australis*	White-Striped Free-tailed Bat	Bat	45	Unknown	Adult	Non-threatened	C01-170424-G05
17/04/2024	G05	*Gymnorhina tibicen*	Australian Magpie	Bird	91	Unknown	Unknown	Non-threatened	FS01-170424-G05
18/04/2024	H01	*Falco cenchroides*	Nankeen Kestrel	Bird	59	Unknown	Unknown	Non-threatened	FS01-180424-H01
18/04/2024	F04	*Corvus coronoides*	Australian Raven	Bird	57	Unknown	Unknown	Non-threatened	INC01-180424-F04
1/05/2024	C13	*Falco cenchroides*	Nankeen Kestrel	Bird	38	Unknown	Unknown	Non-threatened	FS01-010524-C13
27/05/2024	E01	*Falco cenchroides*	Nankeen Kestrel	Bird	42	Unknown	Adult	Non-threatened	FS01-270524-E01
27/05/2024	E04	*Anas superciliosa*	Pacific Black Duck	Bird	125	Unknown	Unknown	Non-threatened	FS01-270524-E04
28/05/2024	E08	*Aquila audux*	Wedge-Tailed Eagle	Bird	69	Unknown	Unknown	Non-threatened	C01-280524-E08
28/05/2024	D08	*Eolophus roseicapilla*	Galah	Bird	44	Unknown	Adult	Non-threatened	FS01-280524-D08

Date found	Turbine	Scientific Name	Common Name	Type	Distance from turbine (m)	Sex	Age	Threatened Species Status	Carcass ID
28/05/2024	G10	*Falco cenchroides*	Nankeen Kestrel	Bird	49	Unknown	Adult	Non-threatened	FS01-280524-G10
28/05/2024	D03	*Gymnorhina tibicen*	Australian Magpie	Bird	36	Unknown	Adult	Non-threatened	FS02-280524-D03
29/05/2024	C07	*Tyto alba*	Barn Owl	Bird	95	unknown	Unknown	Non-threatened	C01-290524-C07
29/05/2024	C03	*Falco cenchroides*	Nankeen Kestrel	Bird	107	Unknown	Adult	Non-threatened	FS01-290524-C03
29/05/2024	F09	*Falco cenchroides*	Nankeen Kestrel	Bird	64	Unknown	Adult	Non-threatened	FS02-290524-F09
29/05/2024	D07	*Aquila audux*	Wedge-Tailed Eagle	Bird	60	Likely male	Unknown	Non-threatened	INC01-290524-D07
30/05/2024	G04	*Falco sp.*	Falco sp.	Bird	40	Unknown	Adult	Non-threatened	FS01-300524-G04
30/05/2024	G01	*Gymnorhina tibicen*	Australian Magpie	Bird	120	Unknown	Adult	Non-threatened	INC-300524-01
24/06/2024	E01	*Gymnorhina tibicen*	Australian Magpie	Bird	39	Unknown	Unknown	Non-threatened	FS01-240624-E01
24/06/2024	E01	*Gymnorhina tibicen*	Australian Magpie	Bird	98	Unknown	Adult	Non-threatened	FS03-240624-E01
24/06/2024	D08	*Eolophus roseicapilla*	Galah	Bird	55	Unknown	Adult	Non-threatened	FS04-240624-D08
25/06/2024	G05	*Unknown*	Unknown	Bird	36	Unknown	Unknown	Non-threatened	C01-250624-G05
26/06/2024	G10	*Falco cenchroides*	Nankeen Kestrel	Bird	71	Unknown	Unknown	Non-threatened	C02-260624-G10
26/06/2024	G10	*Falco cenchroides*	Nankeen Kestrel	Bird	49	Unknown	Unknown	Non-threatened	C03-260624-G10
26/06/2024	G10	*Falco cenchroides*	Nankeen Kestrel	Bird	53	Unknown	Unknown	Non-threatened	C04-260624-G10
2/07/2024	E08	*Corvus sp.*	Raven sp.	Bird	51	Unknown	Unknown	Non-threatened	C01-020724-E08
3/07/2024	C07	*Unknown*	Unknown	Bird	112	Unknown	Adult	Non-threatened	FS01-030724-C07
22/07/2024	C08	*Corvus coronoides*	Australian Raven	Bird	159	Unknown	Unknown	Non-threatened	INC01-220724-C08
23/07/2024	B05	*Aquila audux*	Wedge-Tailed Eagle	Bird	18	Unknown	Unknown	Non-threatened	C01-230724-B05
23/07/2024	E07	*Eopsaltria australis*	Eastern Yellow Robin	Bird	35	Unknown	Unknown	Non-threatened	C02-230724-E07
23/07/2024	G10	*Unknown*	Unknown	Bird	110	Unknown	Unknown	Non-threatened	FS01-230724-G10
23/07/2024	H01	*Falco cenchroides*	Nankeen Kestrel	Bird	14	Unknown	Unknown	Non-threatened	FS02-230724-H01
5/08/2024	F09	*Trichoglossus moluccanus*	Rainbow Lorikeet	Bird	60	Unknown	Adult	Non-threatened	FS01-050824-F09
5/08/2024	C08	*Eolophus roseicapilla*	Galah	Bird	108	Unknown	Unknown	Non-threatened	FS02-050824-C08
5/08/2024	C08	*Eolophus roseicapilla*	Galah	Bird	90	Unknown	Juvenile	Non-threatened	FS03-050824-C08
6/08/2024	G10	*Eolophus roseicapilla*	Galah	Bird	116	Unknown	Adult	Non-threatened	FS04-060824-G10
6/08/2024	H01	*Corvus sp.*	Raven sp.	Bird	117	Unknown	Unknown	Non-threatened	FS05-060824-H01
6/08/2024	H01	*Falco cenchroides*	Nankeen Kestrel	Bird	115	Unknown	Unknown	Non-threatened	FS06-060824-H01
7/08/2024	C13	*Falco cenchroides*	Nankeen Kestrel	Bird	43	Unknown	Unknown	Non-threatened	FS07-070824_C13
7/08/2024	C06	*Cygnus atratus*	Black Swan	Bird	195	Unknown	Adult	Non-threatened	INC01-070824-C06
8/08/2024	G05	*Psephotus haematonotus*	Red-rumped Parrot	Bird	58	Unknown	Unknown	Non-threatened	FS08-080824-G05
8/08/2024	E08	*Unknown*	Unknown	Bird	89	Unknown	Unknown	Non-threatened	FS09-080824-E08
8/08/2024	E07	*Falco berigora*	Brown Falcon	Bird	100	Unknown	Unknown	Non-threatened	FS10-080824-E07

Date found	Turbine	Scientific Name	Common Name	Type	Distance from turbine (m)	Sex	Age	Threatened Species Status	Carcass ID
8/08/2024	B06	*Phylidonyris novaehollaniae*	New Holland Honeyeater	Bird	28	Unknown	Adult	Non-threatened	FS11-080824-B06
13/08/2024	E02	*Aquila audux*	Wedge-Tailed Eagle	Bird	52	Unknown	Juvenile	Non-threatened	INC02-130824-E08
23/08/2024	C12	*Alauda arvensis*	Eurasian Skylark	Bird	10	Unknown	Unknown	Non-threatened	INC01-230824-C13
23/08/2024	C12	*Aquila audux*	Wedge-Tailed Eagle	Bird	52	Unknown	Adult	Non-threatened	INC02-230824-C13
3/09/2024	E04	*Unknown*	Unknown	Bird	65	Unknown	Unknown	Non-threatened	C01-030924-E04
3/09/2024	E08	*Unknown*	Unknown	Bird	82	Unknown	Juvenile	Non-threatened	C02-030924-E08
3/09/2024	E07	*Haliastur sphenurus*	Whistling Kite	Bird	9	Unknown	Unknown	Non-threatened	C03-030924-E07
3/09/2024	E01	*Unknown*	Unknown	Bird	88	Unknown	Unknown	Non-threatened	FS01-030924-E01
3/09/2024	E08	*Unknown*	Unknown	Bird	76	Unknown	Unknown	Non-threatened	FS02-030924-E08
3/09/2024	C06	*Unknown*	Unknown	Bird	107	Unknown	Unknown	Non-threatened	FS03-030924-C06
3/09/2024	C08	*Unknown*	Unknown	Bird	102	Unknown	Unknown	Non-threatened	FS04-030924-C08
4/09/2024	G10	*Unknown*	Unknown	Bird	65	Unknown	Unknown	Non-threatened	C04-040924-G10
4/09/2024	G10	*Unknown*	Unknown	Bird	15	Unknown	Unknown	Non-threatened	C05-040924-G10
4/09/2024	B01	*Falco cenchroides*	Nankeen Kestrel	Bird	67	Unknown	Unknown	Non-threatened	C06-040924-B01
4/09/2024	G10	*Unknown*	Unknown	Bird	55	Unknown	Unknown	Non-threatened	FS05-040924-G10
4/09/2024	G10	*Unknown*	Unknown	Bird	124	Unknown	Unknown	Non-threatened	FS06-040924-G10
4/09/2024	C10	*Haliastur sphenurus*	Whistling Kite	Bird	50	Unknown	Adult	Non-threatened	INC01-040924-C10
5/09/2024	H08	*Unknown*	Unknown	Bird	60	Unknown	Adult	Non-threatened	C07-050924-H08
5/09/2024	G10	*Unknown*	Unknown	Bird	55	Unknown	Unknown	Non-threatened	C08-050924-G10
6/09/2024	H01	*Unknown bird sp.*	Unknown Bird sp.	Bird	64	Unknown	Unknown	Non-threatened	FS07-060924-H01
28/10/2024	E01	*Gymnorhina tibicen*	Australian Magpie	Bird	88	Unknown	Unknown	Non-threatened	C01-281024-E01
28/10/2024	C08	*Falco cenchroides*	Nankeen Kestrel	Bird	78	Unknown	Unknown	Non-threatened	C03-281024-C08
28/10/2024	E01	*Eolophus roseicapilla*	Galah	Bird	50	Unknown	Unknown	Non-threatened	FS01-281024-E01
28/10/2024	E01	*Gymnorhina tibicen*	Australian Magpie	Bird	73	Unknown	Unknown	Non-threatened	FS02-281024-E01
28/10/2024	E01	*Gymnorhina tibicen*	Australian Magpie	Bird	75	Unknown	Unknown	Non-threatened	FS03-281024-E01
29/10/2024	C07	*Corvus sp.*	Raven sp.	Bird	117	Unknown	Unknown	Non-threatened	C01-291024-C07
29/10/2024	C03	*Unknown*	Unknown	Bird	112	Unknown	Unknown	Non-threatened	FS01-291024-C03
30/10/2024	E08	*Aquila audux*	Wedge-Tailed Eagle	Bird	86	Unknown	Unknown	Non-threatened	C02-301024-E08
31/10/2024	D04	*Falco cenchroides*	Nankeen Kestrel	Bird	35	Unknown	Unknown	Non-threatened	C03-311024-D04
31/10/2024	E07	*Gymnorhina tibicen*	Australian Magpie	Bird	27	Unknown	Juvenile	Non-threatened	C04-3111024-E07
31/10/2024	F02	*Gymnorhina tibicen*	Australian Magpie	Bird	61	Unknown	Unknown	Non-threatened	FS01-311024-F02

Note: Incidental finds have carcass ID's starting with I, ie INC or I01

Appendix B: DDWF Year 4 – Mortality Estimate Report (Symbolix)

symbolix

Dundonnell Wind Farm Mortality Estimate - Year 4

Prepared for Aurecon, 24 January 2025, Ver. 1.1

This report outlines an analysis of Brolga, Southern Bent-winged Bat (SBB) and White-striped Freetail Bat (WSFT) mortality at Dundonnell Wind Farm (DWF) from 2023-11-01 to 2024-10-31. The analysis is broken into the three related components below:

- Searcher efficiency / detectability – dog trials were estimated from trials at the neighbouring Bulgana Wind Farm in July 2022 and October 2022. Human (binocular trials) were estimated from previous years at Dundonnell in 2020, 2021, 2022 and 2023.
- Scavenger loss rates – estimated from trials from November 2020 to October 2023
- Mortality estimates - based on surveys at 80 turbines, from 2023-11-20 to 2024-10-31

1 Available data

Survey data was collected and provided by Nature Advisory (NA) on behalf of Tilt Renewables. 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 Aurecon.

Species archetype data was taken from Hull and Muir (2010) (microbat archetype) and Veltheim (2018) (brolga archetype).

1.1 Data cleaning

Survey data:

- Surveys 381 and 382 were deleted as these were actually incidental searches (J. Sullivan, *pers. comms*)
- Survey 338's survey type was recoded from "Substitute" to "Standard" (J. Sullivan, *pers. comms*)

Carcass finds data (formal and incidental):

- Capitalisation and hyphenation of species names made consistent
- Carcasses FS01-061223-G10, FS02-240624-E01, FS05-260624-D08 were deleted due to

being either not a strike or a double up of a carcass already reported (J. Sullivan, *pers. comms*)

- Incidental INC02-060324-C07 was deleted as it was alive and "deemed to be fit for release" by a wildlife carer according to the associated comment, and is therefore not considered a mortality.

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 to targeting specific species, 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).

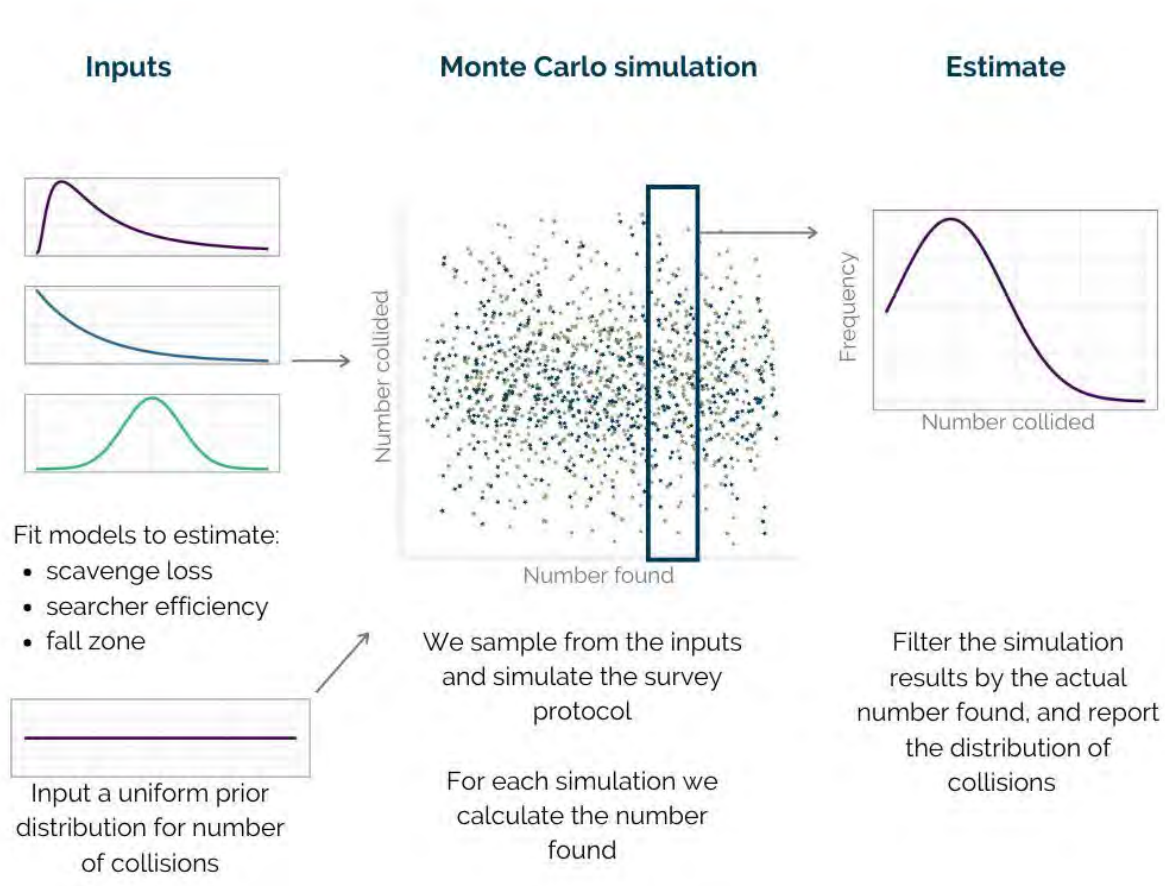

Figure 1: Overview of how the mortality estimation works.

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]. Primarily, this was pulsed monthly program using trained detection dogs at 28 randomly selected turbines. However for 21 Pulse surveys human searchers were used. On two occasions a human searcher had to take over mid-survey from a detection dog, for a conservative estimate we have assigned these as "Human" surveys as humans tend to perform worse in searcher efficiency.

Additionally, searches done by human observers, using binoculars, which only targeted Brolga, were undertaken. These looked for Brolga out to a radius of 120 metres. The number of turbines searched varied each month, but was generally around 50.

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

Table 1: Number of surveys per month.

	Binoculars	Dog		Human	
Date		Pulse	Standard	Pulse	Standard
2023 Nov	30	14	28	14	
2023 Dec	53	28	28		
2024 Jan	63	28	28		
2024 Feb	46	26	28	2	
2024 Mar	48	28	28		
2024 Apr	51	16	28		
2024 May	48	33	23		
2024 Jun	27	12	12		
2024 Jul	86	32	39	6	
2024 Aug	51	27	28		
2024 Sep	51	29	27		1
2024 Oct	64	28	28		

[1] Report 17185 (2.2) Dundonnell Wind Farm BAM Plan 180529.pdf

3.1.2 Carcass finds

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

Table 2: Carcasses found during year 4 formal surveys. Species of interest highlighted.

Species	Bat	Bird
Australasian Pipit		2
Australian Magpie		12
Brown Falcon		5
Common Barn Owl		1
Corella sp.		4
Corvid sp.		8
Crimson Rosella		1
Eastern Yellow Robin		1
Eurasian Skylark		3
European Goldfinch		1
European Greenfinch		1
Falcon sp.		1
Galah		6
Little Corella		1
Long-billed Corella		1
Nankeen Kestrel		27
New Holland Honeyeater		1
Pacific Black Duck		2
Rainbow Lorikeet		1
Red-rumped Parrot		1
Tree Martin		1
Unidentified Bird		23
Wedge-tailed Eagle		6
Whistling Kite		1
Freetail Bat sp.	3	
Gould's Wattled Bat	5	
Unidentified Bat	3	
White-striped Freetail Bat	**20**	

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
Australasian Pipit	1
Australian Magpie	2
Australian Raven	2
Black Swan	1
Corvid sp.	1
Eurasian Skylark	1
European Goldfinch	1
Freetail Bat sp.	1
Little Eagle	1
Nankeen Kestrel	2
Stubble Quail	1
Wedge-tailed Eagle	5
Whistling Kite	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

Searcher efficiency data for dogs was not available for Dundonnell so data from trials conducted by Nature Advisory at the nearby Bulgana Wind Farm was used.

The dog searcher efficiency data is sourced from trials conducted from July 2022 to September 2023. 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)). The trials were undertaken by one of the dogs that also undertook the main mortality surveys. If the carcass was found, “success” was recorded, else “failure” was the dog missing the carcass.

The carcasses deployed for dog searcher efficiency trials included 20 birds, and 20 bats of various size classes.

For the binocular surveys, the previous years’ binocular trials (undertaken by Skylos Ecology) were used. This used Turkey (61 replicates) and Brolga (34 replicates), in trials from 2020 to 2023.

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

Table 4: Count of species and species classes used during the detection trials.

Species	Type	Replicates
Gould's Wattled Bat	Bat	2
Southern Freetail Bat	Bat	3
Unidentified Bat	Bat	8
White-striped Freetail Bat	Bat	7
Australian Magpie	Bird	3
Brown Falcon	Bird	3
Common Myna	Bird	12
Sulphur-crested Cockatoo	Bird	2
Turkey	Brolga Proxy	61
Brolga	Brolga Feather Spot	21
Brolga	Brolga	13

Some surveys were also conducted by human searchers. However neither Dundonnell or Bulgana Wind Farms have human searcher efficiency trial data available, so human searcher efficiency was sourced from the aggregated Victorian data set from Stark and Muir (2020).

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 best model for dog searcher efficiency was the "intercept-only model" (i.e. all carcasses have the same expected searcher efficiency). From the Stark and Muir (2020) data, the best model for human searcher efficiency is split by birds and bats. And the best model for human

searcher efficiency of brolgas using binoculars was also the intercept-only model (i.e. proxies, brolgas and feather spots have the same expected searcher efficiency).

The outputs of this model is presented in Table 5.

Table 5: Detection efficiencies for bats, birds, and Brolga, by dogs, humans, and humans with binoculars.

Variable	Dog (All)	Human (Bats)	Human (Birds)	Binoculars (Brolga)
Number found	39	74	383	77
Number placed	40	141	435	95
Mean detectability proportion	0.98	0.52	0.88	0.81
Detectability lower bound (95% CI)	0.87	0.44	0.85	0.72
Detectability upper bound (95% CI)	1	0.61	0.91	0.88

Overall detectability of bats and birds by dogs is 98%, with a 95% confidence interval of [87%, 100%].

Overall detectability of bats by humans is 52%, with a 95% confidence interval of [44%, 61%]. Overall detectability of birds by humans is 88%, with a 95% confidence interval of [85%, 91%].

Overall detectability of Brolga by humans (with binoculars) is 81%, with a 95% confidence interval of [72%, 88%].

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

The scavenger efficiency data was collected in accordance to the specification in section 5.2.4 of the BBMP. This included trials across multiple seasons at ten randomly selected turbines using multiple sizes and species of carcasses.

Scavenger efficiency trials were conducted from November 2020 to October 2023. The trials ran over approximately 30 days. In total, 179 carcasses were used (including 61 birds, 17 bats, 42 mice (as bat proxies) and 59 turkeys (as brolga proxies)). Trials used cameras in order to record exact times of scavenge events.

Table 6 summarises the species used in the trials.

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

Species type	Species	Count
Brolga Proxy	Turkey	59
Bird	Australian Magpie	13
Bird	Common Barn Owl	1
Bird	Corvid sp.	2
Bird	Galah	2
Bird	Nankeen Kestrel	6
Bird	Rosella species	1
Bird	Unidentified Bird of Prey	1
Bird	Unidentified Ducks	3
Bird	Unidentified Quail	32
Bat Proxy	House Mouse	42
Bat	Unidentified Bat	1
Bat	White-striped Freetail Bat	16

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, ∞] (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

The best model for scavenger efficiency was split by species type with bats and bat proxies combined.

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 bat carcass removal via scavenge is 2.6 days, with a 95% confidence interval of [1, 4.7] days.

Under these assumptions, the median time to brolga carcass removal via scavenge is 21.4 days, with a 95% confidence interval of [11, 40.1] days.

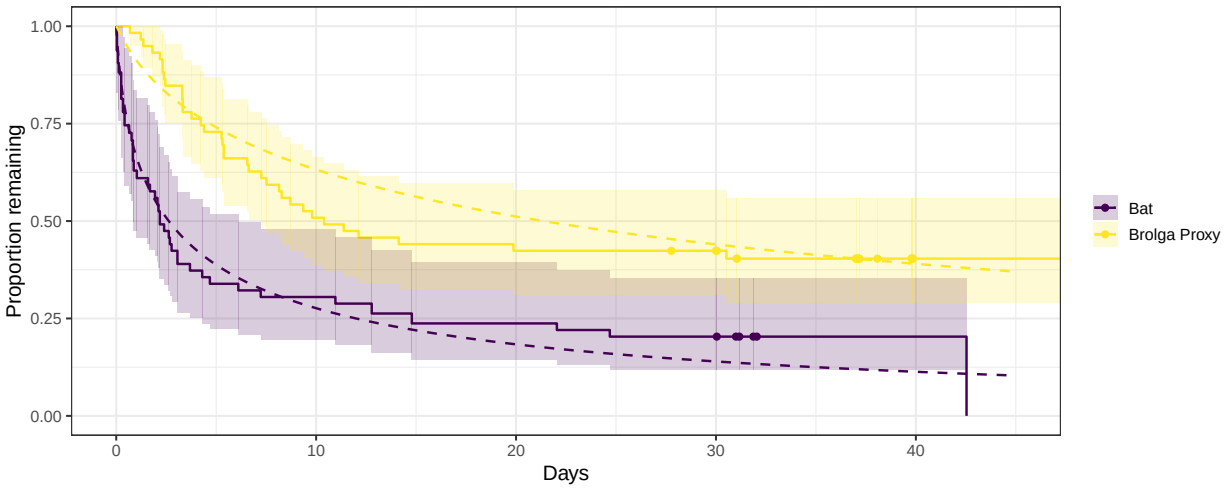

Figure 2: Empirical survival curve (the step function), with 95% confidence intervals shaded. The smooth curve presents the fitted model.

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 Dundonnell Wind Farm. Table 8 shows the brolga and bat physical parameters used. For the Southern Bent-winged Bat and White-striped Freetail Bat we used the standard microbat archetype. These archetypes were used as they represent a medium sized species for each species type and produce an estimate of the average fall zone.

Table 7: Turbine specifications for Dundonnell Wind Farm

Rotor Diameter (m)	Tower Height (m)	RPM
150	114	9.5

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
Brolga	Brolga	7.460	0.1000	0.475

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.

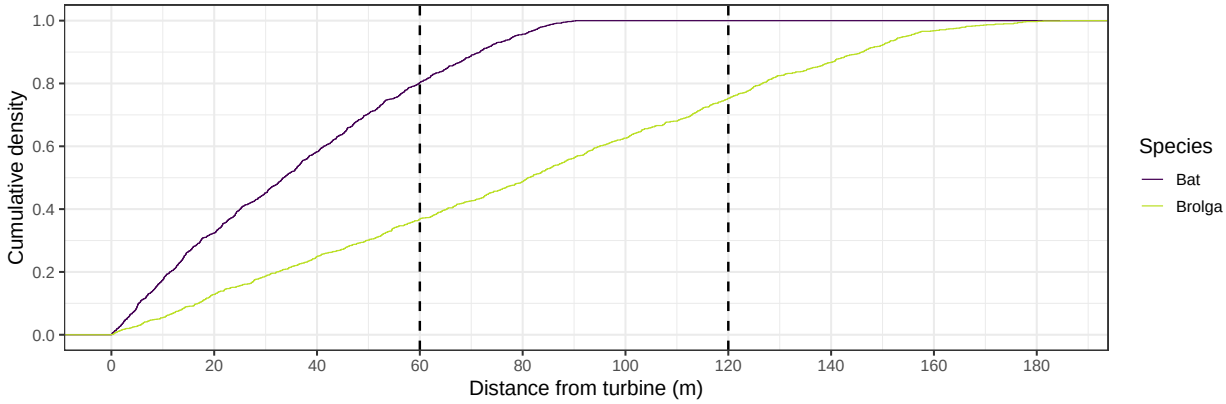

Figure 3: Cumulative distribution function of the fall zone simulation output for brolgas and bats. Vertical lines indicate the Pulse and Standard survey radii.

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 80% of bats and 37% of brolgas to fall within 60m of the turbine, and 100% bats and 75% of brolgas fall within 120m.

4 Mortality estimate

With estimates for scavenge loss, searcher efficiency, and survey coverage for Dundonnell Wind Farm, we then converted the number of bat and brolga carcasses detected into an estimate of overall mortality from 2023-11-01 to 2024-10-31 (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 80 turbines on site available to strike bats and birds.
- Of these, 28 were searched out to 120m monthly with follow-up 60m pulse surveys.
- Additional surveys using binoculars were done at approximately 50 other turbines each month.
- 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 2023-11-01 (approximately one month from the first survey), until the final surveyed date (2024-10-31).
- Bats and Brolga are on-site at all times during this period.
- Bats and Brolga 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.
- The model assumes that at least one animal of the species of interest was struck.

4.1 White-striped Freetail Bats

During the fourth year of surveys, 20 WSFTs were found during formal surveys. The resulting (median) estimate of total mortality is 217 WSFTs lost on site over the year.

Table 9 and Figure 4 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 there was a total site loss of around 217 WSFTs, and are 95% confident that fewer than 342 individuals were lost, over the year.

Table 9: Percentiles of estimated total WSFT losses in the fourth year of surveys.

Estimate	0%	50% (median)	90%	95%	99%
Year 4	106	217	305	342	400

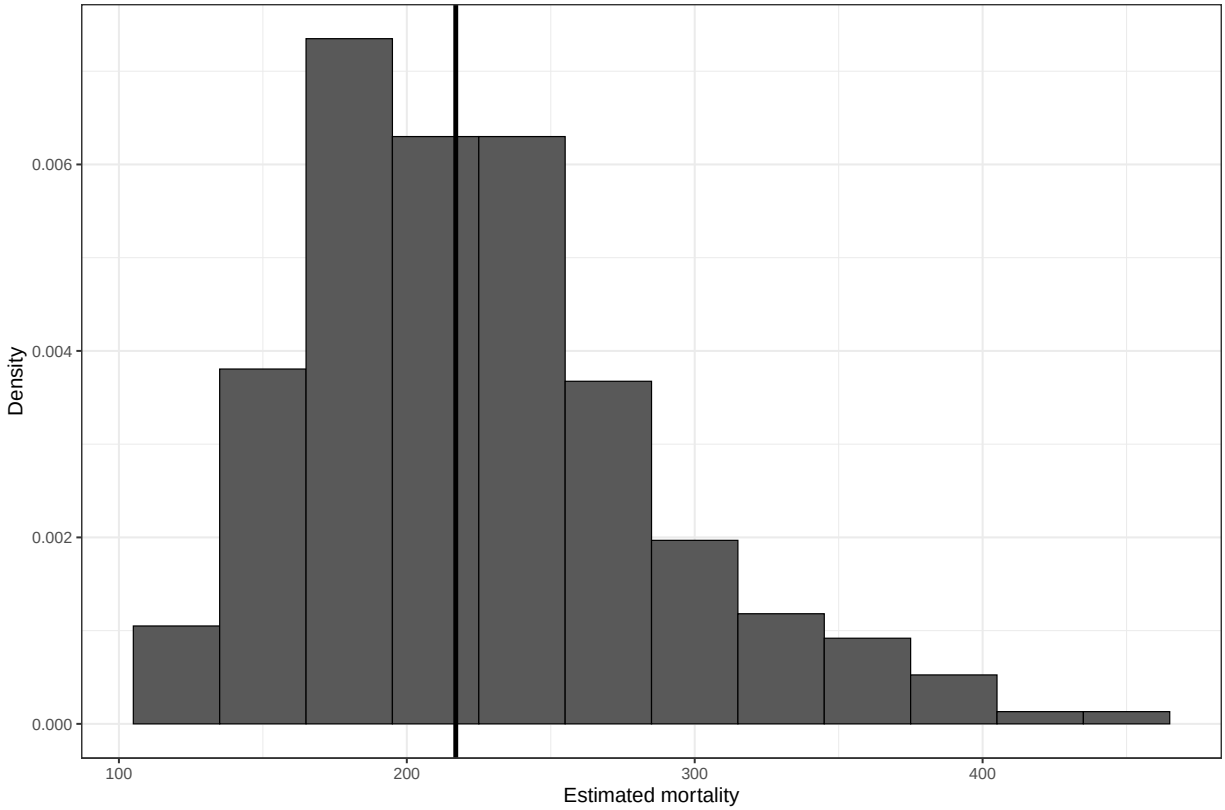

Figure 4: Histogram of the total losses distribution (WSFTs). The black solid line shows the median.

4.2 Southern Bent-winged Bats

During the fourth year of surveys, zero SBBs were found during formal surveys. The resulting (median) estimate of total mortality is 17 SBBs lost on site over the year.

We note that during Year 4, no SBB carcasses were found. Therefore, we have no evidence that SBBs were struck during this period (as opposed to Year 3, where we *did* have evidence that SBBs were struck). As the mortality estimator has an assumption that at least one bat was struck, the estimate is likely biased high (i.e. a conservative estimate).

Table 10 and Figure 5 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 there was a total site loss of around 17 SBBs, and are 95% confident that fewer than 39 individuals were lost, over the year.

Table 10: Percentiles of estimated total SBB losses in the fourth year of surveys.

Estimate	0%	50% (median)	90%	95%	99%
Year 4	11	17	29	39	51

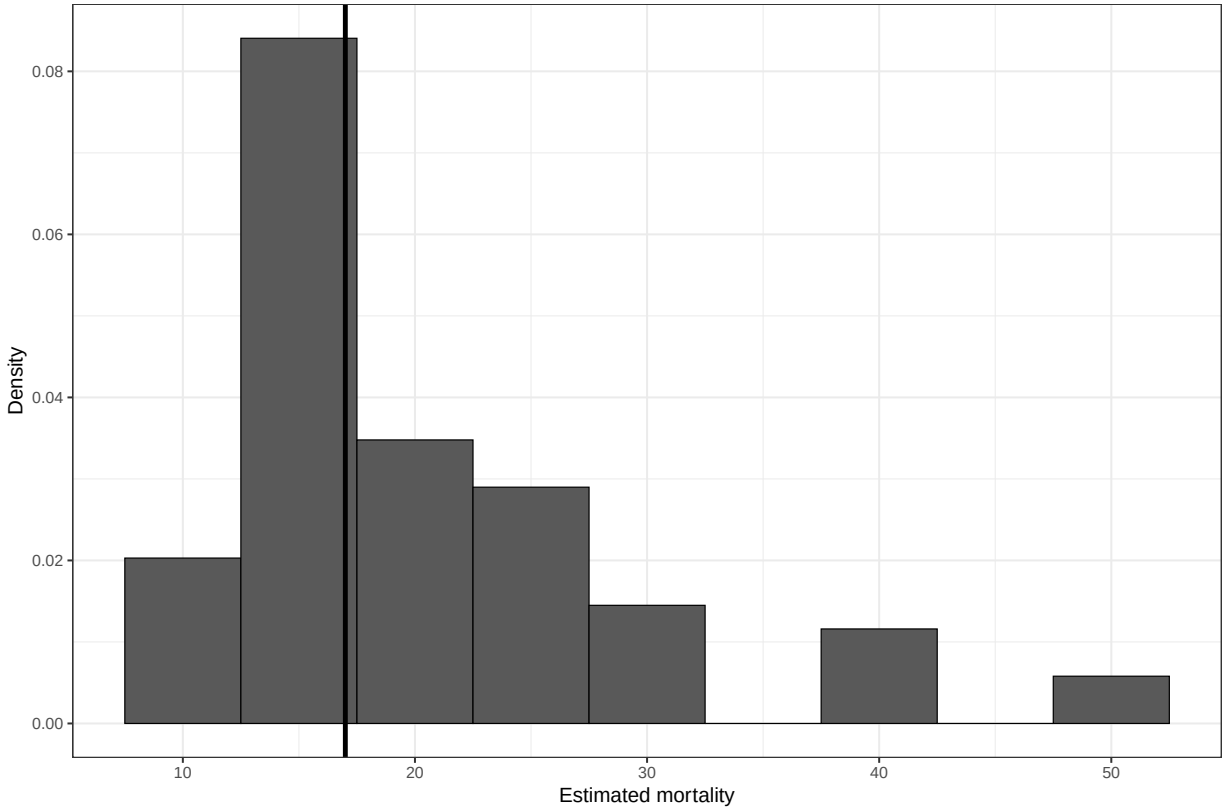

Figure 5: Histogram of the total losses distribution (SBBs). The black solid line shows the median.

4.3 Brolgas

During the fourth year of surveys, zero Brolgas were found during formal surveys. The resulting (median) estimate of total mortality is 1 Brolgas lost on site over the year.

We note that during Year 4, no Brolga carcasses were found. Therefore, we have no evidence that Brolgas were struck during this period (as opposed to Year 2, where we *did* have evidence that Brolgas were struck). As the mortality estimator has an assumption that at least one bird was struck, the estimate is likely biased high (i.e. a conservative estimate).

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 there was a total site loss of around 1 Brolgas, and are 95% confident that fewer than 6 individuals were lost, over the year.

Table 11: Percentiles of estimated total Brolga losses in the fourth year of surveys.

Estimate	0%	50% (median)	90%	95%	99%
Year 4	1	1	4	6	9

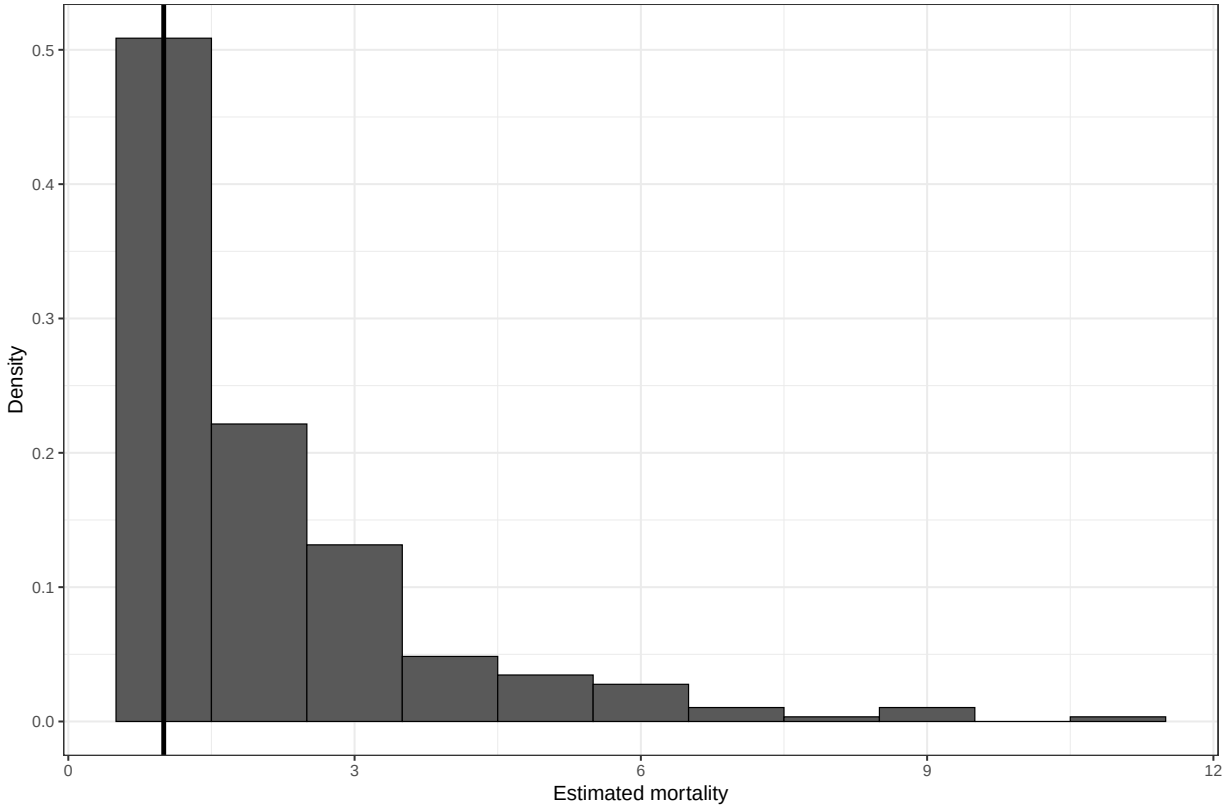

Figure 6: Histogram of the total losses distribution (Brolgas). The black solid line shows the median.

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Appendix C: Details of raptor flights observed within DDWF (Year 4)

Date	Species common name	Flight observation start time	Flight observation end time	Flight distance (m)	Flight direction	Proximity to turbines (m)	Flight height above ground (m)	Habitat	Flight behaviour
11/11/2023	Wedge-tailed Eagle	9:47:00	10:27:00	1697	NE	1105	300	Introduced pasture between lake and waterway/creek/river	Soaring
23/11/2023	Black-shouldered Kite	10:16:00	10:27:00	2003	N-NW; NE	66	80-100	Introduced pasture	Hovering
23/11/2023	Whistling Kite	14:20:00	14:24:04	1946		169	40	Stony knoll	
24/11/2023	Wedge-tailed Eagle	10:00:00	10:02:47	858		115	120	Farmland	
4/12/2023	Black-shouldered Kite	16:20:00	16:29:17	514	NW	88	60-80	Introduced pasture	Powered flight
4/12/2023	Black Kite	17:40:00	17:41:00	896	S-SE	437	15-20	Introduced pasture	Powered flight
5/12/2023	Black-shouldered Kite	9:23:18	9:23:20	1110	NE	37	100-200	pasture	Powered flight
5/12/2023	Black-shouldered Kite	10:06:26	10:06:27	181	S	843	5-510	pasture	Powered flight
5/12/2023	Wedge-tailed Eagle	13:22:00	13:25:59	608	NW	1003	600	Introduced pasture	Soaring
5/12/2023	Peregrine Falcon	16:45:00	16:49:23	499	E-SE	33	140	Trees / pasture	Powered flight
5/12/2023	Nankeen Kestrel	16:50:00	16:56:19	832	N	51	50	Introduced pasture	Foraging
5/12/2023	Black Kite	17:39:38	17:39:41	506	E	96	50	Introduced pasture	Foraging
6/12/2023	Brown Falcon	14:50:00	14:56:34	818	N	2	120	Introduced pasture	Other
7/12/2023	Wedge-tailed Eagle	10:20:00	10:24:00	888	N-NW	549	300	Lake surrounded by introduced pasture and trees	Gliding
7/12/2023	Nankeen Kestrel	11:26:00	11:27:41	191	SE	88	20	Introduced pasture	Powered flight
7/12/2023	Wedge-tailed Eagle	11:30:00	11:35:00	2509	SW	116	140-160	Introduced pasture next to wildlife refuge	Gliding
7/12/2023	Wedge-tailed Eagle	13:05:00	13:07:37	1133		281	300-600	Introduced pasture	Soaring
7/12/2023	Black Kite	17:00:00	17:06:00	1367	N	1780	3-10	Introduced pasture	Foraging
8/12/2023	Whistling Kite	11:32:21	Not recorded	278	NW	186	50-1050	pasture	Hovering
22/01/2024	Nankeen Kestrel	15:34:00	15:39:00	150	S-SE	114	1.5-5	Introduced sheep-grazing pasture	Other
22/01/2024	Brown Falcon	15:54:00	16:01:41	915	NW	12	10-140	Introduced pasture	Foraging
23/01/2024	Wedge-tailed Eagle	10:53:00	10:57:27	867	SSW	226	40-150	Stand of trees in pasture in wind farm	Other
23/01/2024	Wedge-tailed Eagle	13:03:00	13:05:35	497	NE	338	500-800	Pasture near wetland	Soaring
24/01/2024	Brown Falcon	10:18:00	10:20:00	1188	W	146	80-100	Pasture next to wildlife refuge	Gliding
24/01/2024	Wedge-tailed Eagle	10:40:00	10:42:00	954	E	28	150-180	Pasture	Soaring

Date	Species common name	Flight observation start time	Flight observation end time	Flight distance (m)	Flight direction	Proximity to turbines (m)	Flight height above ground (m)	Habitat	Flight behaviour
24/01/2024	Nankeen Kestrel	11:41:08	11:42:08	90	W	192	20	gravel road	Perching
24/01/2024	Nankeen Kestrel	13:19:00	13:22:51	575	SE	172	15-20	Pasture	Powered flight
24/01/2024	Nankeen Kestrel	13:48:44	13:48:46	149	NW	299	30-50	grass	Gliding
24/01/2024	Brown Falcon	13:50:00	13:51:00	99	S	216	50-60	Trees / pasture	Perching
25/01/2024	Brown Falcon	10:00:00	10:02:50	476	S	219	120-130	Pasture near wetland	Powered flight
25/01/2024	Whistling Kite	13:36:28	Not recorded	189	NW	3407	15	grass	Powered flight
25/01/2024	Black Falcon	14:20:54	14:26:56	1154	NE	126	150	over Plains	Soaring
25/01/2024	Nankeen Kestrel	15:54:30	Not recorded	49	E	38	5	over hardstand and grass	Powered flight
25/01/2024	Black Falcon	16:20:46	Not recorded	242	SW	256		over Plains	Gliding
25/01/2024	Nankeen Kestrel	16:26:38	Not recorded	66	N	10	30	over Plains	Powered flight
26/01/2024	Wedge-tailed Eagle	9:35:00	9:38:00	2106	NE	179	140	Pasture	Gliding
29/01/2024	Wedge-tailed Eagle	18:20:00	18:21:00	195	E	13193	10-20	Pasture	Powered flight
31/01/2024	Wedge-tailed Eagle	9:06:00	9:07:00	52	W	13683	10-20	Pasture	Powered flight
5/02/2024	Wedge-tailed Eagle	14:50:00	14:55:00	2195	S-SE	55	0-120	Pasture	Gliding
5/02/2024	Wedge-tailed Eagle	14:53:00	14:55:00	868	SE	48	80-100	Pasture	Gliding
5/02/2024	Nankeen Kestrel	16:20:00	16:21:00	495	W-NW	33	15-20	Pasture	Powered flight
5/02/2024	Brown Falcon	17:15:02	17:15:05	59	W	49	10-20	grass	Powered flight
6/02/2024	Brown Falcon	15:12:00	15:13:35	146	SE	135	0-9	Pasture	Resting
6/02/2024	Nankeen Kestrel	16:22:59	16:23:01	110	W	277	0-50	over Plains	Powered flight
7/02/2024	Nankeen Kestrel	10:27:44	10:27:43	279	N	293	10-30	over road and plains	Powered flight
7/02/2024	Wedge-tailed Eagle	11:17:17	11:37:48	914	N	1	70-200	over Plains	Gliding
7/02/2024	Brown Falcon	11:20:00	11:27:00	1804	NE	98	140	Pasture	Foraging
7/02/2024	Wedge-tailed Eagle	12:27:00	12:29:00	1034	E	359	80	Pasture next to wildlife refuge	Gliding
7/02/2024	Brown Falcon	12:28:00	12:44:00	2039	SE	133	20	Trees in pasture next to wildlife refuge	Powered flight
7/02/2024	Brown Falcon	12:40:00	12:43:00	353	SE	157	20	Trees in pasture next to wildlife refuge	Powered flight
7/02/2024	Nankeen Kestrel	15:02:37	Not recorded	161	NW	50	0-40	Pasture	Powered flight
7/02/2024	Wedge-tailed Eagle	16:20:00	16:21:00	403	N-NW	77	140	Pasture	Soaring
8/02/2024	Australian Hobby	9:37:00	9:39:00	561	E	139	0-15	Pasture	Foraging
8/02/2024	Brown Falcon	12:48:00	12:50:00	1860	S-SE	77	130	Pasture	Powered flight

Date	Species common name	Flight observation start time	Flight observation end time	Flight distance (m)	Flight direction	Proximity to turbines (m)	Flight height above ground (m)	Habitat	Flight behaviour
8/02/2024	Brown Falcon	12:49:00	12:51:00	703	S-SE	181	120	Pasture	Gliding
8/02/2024	Brown Falcon	12:49:00	12:51:00	350	S	154	100	Pasture	Gliding
8/02/2024	Swamp Harrier	17:12:00	17:13:00	224	S	837	10-20	Pasture	Powered flight
15/02/2024	Nankeen Kestrel	10:18:59	Not recorded	42	SW	13355	30	Pasture	Powered flight
26/02/2024	Brown Falcon	16:35:56	Not recorded	120	N	14399	30	Grass	Hovering
27/02/2024	Wedge-tailed Eagle	9:55:48	9:55:51	183	E	15200	40	Pasture	Soaring
6/03/2024	Wedge-tailed Eagle	10:45:40	10:49:42	563		44	150-200		Other
7/03/2024	Nankeen Kestrel	10:30:26	10:30:28	141	W	146	10-20	over plains	Powered flight
12/03/2024	Brown Falcon	10:29:52	Not recorded	77	E	14004	10		Powered flight
13/03/2024	Wedge-tailed Eagle	16:01:19	Not recorded	128		15227	100		Soaring
14/03/2024	Wedge-tailed Eagle	8:20:36	8:20:38	370	S	13829	150		Powered flight
27/03/2024	Wedge-tailed Eagle	11:11:22	Not recorded	483	Circling	14342	70-100	Pasture	Other
27/03/2024	Nankeen Kestrel	14:36:59	Not recorded	17	Hovering	13828	50-60	Pasture	Hovering
27/03/2024	Nankeen Kestrel	15:44:54	Not recorded	133	E	13392	20-40	Pasture	Powered flight
27/03/2024	Brown Falcon	16:06:04	Not recorded	623	SW	14807	10-40	Pasture	Powered flight
28/03/2024	Wedge-tailed Eagle	10:24:53	Not recorded	577		14899	10-60	Pasture	Diving
10/04/2024	Brown Falcon	14:29:24	Not recorded	71	NE	12752	70		
15/04/2024	Black-shouldered Kite	18:14:00	18:14:00	101	S	845	6	Pasture	Powered flight
17/04/2024	Black-shouldered Kite	10:50:00	10:51:00	100	W	225	2-8	Pasture	Resting
17/04/2024	Whistling Kite	11:40:00	11:42:23	1697	W-NW	117	180-220	Pasture	Soaring
17/04/2024	Black-shouldered Kite	12:10:00	12:10:00	323	N	314	20-25	Pasture	Hovering
29/04/2024	Wedge-tailed Eagle	15:05:45	15:10:49	1396	W	304	150-250	flying over plains	Soaring
30/04/2024	Wedge-tailed Eagle	13:29:45	13:29:47	735	SW	172	150-200	over plains, close to turbine	Soaring
30/04/2024	Wedge-tailed Eagle	14:56:35	14:56:47	69	S	76	20-30	over trees and plains	Hovering
1/05/2024	Black-shouldered Kite	12:38:43	12:38:45	76	W	424	10-15	over road	Powered flight
21/05/2024	Nankeen Kestrel	14:26:19	Not recorded	83	S	13039	20		Powered flight
28/05/2024	Wedge-tailed Eagle	11:38:05	11:38:09	1119	N	201	50	Grassland	Diving
28/05/2024	Wedge-tailed Eagle	11:41:20	11:41:21	1749	NW	166	100	Grassland	Soaring
28/05/2024	Wedge-tailed Eagle	14:00:00	14:00:00	529	NW	65	100	Grassland	Soaring

Date	Species common name	Flight observation start time	Flight observation end time	Flight distance (m)	Flight direction	Proximity to turbines (m)	Flight height above ground (m)	Habitat	Flight behaviour
28/05/2024	Wedge-tailed Eagle	15:13:00	15:14:36	639	E	71	220-230	Rocky pasture	Soaring
28/05/2024	Wedge-tailed Eagle	17:14:00	17:17:37	173	S	219	25	Edge of wildlife refuge	Powered flight
28/05/2024	Wedge-tailed Eagle	17:20:00	17:25:47	522	S	229	130	Edge of wildlife reserve	Soaring
28/05/2024	Whistling Kite	17:47:21	17:47:25	54	NW	127	50	Row of Pine trees.	Gliding
28/05/2024	Whistling Kite	17:55:00	17:55:00	266		165	80		Gliding
29/05/2024	Wedge-tailed Eagle	14:47:00	14:51:57	1540	W	17	140-220	Rocky pasture	Soaring
29/05/2024	Nankeen Kestrel	15:32:00	15:34:57	165	NW	298	20-25	Rocky pasture	Powered flight
29/05/2024	Wedge-tailed Eagle	15:59:35	15:59:39	179	SSE	164	0-20	grassland	Other
29/05/2024	Nankeen Kestrel	17:16:35	17:16:38	108	NW	10	10	hardstands	Powered flight
29/05/2024	Wedge-tailed Eagle	17:23:31	17:23:33	884	WSW	171	20-30	grassland and road	Powered flight
29/05/2024	Brown Falcon	18:25:50	18:25:52	403	S	244	20		Powered flight
30/05/2024	Wedge-tailed Eagle	10:11:15	10:11:17	312		99	20-150		Gliding
26/06/2024	Wedge-tailed Eagle	11:53:00	11:57:00	385	NE	201	10-30	Pasture/Rocky outcrop.	Perching
26/06/2024	Wedge-tailed Eagle	12:47:00	12:49:53	453	N	204	60-80	Pasture.	Powered flight
26/06/2024	Wedge-tailed Eagle	14:21:00	14:23:30	445	S/SE	192	100	Treeline/Pasture	Soaring
26/06/2024	Black-shouldered Kite	16:26:00	16:28:00	104	W	290	20-40	Pasture	Hovering
1/07/2024	Brown Falcon	16:03:00	16:05:00	1054	E	108	5-80	Pasture/Rocky Outcrop	Powered flight
2/07/2024	Nankeen Kestrel	11:24:46	11:26:00	352	SW	310	10-15	Pasture	Perching
4/07/2024	Nankeen Kestrel	12:09:01	12:09:05	136	SE	175	20-50	Pasture	Hovering
4/07/2024	Wedge-tailed Eagle	12:36:00	12:38:24	246	NE	257	25-30	Treeline	Perching
22/07/2024	Whistling Kite	15:33:34	15:33:36	134	S	157	50-60		Gliding
22/07/2024	Nankeen Kestrel	15:35:20	15:35:22	129	S	136	50-60		Powered flight
22/07/2024	Nankeen Kestrel	17:46:00	Not recorded	36	N	52	30-40		Powered flight
23/07/2024	Nankeen Kestrel	11:14:00	11:15:52	241	NW, SW	252	20-25	Rocky pasture	Gliding
23/07/2024	Nankeen Kestrel	11:54:00	11:55:20	127	N	914	160	Wetland at edge of rocky pasture	Powered flight
23/07/2024	Brown Falcon	12:34:00	12:35:20	153	WSW	83	90-110	Rocky pasture	Gliding
23/07/2024	Nankeen Kestrel	12:34:00	12:35:00	236	WSW	68	90-100	Rocky pasture	Powered flight
23/07/2024	Brown Falcon	15:43:54	15:43:58	124	SW	250	5	Pasture	Powered flight
23/07/2024	Wedge-tailed Eagle	15:45:00	15:50:35	975	NE	18	80-100	Pasture	Gliding

Date	Species common name	Flight observation start time	Flight observation end time	Flight distance (m)	Flight direction	Proximity to turbines (m)	Flight height above ground (m)	Habitat	Flight behaviour
23/07/2024	Wedge-tailed Eagle	16:11:00	16:13:45	322	W	106	15-20	Rocky outcrops/trees.	Gliding
24/07/2024	Brown Falcon	9:29:16	Not recorded	430	A	168	30-40		Soaring
24/07/2024	Nankeen Kestrel	9:34:00		66	SE	169	20-30		Gliding
24/07/2024	Wedge-tailed Eagle	12:45:00	12:46:00	365	N	235	10-20	Pasture	Powered flight
24/07/2024	Nankeen Kestrel	15:00:00	15:02:32	245	W to E	139	10-20	Pasture/Rocky outcrop	Powered flight
24/07/2024	Brown Falcon	15:28:22	Not recorded	219	SE	208	0-10		Gliding
24/07/2024	Brown Falcon	15:33:27	Not recorded	109	North	171	0-10		Powered flight
24/07/2024	Nankeen Kestrel	16:54:52	Not recorded	139	North	182	0-10		Powered flight
25/07/2024	Nankeen Kestrel	12:13:00	12:14:00	71	W	110	30-40	Pasture	Hovering
25/07/2024	Nankeen Kestrel	16:17:00	16:18:14	59	W	252	20-25	Pasture/Rocky outcrop	Resting
26/07/2024	Nankeen Kestrel	10:47:00	10:48:41	138	N	70	30-40	Pasture/Rocky outcrops.	Hovering
6/08/2024	Nankeen Kestrel	13:32:00	13:33:00	97	N	69	25	Pasture, rocky outcrop	Powered flight
7/08/2024	Nankeen Kestrel	12:56:35	12:56:37	83	SE	109	25-30	Pasture.	Hovering
7/08/2024	Nankeen Kestrel	17:21:29	17:22:00	13	S	129	25	Pasture, rocky outcrop	Powered flight
8/08/2024	Wedge-tailed Eagle	12:17:00	12:19:50	426	N to SE	99	60	Pasture/Treeline.	Powered flight
8/08/2024	Nankeen Kestrel	13:59:14	13:59:16	171	S	173	50	Pasture/Rocky outcrops.	Powered flight
8/08/2024	Nankeen Kestrel	14:01:00	14:02:41	678	NE	89	30-40	Pasture	Powered flight
8/08/2024	Brown Falcon	14:34:00	14:35:38	287	NW to SE	292	25-30	Pasture/Rocky outcrops	Powered flight
3/09/2024	Brown Falcon	10:46:00	10:48:23	91	SW	41	0-5	Pasture/Rocky outcrop	Perching
3/09/2024	Brown Falcon	17:02:00	17:04:25	200	N	135	20-30	Pasture	Perching
4/09/2024	Nankeen Kestrel	17:34:00	17:35:58	112	N then SE	134	30-40	Pasture	Hovering
6/09/2024	Brown Falcon	11:38:00	11:40:22	223	N	225	20-30	Pasture	Powered flight
29/10/2024	Wedge-tailed Eagle	8:51:36	8:51:38	82	E	69	10-20	Pasture	Powered flight
29/10/2024	Wedge-tailed Eagle	9:19:44	9:20:00	244	SE	121	10-20	Pasture/Rocky outcrops	Powered flight
29/10/2024	Brown Falcon	15:42:00	15:44:41	631	SE	209	0-110	Rocky pasture	Gliding
29/10/2024	Whistling Kite	17:26:00	17:30:41	2445	S	404	1000-1600	Rocky pasture	Soaring
30/10/2024	Wedge-tailed Eagle	11:03:00	11:06:16	956	S	218	800	Rocky pasture	Gliding
30/10/2024	Wedge-tailed Eagle	11:39:00	11:41:58	1469	N, S	234	900	Rocky pasture	Soaring
30/10/2024	Wedge-tailed Eagle	13:02:00	13:05:00	1060	W	200	100-150	Pasture	Other

Date	Species common name	Flight observation start time	Flight observation end time	Flight distance (m)	Flight direction	Proximity to turbines (m)	Flight height above ground (m)	Habitat	Flight behaviour
30/10/2024	Wedge-tailed Eagle	13:02:00	13:08:00	2455	SE	68	50-150	Pasture	Soaring
30/10/2024	Wedge-tailed Eagle	14:30:00	14:31:29	868	SW	193	80-200	Pasture	Soaring
30/10/2024	Brown Falcon	14:55:00	14:56:57	813	SW	105	100	Rocky pasture	Powered flight
30/10/2024	Wedge-tailed Eagle	17:21:00	17:23:06	685	NE to SW	297	80-100	Pasture	Powered flight
31/10/2024	Brown Falcon	11:37:00	11:38:29	122	SE	116	25	Rocky pasture	Foraging
31/10/2024	Wedge-tailed Eagle	13:40:00	13:43:23	780	SE	14	120	Rocky pasture	Gliding

Appendix D: Bird species recorded within 5km of DDWF (Year 4)

Common Name	Scientific Name	EPBC Act	FFG Act
Australasian Grebe	*Tachybaptus novaehollandiae*		
Australasian Shoveler	*Spatula rhynchotis*		VU
Australasian Swamphen	*Porphyrio melanotus*		
Australian Gull-billed Tern	*Gelochelidon macrotarsa*		E
Australian Hobby	*Falco longipennis*		
Australian Magpie	*Gymnorhina tibicen*		
Australian Pelican	*Pelecanus conspicillatus*		
Australian Pipit	*Anthus australis*		
Australian Raven	*Corvus coronoides*		
Australian Shelduck	*Tadorna tadornoides*		
Australian Spotted Crake	*Porzana fluminea*		
Australian White Ibis	*Threskiornis molucca*		
Australian Wood Duck	*Chenonetta jubata*		
Banded Lapwing	*Vanellus tricolor*		
Banded Stilt	*Cladorhynchus leucocephalus*		
Barn Owl	*Tyto alba*		
Black Falcon	*Falco subniger*		CE
Black Kite	*Milvus migrans*		
Black Swan	*Cygnus atratus*		
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*		
Black-fronted Dotterel	*Elseyornis melanops*		
Black-shouldered Kite	*Elanus axillaris*		
Black-tailed Native-hen	*Tribonyx ventralis*		
Blue-billed Duck	*Oxyura australis*		VU
Blue-winged Parrot	*Neophema chrysostoma*	VU	
Brolga	*Antigone rubicunda*		E
Brown Falcon	*Falco berigora*		
Brown Goshawk	*Accipiter fasciatus*		
Brown Quail	*Synoicus ypsilophorus*		
Brown Songlark	*Cincloramphus cruralis*		
Brown Thornbill	*Acanthiza pusilla*		
Chestnut Teal	*Anas castanea*		
Common Blackbird*	*Turdus merula*		
Common Bronzewing	*Phaps chalcoptera*		
Common Starling*	*Sturnus vulgaris*		
Crested Pigeon	*Ocyphaps lophotes*		
Crimson Rosella	*Platycercus elegans*		
Dusky Moorhen	*Gallinula tenebrosa*		
Eastern Cattle Egret	*Bubulcus coromandus*		
Eastern Great Egret	*Ardea alba modesta*		VU
Eastern Rosella	*Platycercus eximius*		
Eurasian Coot	*Fulica atra*		
Eurasian Skylark*	*Alauda arvensis*		
European Goldfinch	*Carduelis carduelis*		
European Greenfinch	*Chloris chloris*		
Forest Raven	*Corvus tasmanicus*		
Galah	*Eolophus roseicapilla*		
Golden-headed Cisticola	*Cisticola exilis*		
Great Cormorant	*Phalacrocorax carbo*		
Great Crested Grebe	*Podiceps cristatus*		

Common Name	Scientific Name	EPBC Act	FFG Act
Grey Butcherbird	*Cracticus torquatus*		
Grey Fantail	*Rhipidura albiscapa*		
Grey Shrike-thrush	*Colluricincla harmonica*		
Grey Teal	*Anas gracilis*		
Hardhead	*Aythya australis*		
Hoary-headed Grebe	*Poliocephalus poliocephalus*		
Horsfield's Bronze-Cuckoo	*Chrysococcyx basalis*		
Horsfield's Bushlark	*Mirafra javanica*		
House Sparrow*	*Passer domesticus*		
Latham's Snipe	*Gallinago hardwickii*	VU, M	
Little Black Cormorant	*Phalacrocorax sulcirostris*		
Little Pied Cormorant	*Microcarbo melanoleucos*		
Little Raven	*Corvus mellori*		
Long-billed Corella	*Cacatua tenuirostris*		
Magpie-lark	*Grallina cyanoleuca*		
Masked Lapwing	*Vanellus miles*		
Musk Duck	*Biziura lobata*		VU
Musk Lorikeet	*Glossopsitta concinna*		
Nankeen Kestrel	*Falco cenchroides*		
New Holland Honeyeater	*Phylidonyris novaehollandiae*		
Noisy Miner	*Manorina melanocephala*		
Pacific Black Duck	*Anas superciliosa*		
Peregrine Falcon	*Falco peregrinus*		
Pied Cormorant	*Phalacrocorax varius*		
Pied Stilt	*Himantopus leucocephalus*		
Pink-eared Duck	*Malacorhynchus membranaceus*		
Purple-crowned Lorikeet	*Parvipsitta porphyrocephala*		
Red Wattlebird	*Anthochaera carunculata*		
Red-browed Finch	*Neochmia temporalis*		
Red-capped Plover	*Charadrius ruficapillus*		
Red-necked Avocet	*Recurvirostra novaehollandiae*		
Red-necked Stint	*Calidris ruficollis*		
Red-rumped Parrot	*Psephotus haematonotus*		
Rock Dove*	*Columba livia*		
Royal Spoonbill	*Platalea regia*		
Sharp-tailed Sandpiper	*Calidris acuminata*	VU, M	
Silver Gull	*Chroicocephalus novaehollandiae*		
Silvereye	*Zosterops lateralis*		
Spotted Harrier	*Circus assimilis*		
Straw-necked Ibis	*Threskiornis spinicollis*		
Striated Fieldwren	*Calamanthus fuliginosus*		
Striated Pardalote	*Pardalotus striatus*		
Stubble Quail	*Coturnix pectoralis*		
Sulphur-crested Cockatoo	*Cacatua galerita*		
Superb Fairy-wren	*Malurus cyaneus*		
Swamp Harrier	*Circus approximans*		
Tree Martin	*Petrochelidon nigricans*		
Wedge-tailed Eagle	*Aquila audax*		
Welcome Swallow	*Hirundo neoxena*		
Whiskered Tern	*Chlidonias hybrida*		
Whistling Kite	*Haliastur sphenurus*		
White-faced Heron	*Egretta novaehollandiae*		

Common Name	Scientific Name	EPBC Act	FFG Act
White-fronted Chat	*Epthianura albifrons*		
White-necked Heron	*Ardea pacifica*		
White-plumed Honeyeater	*Ptilotula penicillata*		
White-winged Triller	*Lalage tricolor*		
Willie Wagtail	*Rhipidura leucophrys*		
Yellow Thornbill	*Acanthiza nana*		
Yellow-billed Spoonbill	*Platalea flavipes*		
Yellow-faced Honeyeater	*Caligavis chrysops*		
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*		
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*		

Appendix E: Brolga observations within 5km of DDWF (Year 4)

Date	Number of Brolga	Observation notes	Survey type	Closest wetland ID
22/11/2023	1	1 adult Brolga walking in pasture toward wetland.	Monthly Brolga monitoring	29773
23/11/2023	2	Pair of Adult Brolga, flew from south of main road and now foraging, stretching wings in dry paddock	Monthly Brolga monitoring	29864
23/11/2023	2	Another pair, seen in pasture then flew south east away from wind farm	Monthly Brolga monitoring	29857
23/11/2023	2	Pair of Adult Brolga, walking in wetland	Monthly Brolga monitoring	29587
23/11/2023	4	4 adult Brolgas flying between 10-30m	Monthly Brolga monitoring	29721
23/11/2023	4	4 Brolgas walking in dry wetland. Grassy. Flew here 11.30	Monthly Brolga monitoring	29691
23/11/2023	2	Pair of Adult Brolga foraging in pasture. With sheep.	Monthly Brolga monitoring	32580
24/11/2023	2	2 adult Brolga. Flew in low. Landed, walked down to water and seen drinking from water	Monthly Brolga monitoring	32632
13/12/2023	6		Monthly Brolga monitoring	30412
13/12/2023	2		Monthly Brolga monitoring	29587
13/12/2023	2		Monthly Brolga monitoring	32632
13/12/2023	14		Monthly Brolga monitoring	32667
15/12/2023	2		Monthly Brolga monitoring	30215
18/12/2023	2		Targeted Flocking	32632
18/12/2023	2		Targeted Flocking	29587
19/12/2023	2		Targeted Flocking	29722
19/12/2023	2		Targeted Flocking	29722
20/12/2023	14	Unsure of specific location. Brolgas only seen in flight before landing in north east corner of wetland	Targeted Flocking	32667
20/12/2023	14		Targeted Flocking	32667
20/12/2023	2		Targeted Flocking	29587
20/12/2023	14		Targeted Flocking	32667
21/12/2023	2		Targeted Flocking	32548
21/12/2023	2		Targeted Flocking	32632
21/12/2023	2		Targeted Flocking	32614
16/01/2024	2		Monthly Brolga monitoring	32667
16/01/2024	2		Monthly Brolga monitoring	29587
17/01/2024	2		Monthly Brolga monitoring	29773
13/02/2024	3		Monthly Brolga monitoring	30412

Date	Number of Brolga	Observation notes	Survey type	Closest wetland ID
13/02/2024	2		Monthly Brolga monitoring	29587
13/02/2024	2	2x adult walking in wetland	Monthly Brolga monitoring	32674
13/02/2024	2		Monthly Brolga monitoring	32632
13/02/2024	10		Monthly Brolga monitoring	32614
14/02/2024	2	2 adult Brolga feeding foraging on edge of wetland	Monthly Brolga monitoring	29614
14/02/2024	24		Monthly Brolga monitoring	32614
15/02/2024	2		Monthly Brolga monitoring	32565
19/02/2024	2	Adult pair with feet in the water	Targeted Flocking	32729
19/02/2024	24	24 Brolga standing in crop stubble, feeding, preening, walking, some sitting, largely very still.	Targeted Flocking	32614
19/02/2024	2	2 Brolga split from flock	Targeted Flocking	32614
19/02/2024	24	Flock watched 1-3pm	Targeted Flocking	32614
19/02/2024	2	Landowner reported 4 Brolga; 2 seen	Targeted Flocking	29608
20/02/2024	2	2 Brolga standing in wetland	Targeted Flocking	32674
20/02/2024	8	8 Brolga flying out of wetland	Targeted Flocking	32614
20/02/2024	5	5 Brolga landed in stubble. 2 kept flying north (lost sight) and one flew back the way it came	Targeted Flocking	32614
20/02/2024	2	2 flushed and flew	Targeted Flocking	32614
20/02/2024	6	6 Brolga walking in stubble	Targeted Flocking	32614
20/02/2024	16	16 Brolga standing on southern edge of wetland	Targeted Flocking	32400
20/02/2024	16	16 Brolga standing in wetland. Possibly includes the 2 Brolga that were seen flying earlier this morning	Targeted Flocking	32400
20/02/2024	18	At least 18 Brolga. Includes 16 that flew moments ago plus at least 2 more	Targeted Flocking	32614
20/02/2024	8	5 adults, standing in vegetation next to wetland. Lots of wing flapping	Targeted Flocking	32400
20/02/2024	6	6 Brolga landed in stubble. Walking and flapping	Targeted Flocking	32400
20/02/2024	14	14 Brolga standing in stubble + 7 flew over 10 mins later and joined them	Targeted Flocking	33299
20/02/2024	10	10 Brolga flew in and landed in veg to north of wetland	Targeted Flocking	32400
20/02/2024	16	End of evening count - 16 Brolga roosting	Targeted Flocking	32400
21/02/2024	2	2 Brolga standing in water	Targeted Flocking	32674
21/02/2024	2	2 Brolga standing in water	Targeted Flocking	32632
21/02/2024	16	16 Brolga standing along southern edge of wetland. Feeding in water (7.30am)	Targeted Flocking	32400
21/02/2024	14	14 Brolga foraging in field, 7 still in wetland	Targeted Flocking	32400
21/02/2024	21	21 Brolga, standing in stubble. One with legband - two orange on right leg	Targeted Flocking	32614

Date	Number of Brolga	Observation notes	Survey type	Closest wetland ID
21/02/2024	2	2 Brolga flew into middle of wetland - from edge out of sight	Targeted Flocking	32614
21/02/2024	2	2 Brolga grazing on stubble outside wetland	Targeted Flocking	32400
21/02/2024	6	6 Brolga flew in. Can't see in landscape, position approx	Targeted Flocking	32614
21/02/2024	6		Monthly Brolga monitoring	32400
21/02/2024	10	10 Brolga slightly foraging, mostly standing in vegetation	Targeted Flocking	32400
21/02/2024	18	2 additional Brolga added to 16	Targeted Flocking	32614
21/02/2024	2	2 Brolga standing in middle of wetland. Roosting?	Targeted Flocking	32674
22/02/2024	5	5 Brolga standing/foraging in stubble	Targeted Flocking	32400
22/02/2024	23	23 Brolga standing in stubble	Targeted Flocking	32614
22/02/2024	2	2 Brolga wading in wetland	Targeted Flocking	32674
13/03/2024	2	2 adult Brolga walking on edge of wetland	Monthly Brolga monitoring	30401
13/03/2024	2	2 adults walking in pasture (record may be duplicate unsure if other saved)	Monthly Brolga monitoring	29722
13/03/2024	2	2 adults foraging in pasture	Monthly Brolga monitoring	29722
13/03/2024	2	2 adults walking in field	Monthly Brolga monitoring	29813
13/03/2024	2	2 adults walking in pasture - this record may be duplicate (unsure if other saved)	Monthly Brolga monitoring	29813
13/03/2024	2	2 adults foraging in grass	Monthly Brolga monitoring	29711
13/03/2024	2	2 Brolga foraging in wetland	Monthly Brolga monitoring	29587
14/03/2024	12	12 adult Brolga, walking in grass	Monthly Brolga monitoring	30412
18/03/2024	5	4 adults walking along edge of tall reeds, 1 further back in wetland	Targeted Flocking	30412
18/03/2024	2	2 adults appear in paddock behind wetland - foraging in pasture	Targeted Flocking	30412
18/03/2024	3	Additional 3, now 10 visible	Targeted Flocking	30412
19/03/2024	2	2 Brolga standing in long grass on east side of wetland	Targeted Flocking	30412
19/03/2024	2	2 Brolga foraging in pasture	Targeted Flocking	30412
19/03/2024	9	5 Brolga Foraging in pasture	Targeted Flocking	30412
19/03/2024	5	5 additional Brolga fly in from wetland (total 10)	Targeted Flocking	30412
20/03/2024	7	7 Brolga wading and foraging in grass	Targeted Flocking	33324
20/03/2024	2	2 Brolga wading in wetland	Targeted Flocking	29207
21/03/2024	10	10 Brolga standing in wetland	Monthly Brolga monitoring	30412
9/04/2024	17	Wading at edge of wetland	Monthly Brolga monitoring	32614
9/04/2024	6	6 Brolga foraging in long grass	Monthly Brolga monitoring	30412

Date	Number of Brolga	Observation notes	Survey type	Closest wetland ID
10/04/2024	2	2 Brolga sitting/standing in long grass	Monthly Brolga monitoring	32517
11/04/2024	15	15 Brolga, standing on edge of water	Monthly Brolga monitoring	32614
11/04/2024	2	2 Brolga feeding in pasture	Monthly Brolga monitoring	32614
11/04/2024	3	3 Brolga feeding in pasture - 2 adult, 1 immature (slightly smaller, darker head)	Monthly Brolga monitoring	32558
11/04/2024	2	2 Brolga foraging in pasture	Monthly Brolga monitoring	30412
15/04/2024	21		Targeted Flocking	32614
16/04/2024	2		Targeted Flocking	32628
16/04/2024	4		Targeted Flocking	32614
17/04/2024	2		Targeted Flocking	32628
17/04/2024	2		Targeted Flocking	30412
17/04/2024	6		Targeted Flocking	30412
18/04/2024	2		Targeted Flocking	32628
14/05/2024	2	Brolga pair	Monthly Brolga monitoring	30412
14/05/2024	6	6 Adults	Monthly Brolga monitoring	30412
15/05/2024	2	2 birds feeding in field adjacent to lake.	Monthly Brolga monitoring	30401
15/05/2024	2	A pair of Brolga on the other side of lake.	Monthly Brolga monitoring	32580
15/05/2024	3		Monthly Brolga monitoring	30412
16/05/2024	46		Monthly Brolga monitoring	32400
20/05/2024	2	2 Brolga standing in wetland	Monthly Brolga monitoring	33045
20/05/2024	43	43 Brolga foraging around wetland	Monthly Brolga monitoring	32400
20/05/2024	8		Monthly Brolga monitoring	30412
20/05/2024	46	46 Brolga flew into pasture	Monthly Brolga monitoring	32614
21/05/2024	32	Foraging in pasture	Monthly Brolga monitoring	32400
21/05/2024	10	10 Brolga foraging in pasture	Monthly Brolga monitoring	30412
21/05/2024	10	10 Brolga foraging in pasture	Monthly Brolga monitoring	30412
21/05/2024	2	2 Brolga flying east to west	Monthly Brolga monitoring	29598
21/05/2024	9	9 visible. Maybe more, very low light	Monthly Brolga monitoring	32400
22/05/2024	2	Standing in sun in wetland	Monthly Brolga monitoring	30412
22/05/2024	7	7 Brolga foraging in pasture	Monthly Brolga monitoring	30412
22/05/2024	39	Approx 39. Landed out of sight, but did see backslapping as they descended	Monthly Brolga monitoring	29913

Date	Number of Brolga	Observation notes	Survey type	Closest wetland ID
23/05/2024	2	no	Targeted Flocking	32517
23/05/2024	10	no	Targeted Flocking	30412
23/05/2024		heard from across paddock. not seen but assuming it's the same flock as 22nd May ~39 individuals.	Targeted Flocking	29913
23/05/2024	2		Monthly Brolga monitoring	30813
18/06/2024	2	2 Brolga foraging in long grass on edge of wetland	Monthly Brolga monitoring	30404
18/06/2024	2	Brolga standing in plowed paddock	Monthly Brolga monitoring	32400
18/06/2024	9	9 Brolga walking in field	Monthly Brolga monitoring	32614
18/06/2024	2	Foraging in plowed field	Monthly Brolga monitoring	32517
19/06/2024	18	18 Brolga foraging in pasture next to wetland	Monthly Brolga monitoring	30412
19/06/2024	2	2 Brolga foraging in dry wetland	Monthly Brolga monitoring	32542
19/06/2024	2	2 adult Brolga foraging in pasture	Monthly Brolga monitoring	29813
20/06/2024	11	11 Brolga foraging in pasture	Monthly Brolga monitoring	30412
20/06/2024	13	13 Brolga foraging in pasture	Monthly Brolga monitoring	32614
20/06/2024	2	2 Brolga foraging in pasture	Monthly Brolga monitoring	32614
24/06/2024	21	Feeding on edge of wetland	Targeted Flocking	30412
24/06/2024	2	Walking, Feeding on edge of wetland	Monthly Brolga monitoring	32614
24/06/2024	10	10 Brolga feeding in pasture	Monthly Brolga monitoring	32614
25/06/2024	1	Wading, walking through shallow water wetland. Many pink eared ducks also	Targeted Flocking	32517
25/06/2024	2	Walking in front of cows	Targeted Flocking	30412
25/06/2024	2	2 Brolga walking	Targeted Flocking	32614
25/06/2024	2	2 Brolga walking	Targeted Flocking	32614
25/06/2024	7	Foraging in pasture (total 11 Brolga visible)	Monthly Brolga monitoring	32614
25/06/2024	16	Flock spread - some amongst cows, some near trees. (18 total)	Targeted Flocking	30412
25/06/2024	18		Targeted Flocking	30412
25/06/2024	18		Targeted Flocking	30412
26/06/2024	4	4 Brolga feeding in pasture	Monthly Brolga monitoring	30412
26/06/2024	15	15 Brolga foraging in pasture	Monthly Brolga monitoring	32614
26/06/2024	2		Targeted Flocking	32664
26/06/2024	3	3 Brolga. 2 dancing	Targeted Flocking	32558
26/06/2024	8	8 Brolga foraging in field	Monthly Brolga monitoring	30412

Date	Number of Brolga	Observation notes	Survey type	Closest wetland ID
26/06/2024	18	8 birds flying to meet 10 birds already in wetland.	Targeted Flocking	30412
26/06/2024	21		Targeted Flocking	30412
27/06/2024	2		Targeted Flocking	32517
27/06/2024	2		Targeted Flocking	30412
27/06/2024	5	total of 7 birds. 2 flew from wetland and total of 7 in paddoc	Targeted Flocking	30412
27/06/2024	2		Targeted Flocking	32558
16/07/2024	8	Foraging along edge of wetland	Monthly Brolga monitoring	30412
17/07/2024	2		Monthly Brolga monitoring	32517
17/07/2024	2	2 Brolga standing in dry lake	Monthly Brolga monitoring	32542
17/07/2024	2	Flushed from pasture	Monthly Brolga monitoring	30401
17/07/2024	15	15 Brolga foraging on edge of wetland	Monthly Brolga monitoring	30412
23/07/2024	2	2 Brolga foraging in drainage channel	Monthly Brolga monitoring	30416
23/07/2024	12	12 Brolga foraging on edge of wetland	Monthly Brolga monitoring	30412
23/07/2024	2	2 additional Brolga - 14 total now	Monthly Brolga monitoring	30412
23/07/2024	3		Targeted Flocking	30413
23/07/2024	5		Targeted Flocking	30412
24/07/2024	2	A pair in the field.	Targeted Flocking	30412
24/07/2024	2	A pair flew into field.	Targeted Flocking	30412
24/07/2024	21	Foraging in pasture next to wetland	Monthly Brolga monitoring	30412
24/07/2024	2	Foraging in wetland	Monthly Brolga monitoring	32517
24/07/2024	19	Brolga flock observed in field.	Targeted Flocking	30412
24/07/2024	4	4 birds observed in field.	Targeted Flocking	30412
24/07/2024	2	Foraging in pasture	Monthly Brolga monitoring	30412
25/07/2024	22	A flock of 22 observed in the lake.	Targeted Flocking	30412
25/07/2024	2	A pair in the field.	Targeted Flocking	30412
25/07/2024	8	8 Brolga feeding in lake.	Targeted Flocking	30412
25/07/2024	4	A flock of 4 Brolga feeding adjacent to lake.	Targeted Flocking	30412
25/07/2024	21	A flock of 21 birds feeding in field adjacent to lake.	Targeted Flocking	30412
25/07/2024	2	A pair of Brolga foraging in field.	Targeted Flocking	30412
26/07/2024	22	A flock of 22 feeding in field.	Targeted Flocking	30412

Date	Number of Brolga	Observation notes	Survey type	Closest wetland ID
26/07/2024	2	2 Brolga observed feeding in the field.	Targeted Flocking	30412
26/07/2024	2	A pair feeding in field.	Targeted Flocking	30416
21/08/2024	4	Four Brolga observed in field.	Monthly Brolga monitoring	32400
22/08/2024	2	Two Brolga feeding in drainage line	Monthly Brolga monitoring	30212
23/08/2024	2	Two Brolga standing in water, short looping flight and returned	Monthly Brolga monitoring	32614
16/09/2024	2	Standing in pasture	Monthly Brolga monitoring	29773
16/09/2024	2	Foraging on edge of wetland	Monthly Brolga monitoring	29587
16/09/2024	2	Walking in paddock	Monthly Brolga monitoring	32558
16/09/2024	1	1 Brolga standing on edge of wetland	Monthly Brolga monitoring	32664
17/09/2024	2	Foraging.	Monthly Brolga monitoring	29691
17/09/2024	2	Foraging in dry wetland	Monthly Brolga monitoring	32542
17/09/2024	2	A pair observed on wetland.	Monthly Brolga monitoring	32548
17/09/2024	1	Solo Brolga foraging in drainage line	Monthly Brolga monitoring	30416
18/09/2024	2	A pair foraging in field.	Monthly Brolga monitoring	30412
14/10/2024	2	2 Brolga walking in dry wetland. One Brolga loafing as we watched	Monthly Brolga monitoring	32558
14/10/2024	2	Flying over. Did not land	Monthly Brolga monitoring	N/A
16/10/2024	2	2 Brolga standing in open pasture	Monthly Brolga monitoring	30412

Appendix F: Brolga flights observed within 5km of DDWF (Year 4)

Flight date	Flight start time	Flight end time	Duration of flight (sec)	Flight height (m)	Flight distance (m)	Proximity to turbines (m)	Notes
23/11/2023		9:14:55	7	20	2574	809	Standing in pasture, then flew away from WF, over farmland over road and away to SE
23/11/2023	11:34:00	11:37:12	192	30	2657	398	4 Brolga flying together over farmland toward WF
23/11/2023	8:59:55	8:59:58	3	10	2127	814	Pair seen flying over road from wetland toward wind farm
23/11/2023	12:24:43	12:25:53	70	20	1204	351	4 Adult Brolgas flying over farmland
24/11/2023	10:54:00	10:54:00	0	5	91	5604	Crop, dam
13/12/2023	12:26:00	12:30:00	240		693	3094	
20/12/2023	9:57:26	9:57:33	7		1193	3086	
16/01/2024	12:58:00	13:00:12	132	25	1525	4127	Took off from wetland, flying over harvested crops
15/02/2024	12:17:07	12:17:10	3	12	474	1850	Dry paddock to wetland area
19/02/2024	13:40:00	13:40:00	0	5	167	1258	2 Brolga split from main flock and flew over crop stubble towards Lake Gellie
20/02/2024	7:20:09	7:20:13	4	20	242	637	8x Brolga, 5 landed, 2 went on to edge of large lake, 1 went back
20/02/2024	7:29:00	7:31:00	120	40	1342	761	2 Brolga flushed from wetland edge, flew over wetland over grazing land to crop stubble
20/02/2024	9:37:00	9:41:00	240	40	2426	1001	From wetland, 16 Brolga up and flew across road, over pasture toward Lake Gellie and landed in crop stubble
20/02/2024	19:14:00	19:15:46	106	3	311	1696	6 Brolga flying to field - in stubble
20/02/2024	19:35:44	19:37:03	79	40	1280	1817	2 Brolga walked to edge of wetland and then flew
20/02/2024	20:10:00			20	3703	515	8 flew in, landed in veg to south of wetland. Additional 2 flew in 1 min later
20/02/2024	20:38:00	20:39:29	89	4	117	1723	6 Brolga flew from edge of wetland into water
21/02/2024	8:10:00	8:12:53	173	40	2802	612	9 Brolga landed in crop stubble
21/02/2024	8:04:00	8:04:00	0	30	2344	706	8 Brolga landed in crop stubble
21/02/2024	9:25:00	9:28:23	203	10	1347	715	21 Brolga flew from stubble to edge of wetland
21/02/2024	9:10:00	9:31:23	1283	4	224	1313	2 Brolga flew to outcrop in wetland
21/02/2024	19:29:00	19:30:00	60	30	1581	483	9 Brolga flew into wetland. 6 now standing in water. 3 out of sight behind rise
21/02/2024	19:20:00	19:21:00	60	30	495	315	6 Brolga flew in to arm of wetland
21/02/2024	20:12:00	20:13:00	60	30	2755	445	16 Brolga flew to stubble
21/02/2024	20:02:00	20:02:00	0	3	239	1638	6 Brolga from wetland fly to veg to forage with 10 already there
21/02/2024	20:20:00			10	881	628	6 Brolga into wetland, 10 on bank behind
21/02/2024	20:12:00	20:13:00	60	3	215	1723	2 Brolga flew behind rise in wetland

Flight date	Flight start time	Flight end time	Duration of flight (sec)	Flight height (m)	Flight distance (m)	Proximity to turbines (m)	Notes
22/02/2024	7:28:00	7:29:00	60	6	749	639	2 Brolga flew from embankment to stubble
22/02/2024	7:18:00	7:21:00	180	50	5104	275	5 Brolga flew to stand in stubble
22/02/2024	9:00:00	9:00:00	0		64	955	Flight not observed. 23 Brolga moved to top of rise.
22/02/2024	9:29:07	9:29:09	2		109	896	Moved to edge of lake
13/03/2024	14:41:00	14:43:57	177	6	2236	1384	2x adults. From wetland to pasture
18/03/2024	16:25:00	16:26:00	60	3	205	2932	2 Brolga fly out and back into wetland
18/03/2024	15:50:00	16:05:00	900	0	61	2891	4 Brolga WALKING/foraging along edge of wetland
18/03/2024	16:20:00	16:21:00	60	3	94	2946	4 Brolgas fly out of and back into wetland
18/03/2024	17:44:00	17:45:00	60	8	1377	2879	4 Brolga flew, did lap of wetland and landed back in pasture where they started
18/03/2024	17:57:00	17:58:20	80	4	148	3405	2 Brolga flew and landed back in pasture
18/03/2024	18:05:00	18:07:13	133	4	235	3341	Pair chase other pair around wetland
18/03/2024	18:23:00	18:24:58	118	6	157	3356	9 Brolga fly back to pasture, joining one remaining - all 10 in pasture
18/03/2024	18:14:00	18:14:03	3	8	311	3273	6 Brolga flew from pasture to east side of wetland
18/03/2024	18:42:47	18:42:49	2	6	278	3296	2 additional Brolga flew from wetland to pasture. Now 12 total
18/03/2024	19:27:00	19:29:47	167	4	215	3385	5 Brolga flew down to join the others - open bare ground
18/03/2024	19:50:00	19:53:00	180	8	1716	2870	From open ground, landing in long grass on edge of wetland
19/03/2024	7:24:00	7:26:00	120	20	1604	1619	Took off from wetland, flew towards turbines, out of site
19/03/2024	7:29:00	7:32:00	180	12	2757	2878	From wetland to open ground
19/03/2024	7:56:00	7:58:49	169	10	1327	3188	From wetland, went out of sight
19/03/2024	7:50:00	7:52:00	120	0	109	3645	8 Brolga WALKING north away from car
19/03/2024	8:24:00	8:24:00	0	3	102	3407	2 Brolga join 8 in open ground
19/03/2024	9:15:00	9:15:00	0	4	235	3236	Flew from open ground into long veg in wetland
19/03/2024	18:58:00	18:02:00		10	2972	2767	Pasture to pasture
19/03/2024	18:20:00	18:20:00	0	10	934	2984	Pasture to pasture
19/03/2024	18:22:59	18:23:02	3	4	479	2960	4 Brolga fly from wetland to pasture
19/03/2024	18:14:00	18:14:00	0	4	183	2985	Landed in pasture (now 7 Brolga in paddock)
19/03/2024	18:06:00	18:07:00	60	4	302	2971	5 Brolga fly into wetland
19/03/2024	18:26:00	18:26:00	0	6	524	2966	3 Brolga fly Wetland to pasture
19/03/2024	18:34:00	18:35:00	60	6	723	2965	5 Brolga fly pasture to pasture
19/03/2024	18:42:00	18:42:00	0	6	820	2979	3 Brolga fly back to pasture

Flight date	Flight start time	Flight end time	Duration of flight (sec)	Flight height (m)	Flight distance (m)	Proximity to turbines (m)	Notes
20/03/2024	9:56:00	9:58:38	158	20	1752	4970	2 Brolga flying over pasture, landed in wetland
21/03/2024	7:56:00	7:57:46	106	30	2915	1296	From wetland towards WF out of sight
21/03/2024	8:26:00	8:26:00	0	4	88	2973	3 Brolga fly from wetland to pasture
21/03/2024	9:05:00	9:05:00	0	8	1141	3004	2 Brolga Paddock to pasture
21/03/2024	9:06:00	9:06:00	0	6	1119	2976	2 Brolga fly wetland to pasture
21/03/2024	9:02:00	9:03:00	60	6	1572	2767	5 Brolga Wetland to pasture
21/03/2024	10:59:00	10:59:00	0	3	476	3360	2 Brolga fly Pasture to pasture
18/04/2024	7:21:26	7:24:19	173	20	638	3624	2 Brolgas
18/04/2024	7:26:37	7:28:39	122	15	1150	3663	7 Brolgas
18/04/2024	7:35:56	7:37:57	122	10	642	3638	1 Brolga
18/04/2024	9:50:28	9:56:30	362	15	2203	3256	2 Brolgas
15/05/2024	16:33:34	16:33:35	1	10	827	2991	
20/05/2024	13:37:34	13:05:00		4	171	1449	Pasture
20/05/2024	17:23:00	17:25:00	120	30	1715	1289	46 Flying to pasture
20/05/2024	17:42:46	17:49:22	396	20	1977	1357	approximately 26 Brolga
20/05/2024	17:47:51	17:52:42	291	20	1506	1917	approximately 16 Brolga
20/05/2024	17:40:00	17:41:16	76	8	404	1276	12 fly To pasture
21/05/2024	7:46:25	7:52:27	362	20	1132	1370	2 Brolga
21/05/2024	7:51:27	8:00:45	558	15	2721	901	2 Brolga flying
21/05/2024	7:55:18	7:59:50	273	15	1525	1312	11 total
21/05/2024	8:03:34	8:04:57	83	15	1636	1364	2 Brolga
21/05/2024	8:22:37	8:26:40	242	20	989	860	2 Brolga
21/05/2024	8:26:23	8:31:25	302	2	2081	1799	2 Brolga
21/05/2024	8:28:00			20	2988	200	5 Brolga Pasture to out of sight
21/05/2024	8:32:03	8:35:29	206	15	2046	554	4 Brolga
21/05/2024	8:32:21	8:39:39	438	15	672	1384	19 Brolga
21/05/2024	8:42:29	8:45:30	182	10	697	1016	5 Brolga
21/05/2024	8:43:13	8:47:06	233		1241	1121	1 Brolga (joining flock)
21/05/2024	8:51:12	8:57:03	350	15	839	1330	25 flying Brolga to form 32 Brolga flock
21/05/2024	8:57:47	9:02:57	309		2082	1385	2 Brolga flying into distance

Flight date	Flight start time	Flight end time	Duration of flight (sec)	Flight height (m)	Flight distance (m)	Proximity to turbines (m)	Notes
21/05/2024	17:29:00	17:31:00	120	20	4290	8904	2 adults Flying
22/05/2024	7:55:33	7:58:36	183	15	974	1459	8 Brolga flying. low visibility due to fog
22/05/2024	17:29:00	17:32:06	186	24	1056	1935	? Flying above trees - ~39 Brolga
24/06/2024	16:53:00	16:58:00	300	10	912	1235	Pasture to wetland (8Brolga)
24/06/2024	16:54:00	16:54:00	0	8	77	1235	Pasture 2 Brolga
24/06/2024	17:17:00	17:17:00	0	35	1210	1224	2 Brolga flying - Pasture
24/06/2024	17:20:00	17:20:00	0	20	1085	1259	6 Brolga flying - Pasture
24/06/2024	17:40:00	17:43:00	180	30	1970	1322	10 Brolga flying together over road, over house and beyond. Very noisy.
25/06/2024	8:25:00	8:26:00	60	30	1247	1228	4 Brolga flew from pasture out of sight
25/06/2024	8:22:00	8:24:00	120	15	3077	1204	4 Brolga flying Over road (in 2 pairs)
25/06/2024	9:35:00	9:36:00	60	12	655	1368	2 Brolga flew over road
25/06/2024	10:08:00	10:09:00	60	5	862	3038	Pasture. 7 Brolga which were originally near rock pile flew to join larger flock at wetland (total 18)
25/06/2024	16:41:20	16:44:58	217	8	692	3145	
25/06/2024	17:01:58	17:06:51	293	10	3182	3266	3 Brolga doing 5 laps
25/06/2024	17:40:18	17:42:53	155		510	3055	18 Brolga flying to wetland from behind planted sugar gums
26/06/2024	8:28:54	8:30:47	113	8	530	1365	2 Brolga flying
26/06/2024	8:25:00	8:29:00	240	35	1997	241	11 Brolga flew from pasture, south west and out of sight
26/06/2024	9:17:00	9:19:00	120	30	783	5101	3 Brolga seen flying along tree line - dropped behind trees. Start of flight not seen
26/06/2024	10:35:33	10:38:27	173	8	1053	2905	8 Brolga flying. landing on edge of wetland
26/06/2024	16:43:19	16:43:20	1	8	715	3007	16 Brolga flying to paddock
26/06/2024	17:45:43	17:45:44	1	10	696	3026	20 Brolga flying to wetland
27/06/2024	7:46:15	7:46:16	1	10	846	3280	2 Brolga flying from wetland to paddoc
27/06/2024	8:43:28	8:43:29	1	9	762	3044	8 Brolga flying into wetland
27/06/2024	9:11:59	9:12:00	1	5	454	4986	
17/07/2024	12:50:00	12:52:00	120	10	880	1484	Flushed from pasture
23/07/2024	14:55:00	14:57:34	155	8	748	3108	From wetland to edge of wetland
23/07/2024	14:57:00	15:59:00	3720	15	669	3004	To pasture
23/07/2024	15:01:00	15:03:26	147	8	733	2952	To pasture
23/07/2024	14:57:00	15:00:00	180	30	2584	1973	From pasture, OOS towards wf

Flight date	Flight start time	Flight end time	Duration of flight (sec)	Flight height (m)	Flight distance (m)	Proximity to turbines (m)	Notes
23/07/2024	15:48:00	15:50:29	150	4	406	2993	Wetland to pasture
23/07/2024	16:55:13	16:57:26	133	15	1799	2206	Fields.
23/07/2024	17:55:35	17:57:44	129	15	429	2949	Fields.
24/07/2024	8:07:35	8:09:44	129	15	678	2526	Field.
24/07/2024	17:47:02	17:49:09	127	15	668	2409	The flock of 4 Brolga were in paddock and were observes flying north.
24/07/2024	17:31:49	17:35:52	243	15	378	3083	The flock of 19 flew from the field to the lake.
25/07/2024	8:01:00	8:03:00	120	8	879	3145	Pasture
25/07/2024	8:08:00	8:09:00	60	6	300	3266	Pasture
25/07/2024	16:27:00	16:29:00	120	8	1017	2940	Pasture
25/07/2024	17:49:29	17:51:35	126	5	1461	1271	Field and wetland.
25/07/2024	17:35:17	17:37:24	127	5	632	2253	Field near lake.
26/07/2024	8:44:00	8:46:00	120	20	1575	2921	Pasture
26/07/2024	8:44:00	8:46:00	120	30	1684	2574	From pasture out of sight
23/08/2024	10:55:12	10:57:22	130	5	813	4322	Lake Gellie crops.
21/08/2024	15:41:52	15:45:18	206	10	976	3523	Cropped field near Lake Gellie.
23/08/2024	11:01:34	11:03:42	128	2	456	3918	Area of field.
17/09/2024	10:31:46	10:35:01	195	10	2075	383	Field.
14/10/2024	14:30:00	14:35:11	311	30	2737	3038	Flying only. Did not see land

Appendix G: Wetland monitoring results from within 5km of DDWF (Year 4)

Survey date	Survey type	Wetland ID	Survey start time	Survey end time	Temp (C°)	Wind (km/h)	Wind direction	Humidity (%)	Cloud cover (%)	Rain	Water level	Bird species observed	Number of Brolga observed	Brolga Observation
22/11/2023	Monthly Brolga monitoring	32614	13:35	14:05	21.6	22	ESE	42	0	No	3	Chestnut Teal, Eurasian Coot, Golden Headed Cisticola, Great Crested Grebe Grey teal, Hardhead, Hoary-headed Grebe, House Sparrow, Little Pied Cormorant Stubble Quail, Wedge-tailed Eagle, Welcome Swallow, Whiskered Tern		
22/11/2023	Monthly Brolga monitoring	32664	14:23	15:05	22.5	15	ENE	40	0	No	3	Australian Wood Duck, Black Swan, Black-wing Stilt, Eurasian Coot, Grey teal, Hoary-headed Grebe, Little Pied Cormorant, Masked Lapwing, Purple Swamphen, Red-necked Stint, Silver Gull, Sharp-tailed Sandpiper, White-faced Heron, Whiskered Tern		
22/11/2023	Monthly Brolga monitoring	29857	15:35	15:40	23.9	20	SE	39	0	No	0			
22/11/2023	Monthly Brolga monitoring		16:00	16:15	23.9	20	SE	39	0	No	3	Eurasian Coot, Grey Teal, Hardhead, Hoary-headed Grebe, Welcome Swallow, White-fronted Chat		
22/11/2023	Monthly Brolga monitoring	29773	16:15	16:55	22.5	26	SSE	44	0	No	3	Black Swan, Blue-bill Duck, Eurasian Coot, Grey teal, Pink-ear Duck	1	1 adult Brolga walking in pasture toward wetland. First recorded at 4.14
22/11/2023	Monthly Brolga monitoring	29711	16:58	17:05	22.5	26	SSE	44	0	No	3			
23/11/2023	Monthly Brolga monitoring	32558	8:15	8:30	12.6	13	ENE	85	100	No	0	Black Kite, Straw-necked Ibis, White-faced Heron		
23/11/2023	Monthly Brolga monitoring	736012	8:35	8:48	12.6	13	ENE	85	100	No	3	Australasian Shelduck, Pacific Black Duck, Purple Swamphen, Straw-necked Ibis, Whistling Kite		
23/11/2023	Monthly Brolga monitoring	30523	9:10	9:45	14.8	17	NE	77	100	No	0			4 adult Brolga (2 pairs). One flew in from south of Woorndoo-Dundonell Road (2km). One pair flew south east past intersection with Darlington-New Road (2km+). All seen foraging in pasture recently cut for hay. Flight heights 10-20m, 600 m from turbines. O
23/11/2023	Monthly Brolga monitoring	29587	10:06	10:31	16.3	20	NNE	72	85	No	2	Black Swan, Grey teal, Hoary-headed Grebe, Pacific Black Duck, Purple Swamphen, Straw-necked ibis, White-necked Heron	2	2 adult Brolga seen walking in wetland. Walked south. No nest visible in wetland
23/11/2023	Monthly Brolga monitoring	695083	11:25	11:32	20.8	15	NE	59	50	No	3	Grey Teal, Little Pied Cormorant, Masked Lapwing, White-faced Heron		4 adult Brolga flew toward wetland, then away to southeast (toward WF). 3 minute flight, 10-30m height)
23/11/2023	Monthly Brolga monitoring	29753	12:50	13:30	24	22	E	48	30	No	2	White-faced Heron, White-necked Heron		
23/11/2023	Monthly Brolga monitoring	29614	13:52	14:06	25.4	20	NE	43	80	No	4	Australasian Shelduck, Australian White Ibis, Grey teal, Hardhead, Hoary-headed Grebe, Little Pied Cormorant, Masked Lapwing, Pink-ear Duck, Pacific Black Duck, Silver Gull, Welcome Swallow, White-faced Heron		
23/11/2023	Monthly Brolga monitoring	32542	16:23	16:35	24	22	E	46	100	No	0	Masked Lapwing		
23/11/2023	Monthly Brolga monitoring	32565	16:20	17:00	24	22	E	46	100	No	0	Black-wing Stilt, Grey Teal, Purple Swamphen, Red-capped Plover, Red-necked Stint, Whistling Kite,		
23/11/2023	Monthly Brolga monitoring	32580	16:50	17:10	24	22	E	46	100	No	0		2	Pair of Adult Brolga foraging in pasture. With sheep.
24/11/2023	Monthly Brolga monitoring	29839	9:20	10:05	18	11	N	85	100	Yes	1	Black Swan, Cattle Egret, Grey Teal, Purple Swamphen, Royal Spoonbill, White-necked Heron, White-faced Heron, Yellow-billed Spoonbill		
24/11/2023	Monthly Brolga monitoring	32610	10:50	11:20								Black Swan, Black-tailed Native-hen, Whiskered Tern	2	2 adult Brolga seen flying over road, then drinking from pond/waterway
13/12/2023	Monthly Brolga monitoring	30401	10:51	10:52	27	19	S	55	20	no	3			
13/12/2023	Monthly Brolga monitoring	30401	10:51	10:52	27	19	S	55	20	no	3	Australian Wood Duck, Australian Shelduck, Grey Teal, Little Pied Cormorant, Masked Lapwing, Australian Magpie, Yellow-billed Spoonbill, Pacific Black Duck, White-faced Heron		
13/12/2023	Monthly Brolga monitoring	29753	11:53	11:53	28.5	13	S	49	25	no	1	White-faced Heron		
13/12/2023	Monthly Brolga monitoring	30412	12:26	12:26	29.5	17	S	47	20	no	2	Brolga	6	6 brolgas flew from wetland SE
13/12/2023	Monthly Brolga monitoring	29773	12:38	12:38	29	15	S	49	20	no	3	Black Swan, White-faced Heron, Pacific Black Duck, Eurasian Coot, Australian Shelduck, Hoary-headed Grebe, Silver Gull		

Survey date	Survey type	Wetland ID	Survey start time	Survey end time	Temp (C°)	Wind (km/h)	Wind direction	Humidity (%)	Cloud cover (%)	Rain	Water level	Bird species observed	Number of Brolga observed	Brolga Observation
13/12/2023	Monthly Brolga monitoring	29773	13:08	13:08	29.8	9	SSW	48	75	no	2	White-faced Heron, White-necked Heron, Black Swan, Brolga, Australian White Ibis, Australian Shelduck, Little Raven, Pacific Black Duck, Grey Teal, Straw-necked Ibis, Yellow-billed Spoonbill, Eurasian Coot	2	2 adult brolga
13/12/2023	Monthly Brolga monitoring	29711	13:20	13:20	30.2	7	SW	47	75	no	3	Black Swan, Eurasian Coot, Pacific Black Duck, Masked Lapwing, Silver Gull		
13/12/2023	Monthly Brolga monitoring	29627	14:04	14:04	30.2	32	NNW	28	30	no	0			
13/12/2023	Monthly Brolga monitoring	32614	15:42	15:43	32.5	26	NW	26	15	no	3	Pacific Black Duck, Eurasian Coot, Welcome Swallow		
13/12/2023	Monthly Brolga monitoring	32667	16:11	16:11	32.5	22	NW	24	20	no	3	Eurasian Coot, Little Pied Cormorant, Grey Teal, Hoary-headed Grebe, Masked Lapwing, Black Swan, Crested Pigeon, Magpie-lark, Australian Magpie, Brolga, Great Crested Grebe	14	14 brolga
13/12/2023	Monthly Brolga monitoring	32565	10:19	10:19	16.6	26	W	74	100	no	3	Sharp-tailed Sandpiper, Pacific Black Duck, Black Swan, Masked Lapwing, Grey Teal, Australian Shelduck, Hoary-headed Grebe, Silver Gull, Chestnut Teal		
14/12/2023	Monthly Brolga monitoring	32580	11:01	11:01	19	20	W	64	100	no	3	Grey Teal, Masked Lapwing, Little Pied Cormorant, Eurasian Coot, Black Swan, Little Raven, Musk Duck, Hoary-headed Grebe		
14/12/2023	Monthly Brolga monitoring	32542	12:34	12:34	21	26	W	54	100	no	0			
14/12/2023	Monthly Brolga monitoring	32664	12:56	12:56	21	26	WNW	54	90	no	3	Black Swan, Eurasian Coot, Grey Teal, , Pacific Black Duck, Hoary-headed Grebe		
14/12/2023	Monthly Brolga monitoring	29857	13:35	13:35	20.8	24	W	55	100	no	0			
18/12/2023	Targeted Flocking	32632	12:25	13:00	24.9	28	NNW	34	100	yes	4	Brolga, Eastern Cattle Egret, Black-fronted Dotterel, Eurasian Coot, Hoary-headed Grebe, Hardhead, Grey Teal, Eurasian Skylark, Stubble Quail, Australian Pelican	2	2 brolga recorded on water edge. Moved into grass
18/12/2023	Targeted Flocking	32558												
18/12/2023	Targeted Flocking	29587	14:42	14:56	28.7	26	NNW	35	90	no	3	Brolga, Forest Raven, Pacific Black Duck, Australian Wood Duck, White-faced Heron, Yellow-billed Spoonbill, Australian White Ibis, Masked Lapwing, White-necked Heron, Grey Teal, Australian Shelduck	2	
18/12/2023	Targeted Flocking	32614	09:51	10:19	13.9	22	SSW	78	70	no	4	Great Crested Grebe, Whiskered Tern, Black Swan, Grey Teal, House Sparrow, Little Black Cormorant, Eurasian Coot, Hoary-headed Grebe, Chestnut Teal		
19/12/2023		29722	10:54	11:10	15.5	30	SSW	67	70	no	2	Brolga, Yellow-billed Spoonbill, Whiskered Tern, Grey Teal, Black Swan, Little Black Cormorant, Brown Thornbill, Masked Lapwing	2	2 brolga recorded. Also add Black-winged Stilt (cannot find in drop down)
20/12/2023	Targeted Flocking	32614	08:49	09:09	13.9	26	SSE	54	90	no	4	Australian Magpie, Australian White Ibis, Musk Duck, Grey Teal, Chestnut Teal, Hoary-headed Grebe, Welcome Swallow, Black Swan, Little Pied Cormorant, Whiskered Tern, White-faced Heron		
20/12/2023	Targeted Flocking	32632	12:43	12:48	17.8	24	S	40	30	no	3	Black Swan, Eurasian Coot, Great Crested Grebe, Hoary-headed Grebe, Welcome Swallow, Little Pied Cormorant		
20/12/2023	Targeted Flocking	29587	13:20	13:26	16.6	26	SSE	50	60	no	2	Yellow-billed Spoonbill, Australian Shelduck, Eurasian Coot, Australian White Ibis, Brolga, Australian Wood Duck	2	
20/12/2023	Targeted Flocking	32548	10:28	10:36	21	33	ENE	48	50	no	1	Australian White Ibis, Little Raven, Brolga, Brown Falcon, Australian Magpie, White-faced Heron, White-necked Heron, Masked Lapwing		
21/12/2023	Targeted Flocking	32632	12:14	12:25	22.8	26	ENE	40	50	no	3	Brolga, Little Black Cormorant, Eurasian Coot, Black Swan, Black-tailed Native-hen, Grey Teal, Hoary-headed Grebe, Yellow-billed Spoonbill, Australian White Ibis	2	
21/12/2023	Targeted Flocking	32614	12:30	12:42	23.1	32	E	39	50	no	4	Brolga, Yellow-billed Spoonbill, Welcome Swallow, Australian Magpie	2	
20/12/2023	Targeted Flocking	32667	12:13		15.4	22	S	55	40	no	3	Brolga	14	Unsure of specific location. Brolgas only seen in flight before landing in north east corner of wetland
18/01/2024	Monthly Brolga monitoring	32548	11:36	11:39	16.3	30	WSW	72	40	yes	1			
18/01/2024	Monthly Brolga monitoring	32593	12:23	12:27	14.1	28	SW	91	40	yes	3	Australasian Grebe, Pacific Black Duck, Eurasian Coot, Chestnut Teal, Black Swan		
16/01/2024	Monthly Brolga monitoring	32667	12:57		28	33	NNE	50	20	no	3	Australasian Grebe, Australian Magpie, Australian Shelduck, Black Swan, Brolga, Eurasian Coot, Hoary-headed Grebe, Masked Lapwing, Swamp Harrier, Welcome Swallow	2	
16/01/2024	Monthly Brolga monitoring	32664	12:30	12:30	27	32	NNE	52	30	no	3	Australian Shelduck, Black Swan, Grey Teal, Eurasian Coot, Little Pied Cormorant		

Survey date	Survey type	Wetland ID	Survey start time	Survey end time	Temp (C°)	Wind (km/h)	Wind direction	Humidity (%)	Cloud cover (%)	Rain	Water level	Bird species observed	Number of Brolga observed	Brolga Observation
16/01/2024	Monthly Brolga monitoring	32664	14:25	14:25	27	24	NNE	52	90	no	3	Black Swan, Eurasian Coot, Musk Duck		
16/01/2024	Monthly Brolga monitoring	29773	14:53	14:53	27	19	NNW	54	100	no	3	Australasian Shoveler, Black Swan, Hoary-headed Grebe		
16/01/2024	Monthly Brolga monitoring	29711	15:01	15:01	27	19	NNW	54	100	no	3	Black Swan, Eurasian Coot		
16/01/2024	Monthly Brolga monitoring	29587	15:09	15:09	26	24	NNW	54	100	yes	3	Brolga, Straw-necked Ibis, White-faced Heron, Australian White Ibis, Yellow-billed Spoonbill, Eurasian Coot, Masked Lapwing, Pacific Black Duck	2	2 brolga foraging in pasture beside wetland
16/01/2024	Monthly Brolga monitoring	30412	15:27	15:27	23	13	NNE	77	100	no	2	Black Swan		
16/01/2024	Monthly Brolga monitoring	29857	15:35	15:35	24	13	NE	75	100	no	0			
16/01/2024	Monthly Brolga monitoring	29627	09:10	09:10	15	9	SE	94	95	no	0			
16/01/2024	Monthly Brolga monitoring	29753	10:41	10:41	18	13	SW	75	100	no	1			
17/01/2024	Monthly Brolga monitoring	32565	11:35	11:35	16	26	SW	85	100	yes	2	Masked Lapwing, Sharp-tailed Sandpiper, Chestnut Teal, Black Swan		
17/01/2024	Monthly Brolga monitoring	32580	11:49	11:49	16	24	SW	90	100	yes	3	Australasian Shoveler, Little Pied Cormorant, Masked Lapwing, Pacific Black Duck, Hoary-headed Grebe, Yellow-faced Honeyeater		
17/01/2024	Monthly Brolga monitoring	32542	12:28	12:28	16	24	SW	84	100	yes	0			
17/01/2024	Monthly Brolga monitoring	29614	13:16	13:16	17	26	SW	75	90	no	3	Silver Gull		
17/01/2024	Monthly Brolga monitoring	30401	14:18	14:18	19	20	SW	59	80	no	3	Grey Teal, Australian Wood Duck, Masked Lapwing, White-faced Heron, Yellow-billed Spoonbill, Little Pied Cormorant		
17/01/2024	Monthly Brolga monitoring	29839	15:31	15:31	18	22	SW	55	85	no	1	Black Swan		
18/01/2024	Monthly Brolga monitoring	29770	13:01	13:01	19	17	W	61	85		3	Brolga, Pacific Black Duck		
13/02/2024	Monthly Brolga monitoring	32674	14:32	14:37	32.9	32	WSW	33	37	no	2	Brolga, Grey Teal, Masked Lapwing, Silver Gull, Black Swan	2	2x adult walking in wetland
19/02/2024	Targeted Flocking	32667	12:15	12:27	22.3	20	ESE	47	20	no	4	Black Swan, Eurasian Coot, Little Pied Cormorant, Pacific Black Duck, Australian Shelduck		
13/02/2024	Monthly Brolga monitoring	30412	12:51	12:51	35.7	41	NNW	25	40	no	2	Black Swan, Brolga, Australian Shelduck	3	3x adult brolga wading/foraging
13/02/2024	Monthly Brolga monitoring	29773	13:09	13:09	36.2	43	NW	24	30	no	3	Black Swan, Eurasian Coot, Silver Gull		
13/02/2024	Monthly Brolga monitoring	29711	13:31	13:31	37	41	NW	23	20	no	3	Black Swan, Eurasian Coot, Silver Gull, Australian Shelduck, Masked Lapwing, Little Pied Cormorant, Blue-billed Duck		
13/02/2024	Monthly Brolga monitoring	29587	13:55	13:56	33	30	WSW	30	50	no	1	Brolga, White-necked Heron, Pacific Black Duck, Australian White Ibis, Australian Wood Duck	2	2 adult brolga sitting in wetland (very hot and windy)
13/02/2024	Monthly Brolga monitoring	32614	15:25	15:26	34	43	W	23	70	no	3	Brolga	10	10 adult brolga foraging in shallow water
13/02/2024	Monthly Brolga monitoring	29753	15:39	15:39	33	43	W	25	20	no	0			
13/02/2024	Monthly Brolga monitoring	30401	10:04	10:04	14.7	17	ESE	57	80	no	3	Little Pied Cormorant, Masked Lapwing		
13/02/2024		29627												
14/02/2024	Monthly Brolga monitoring	29614	11:20	11:20	14.5	13	SSE	59	90	no	3	Australian White Ibis, Masked Lapwing, Royal Spoonbill, Yellow-billed Spoonbill, Black Swan, Brolga	2	2 adult brolga feeding foraging on edge of wetland
14/02/2024	Monthly Brolga monitoring	32667	12:15	12:15	18	20	SSW	39	50	no	3	Australian Shelduck, Black Swan, Eurasian Coot, Australasian Grebe, Hoary-headed Grebe, Little Pied Cormorant, Grey Teal, Pacific Black Duck, Australasian Shoveler, Chestnut Teal, Welcome Swallow, Masked Lapwing		
14/02/2024	Monthly Brolga monitoring	32614	12:59	12:59	17	17	SW	44	20	no	3	Australian Shelduck, Black Swan, Eurasian Coot, Eastern Great Egret, Grey Teal, Musk Duck, Pink-eared Duck, Hoary-headed Grebe, Great Crested Grebe, Brolga	24	24 brolga foraging next to wetland
14/02/2024	Monthly Brolga monitoring	32596	13:51	13:51	18	15	SSW	36	10	no	0			
14/02/2024	Monthly Brolga monitoring	29839	14:48	14:48	20	13	SSW	31	5	no	0	Masked Lapwing		
14/02/2024	Monthly Brolga monitoring	32548	15:28	15:28	21	22	SW	30	5	no	0			
15/02/2024	Monthly Brolga monitoring	32565	12:04	12:04	19	11	SSE	43	5	no	2	Masked Lapwing, Swamp Harrier, Chestnut Teal, Grey Teal, Pacific Black Duck, Welcome Swallow, Australasian Shoveler, Australian Shelduck, Black Swan	2	
15/02/2024	Monthly Brolga monitoring	32580	12:26	12:26	18	6	SE	42	5	no	2	Australian White Ibis, Eurasian Coot, Hoary-headed Grebe		2 adult brolga flew into wetland area from paddock (but couldn't see landing place)
15/02/2024	Monthly Brolga monitoring	32542	13:14	13:14	20	15	SE	36	15	no	0			

Survey date	Survey type	Wetland ID	Survey start time	Survey end time	Temp (C°)	Wind (km/h)	Wind direction	Humidity (%)	Cloud cover (%)	Rain	Water level	Bird species observed	Number of Brolga observed	Brolga Observation
19/02/2024	Targeted Flocking	32614	13:00	14:27	25	20	S	39	0	no	4	Eastern Great Egret, Brolga, Australian Pelican, Grey Teal, Silver Gull, Whistling Kite, Eurasian Coot	24	Flock watched 1-3pm;24 Brolga standing in crop stubble, feeding, preening, walking, some sitting, largely very still.;2 brolga split from flock
19/02/2024	Targeted Flocking	32614	07:15		16	11	ENE	84	100	no	4	Australasian Shoveler, Musk Duck, Eastern Great Egret, Little Pied Cormorant, Brolga, Black Swan, Australian Shelduck, Eurasian Coot, Wedge-tailed Eagle, Whistling Kite, Black-shouldered Kite, Australian Hobby	24	Flock watched 1-3pm;24 Brolga standing in crop stubble, feeding, preening, walking, some sitting, largely very still.;2 brolga split from flock
20/02/2024	Targeted Flocking	32400	19:11	19:11	25	9	WSW	41	100	no	3	Brolga, Eastern Great Egret, White-faced Heron, Little Raven, Black-shouldered Kite	16	16 Brolga standing in wetland. Possibly includes the 2 brolga that were seen flying earlier this morning ;5 adults, standing in vegetation next to wetland. Lots of wing flapping ;16 brolga standing on southern edge of wetland ;6 brolga landed in stubble. Walking and flapping ;10 brolga flew in and landed in veg to north of wetland ;End of evening count - 16 brolga roosting
20/02/2024	Targeted Flocking	32400	07:18	07:18	14	9	NNE	86	15	no	3	Brolga, Australian Shelduck	16	16 Brolga standing in wetland. Possibly includes the 2 brolga that were seen flying earlier this morning ;5 adults, standing in vegetation next to wetland. Lots of wing flapping ;16 brolga standing on southern edge of wetland ;6 brolga landed in stubble. Walking and flapping ;10 brolga flew in and landed in veg to north of wetland ;End of evening count - 16 brolga roosting
21/02/2024	Targeted Flocking	32632	07:10	07:10	13.2	6	NE	88	15	no	3	Grey Teal, Australian Shelduck, Eurasian Coot, Little Pied Cormorant, Musk Duck	2	2 brolga standing in water
20/02/2024	Targeted Flocking	32614	09:09	09:09	23.4	19	NNE	56	10	no	3	Hoary-headed Grebe, Australian Shelduck, Brolga, Brown Falcon, Black Swan, Grey Teal, Musk Duck, Little Black Cormorant	18	2 flushed and flew;At least 18 Brolga. Includes 16 that flew moments ago plus at least 2 more ;5 brolga landed in stubble. 2 kept flying north (lost sight) and one flew back the way it came ;8 brolga flying out of wetland ;6 brolga walking in stubble
20/02/2024	Targeted Flocking	32674	06:59	07:00	13	6	NE	88	15	no	2	Australian Shelduck, Brolga, Grey Teal, Masked Lapwing, Red-capped Plover	2	2 brolga standing in wetland
21/02/2024	Targeted Flocking	32400	19:15	19:18	31.6	6	N	29	40	no	2	Brolga, Eastern Great Egret	16	16 brolga standing along southern edge of wetland. Feeding in water (7.30am);14 brolga foraging in field, 7 still in wetland ;2 brolga grazing on stubble outside wetland ;10 brolga slightly foraging, mostly standing in vegetation
21/02/2024	Targeted Flocking	32614	19:18								3		21	21 brolga, standing in stubble. One with legband - two orange on right leg;2 brolga flew into middle of wetland - from edge out of sight;6 brolga flew in. Can't see in landscape, position approx;2 additional brolga added to 16
21/02/2024	Targeted Flocking	32400	19:31								2	Brolga, Eastern Great Egret	16	16 brolga standing along southern edge of wetland. Feeding in water (7.30am);14 brolga foraging in field, 7 still in wetland ;2 brolga grazing on stubble outside wetland ;10 brolga slightly foraging, mostly standing in vegetation
21/02/2024	Targeted Flocking	32614	19:18	19:31	31.9	9	NNW	26	25	no	3	Brolga, Australian Shelduck	21	21 brolga, standing in stubble. One with legband - two orange on right leg;2 brolga flew into middle of wetland - from edge out of sight;6 brolga flew in. Can't see in landscape, position approx;2 additional brolga added to 16

Survey date	Survey type	Wetland ID	Survey start time	Survey end time	Temp (C°)	Wind (km/h)	Wind direction	Humidity (%)	Cloud cover (%)	Rain	Water level	Bird species observed	Number of Brolga observed	Brolga Observation
21/02/2024	Targeted Flocking	32400	19:31	20:23	29.4	9	ENE	29	25	no	2	Brolga, Eastern Great Egret	16	16 brolga standing along southern edge of wetland. Feeding in water (7.30am);14 brolga foraging in field, 7 still in wetland ;2 brolga grazing on stubble outside wetland ;10 brolga slightly foraging, mostly standing in vegetation 7:31 pm. A flock of 9 Brolga flew to the lake from Lake Gellie. They landed in the lake in a group of 4 and 5. 7:39 pm. Pair of Brolga foraging in field. 7:50 pm. Brolga flock on edge of water. 7:53 pm. A total of 18 Brolga. 6 birds feeding in lake. 10 birds feeding in vegetation adjacent. 2 birds feeding in field. 8:03 pm. 6 birds flew and joined 10 in vegetation. 8:05 pm. Pair joined flock in vegetation. 8:11 pm. Flock of 16 flew to Lake Gellie and landed in field. 8:13 pm. Pair flew north away from the lake.
21/02/2024	Targeted Flocking	32614	20:18							no	3	Brolga, Australian Shelduck	21	21 brolga, standing in stubble. One with legband - two orange on right leg;2 brolga flew into middle of wetland - from edge out of sight;6 brolga flew in. Can't see in landscape, position approx;2 additional brolga added to 16 . 8:23 pm. 16 Brolga on Lake Gellie. 10 birds in lake. 6 birds in vegetation. 8:39 pm. 8 birds flew into lake from vegetation. 13 in wetland. 5 flew further north. Feeding.
21/02/2024	Targeted Flocking	32674	21:07	21:15	25.5	13	N.	39	25	no	2	Brolga, Grey Teal, Australian Shelduck	2	2 brolga standing in water ;2 brolga standing in middle of wetland. Roosting. 9:07 pm. A pair of Brolga observed within the lake.
22/02/2024	Targeted Flocking	32400	07:13	07:24	23.4	20	N	43	40	no	2	Brolga, Australian Shelduck	5	7:13 am. A flock of Brolga observed in field adjacent to lake. 7:18 am. Flock flying around wetland, and then to Lake Gellie in field.
22/02/2024	Targeted Flocking	32614	07:32	09:31	24.9	33	N	40	40	no	3	Brolga, Australian Shelduck, White-faced Heron	23	7:32 am. Flock flew to Lake Gellie. 7:36 am. A Brolga pair flew into field. 7:39 am. A flock of 16 birds observed in field. 7:49 am. A flock of 23 birds observed in field. Additional birds were likely in area. 8:23 am. Flock observed in the same area. 9:13 am. Flock oberved moving further towards Lake areas. 9:29 am. Flock moved to the edge of the Lake in windy conditions.
29/02/2024	Targeted Flocking	32674	09:49	09:51	29.4	43	NNE	38	40	no	2	Brolga, Grey Teal, Silver Gull		9:49 am. A pair of Brolga observed in the lake area.
13/03/2024	Monthly Brolga monitoring	29839	16:07	16:09	20.4	13	SSW	60	65	no	0	Masked Lapwing		6 Masked Lapwing. No water on wetland. Windy.
13/03/2024	Monthly Brolga monitoring	29773	16:39	16:43	20.8	13	S	50	75	no	3	Hoary-headed Grebe, Black Swan, Eurasian Coot		Birds utilising wetland. Mostly full.
13/03/2024	Monthly Brolga monitoring	29711	16:49		20.7	20	S	59	75	no	3	Australasian Shoveler, Australian Shelduck, Brolga	2	2 adults foraging in grass
13/03/2024	Monthly Brolga monitoring	29587	17:01	17:03	20.6	15	S	57	90	no	0	Brolga, White-necked Heron	2	2 brolga foraging in wetland
14/03/2024	Monthly Brolga monitoring	30412	09:06	09:09	15.6	19	S	82	75	no	1	Brolga	12	12 adult brolga, walking in grass
14/03/2024	Monthly Brolga monitoring	32542	10:47	10:49	16.9	28	SSE	75	90	no	0			
14/03/2024	Monthly Brolga monitoring	32614	13:11	13:15	19.9	24	SSE	55	90	no	3	Australian Shelduck, Black Swan, Chestnut Teal, Eastern Great Egret, Little Black Cormorant, Australasian Shoveler, White-faced Heron, Masked Lapwing, Musk Duck, Silver Gull, Hoary-headed Grebe, Grey Teal, Eurasian Coot		
15/03/2024	Monthly Brolga monitoring	32674	10:07	10:09	18.3	22	SE	73	25	no	0			

Survey date	Survey type	Wetland ID	Survey start time	Survey end time	Temp (C°)	Wind (km/h)	Wind direction	Humidity (%)	Cloud cover (%)	Rain	Water level	Bird species observed	Number of Brolga observed	Brolga Observation
18/03/2024	Targeted Flocking	30412	15:43	18:23	30	20	N	32	40	no	2	Australian Shelduck, Australian White Ibis, Whistling Kite, Swamp Harrier, Brolga, Masked Lapwing, White-faced Heron	5	4 adults walking along edge of tall reeds, 1 further back in wetland ;2 adults appear in paddock behind wetland - foraging in pasture ;Additional 3, now 10 visible. 3:43 pm. 4 Brolga observed adjacent to Lake. 4:03 pm. Additional Brolga observed further in reeds in wetland. Other 4 walking into vegetation. 4:23 pm. A pair of Brolga flying into lake, followed by 1 more. At the southern portion. 4:25 pm. A pair flew into the field adjacent to lake. 4:37 pm. A flock of 7 Brolga walking through field to the north. 4:43 pm. Another 2 Brolga in field on the south eastern side of lake. 4:49 pm. A flock of 8 Brolga in field. The other pair feeding. 5:09 pm. 6 walking in field to the south. 2 in lake. 2 in field to the north. 5:25 pm. A flock of 8 Brolga in field. 2 Brolga in field further north. 5:43 pm. 2 Brolga from flock flew north around lake with northern pair. Went back to other 6 birds. 6:00 pm. 2 Brolga flew further down hill. 6:07 pm. 2 birds flew into wetland. 2 more from flock flew. 1 joined the flock of 6. 6:15 pm. The flock of 6 flew into the lake. 6:25 pm. 9 birds flew to field adjacent to lake. 6:43 pm. 12 Brolga observed in field.
19/03/2024	Targeted Flocking	30412	07:15	07:19	23.4	22	N	54	25	no	2	Brolga, Australian Shelduck, Swamp Harrier, Wedge-tailed Eagle, Australian White Ibis	9	2 brolga standing in long grass on east side of wetland ;2 brolga foraging in pasture ;5 brolga Foraging in pasture;5 additional brolga fly in from wetland (total 10). 7:15 am. 2 birds seen on other side of lake. 7:25 am. 2 birds flying north from lake. 7:29 am. 5 birds flying around and landing in field adjacent to lake. 7:43 am. 7 Brolga in field feeding and walking further south. 7:47 am. 8 Brolga in field, walking north. 7:53 am. 2 Brolga flying from lake to the east. 8:25 am. 8 Brolga joined by 2 Brolga in field. 9:15 am. Flock of Brolga flew into lake. 9:37 am. 2 Brolga in field north of lake.
19/03/2024	Targeted Flocking	30412	17:33	19:51	22.1	17	WSW	50	65	no	2	Brolga, Australian Shelduck, Australian White Ibis, Swamp Harrier, Nankeen Kestrel, Masked Lapwing	9	2 brolga standing in long grass on east side of wetland ;2 brolga foraging in pasture ;5 brolga Foraging in pasture;5 additional brolga fly in from wetland (total 10) 5:37 pm. 5 Brolga in field foraging adjacent to lake. 5:43 pm. 9 Brolga foraging in field adjacent to lake. 6:00 pm. 5 Brolga flew from lake to field north east. 6:07 pm. 5 Brolga flew from field adjacent to lake north into lake. 6:15 pm. 2 Brolga flew into field to the north east. 6:20 pm. 5 Brolga from field north east flew south west to field adjacent to lake. 6:25 pm. 2 Brolga from field to the north east and 2 Brolga from lake flew south west to field with 5 Brolga. 6:29 pm. 3 Brolga from lake flew south west to join 9 Brolga in field. 6:37 pm. 5 Brolga flew north of lake to field. 6:43 pm. 3 Brolga flew from field north of lake south to flock of 7. 7:43 pm. Brolga assumed to be in lake.

Survey date	Survey type	Wetland ID	Survey start time	Survey end time	Temp (C°)	Wind (km/h)	Wind direction	Humidity (%)	Cloud cover (%)	Rain	Water level	Bird species observed	Number of Brolga observed	Brolga Observation
21/03/2024	Targeted Flocking	30412	07:25		5.9	2	S	96	0	no	2	Brolga, Australian Shelduck, Swamp Harrier	10	10 brolga standing in wetland 7:43 am. Brolga observed in lake. 7:45 am. Birds flew out of lake into field to the north. 7:53 am. 2 Brolga flew north. 8:09 am. 6 Brolga observed feeding in field adjacent to lake. 8:25 am. 3 Brolga flew north of lake to field. 9:00 am. 5 Brolga and 2 Brolga flew south over lake to field. 2 Brolga from field north of lake flew south to flock of 7. A total of 9 birds. 9:43 pm. 9 Brolga feeding adjacent to lake in field.
13/03/2024	Monthly Brolga monitoring	30401	14:33	14:33	19.4	13	S	66	100	no	2	Australian Shelduck, Australian Wood Duck, Pacific Black Duck, Yellow-billed Spoonbill, Brolga	2	2 adult brolga walking on edge of wetland
13/03/2024	Monthly Brolga monitoring	29753	15:29	15:29	19.6	17	S	65	98	no	0			
13/03/2024	Monthly Brolga monitoring	29753	16:34	16:34	21	13	S	58	95	no	0			
13/03/2024	Monthly Brolga monitoring	32565	10:12	10:12	16	22	SSE	76	98	no	2	Masked Lapwing, Silver Gull		
13/03/2024	Monthly Brolga monitoring	32580	10:18	10:18	17	24	SSE	74	95	no	3	Australasian Shoveler, Australian White Ibis, Australian Shelduck, Grey Teal, Pacific Black Duck, Little Pied Cormorant, Masked Lapwing, Hoary-headed Grebe		
14/03/2024	Monthly Brolga monitoring	29614	11:12	11:12	17.5	17	S	70	100	no	1	Silver Gull, White-faced Heron, Nankeen Kestrel		
14/03/2024	Monthly Brolga monitoring	32632	11:45	11:45	18	17	SSE	66	95	no	2	Australian Shelduck, Black Swan, Black-shouldered Kite, Eurasian Coot, Great Crested Grebe, Grey Teal, Hoary-headed Grebe, Masked Lapwing, Musk Duck, Pacific Black Duck, Pied Cormorant, Welcome Swallow, Eastern Great Egret		
14/03/2024	Monthly Brolga monitoring	32667	12:23	12:23	19	19	S	61	95	no	3	Australian Shelduck, Black Swan, Eurasian Coot, Masked Lapwing, Wedge-tailed Eagle, Musk Duck, Australasian Shoveler, Hoary-headed Grebe, Peregrine Falcon, Black-fronted Dotterel		
15/03/2024	Monthly Brolga monitoring	32664	10:09	10:09	16	20	SE	78	50	no	2	Australian Shelduck, Black Swan, Eurasian Coot, Masked Lapwing, Hoary-headed Grebe, Musk Duck, Pacific Black Duck, Silver Gull		
14/03/2024	Monthly Brolga monitoring	32400	10:42	10:42	17.5	19	ESE	73	30	no	2			
09/04/2024	Monthly Brolga monitoring	32400	14:18	14:25	13.9	26	SW	59	80	no	2			
09/04/2024	Monthly Brolga monitoring	30412	14:39		13.9	28	SW	59	40	no	2	Brolga, Australian Shelduck	6	A flock of 6 Brolga recorded in field adjacent to lake.
09/04/2024	Monthly Brolga monitoring	29773	14:57	15:00	14.7	24	SSW	56	40	no	2	Silver Gull, Pacific Black Duck, Eurasian Coot		
09/04/2024	Monthly Brolga monitoring	29711	15:03	15:07	15.1	26	SW	54	40	no	2	Silver Gull, Australian Shelduck, Australasian Shoveler, Masked Lapwing, Sharp-tailed Sandpiper		
10/04/2024	Monthly Brolga monitoring	29753	10:40	10:43	13.6	13	SW	81	100	no	2	Australian Shelduck, Pacific Black Duck, Australian Wood Duck, White-faced Heron		
10/04/2024	Monthly Brolga monitoring	29627	11:15	11:18	13.6	13	SW	81	100	no	0			
09/04/2024	Monthly Brolga monitoring	32614	13:47	13:47	14.5	26	SSW	57	80	no	2	Australian Shelduck, Black Swan, Nankeen Kestrel, Brolga, Pacific Black Duck, Eurasian Coot, Masked Lapwing, Grey Teal, Wedge-tailed Eagle		17 brolga standing on edge
09/04/2024	Monthly Brolga monitoring	29587	15:38	15:38	15	24	SW	46	60	no	3	White-faced Heron, Pacific Black Duck, Australian Wood Duck, Australian Shelduck		
09/04/2024	Monthly Brolga monitoring	30401	09:58	09:58	12	17	SW	95	100	no	2	Australian Shelduck, Australian Wood Duck, Grey Teal, Pacific Black Duck, Australian White Ibis, Masked Lapwing, Crested Pigeon		
10/04/2024	Monthly Brolga monitoring	29839	12:00	12:00	14	19	SW	72	100	yes	0	Australian Magpie, Nankeen Kestrel, Wedge-tailed Eagle		
10/04/2024	Monthly Brolga monitoring	32548	12:49	12:49	15	19	SW	68	100	no	0			
10/04/2024	Monthly Brolga monitoring	32565	13:23	13:23	16	20	SW	62	99	no	0			
10/04/2024	Monthly Brolga monitoring	32580	13:35	13:35	15.9	22	SW	61	100	no	3	Yellow-billed Spoonbill, Australian Shelduck, Grey Teal, Chestnut Teal, Pacific Black Duck, Hoary-headed Grebe, Masked Lapwing, Australian White Ibis, Australasian Shoveler		
10/04/2024	Monthly Brolga monitoring	29614	14:32	14:33	15.9	19	SSW	66	75	no	0			
10/04/2024	Monthly Brolga monitoring	30215	14:54	14:54	16.3	15	SW	58	80	no	0			

Survey date	Survey type	Wetland ID	Survey start time	Survey end time	Temp (C°)	Wind (km/h)	Wind direction	Humidity (%)	Cloud cover (%)	Rain	Water level	Bird species observed	Number of Brolga observed	Brolga Observation
10/04/2024	Monthly Brolga monitoring	29813	14:57	14:57	16.5	15	SW	58	80	no	0			
10/04/2024	Monthly Brolga monitoring	32674	09:50	09:50	13	13	SW	85	100	no	0			
10/04/2024	Monthly Brolga monitoring	32664	09:51	09:51	13	15	SW	85	100	no	2	Black Swan, Hoary-headed Grebe, Musk Duck, Masked Lapwing, Eurasian Coot, Little Pied Cormorant		
11/04/2024	Monthly Brolga monitoring	32667	10:24	10:24	14	11	SW	73	95	yes	2	Australian Shelduck, Welcome Swallow, Chestnut Teal, Grey Teal, Eurasian Coot, Hoary-headed Grebe, Australasian Shoveler, Whistling Kite, Galah, Wedge-tailed Eagle, Little Raven, Red-necked Stint		
15/04/2024	Targeted Flocking	32664	16:33	18:11	18.6	11	SSW	55	40	no	2	Australian Shelduck, Black Swan, Black-shouldered Kite, Brolga, Eurasian Coot, Grey Teal, Hoary-headed Grebe		4:37 pm. Flock of 21Brolga observed feeding in field north of Lake. 5:03 pm. 4 birds flew south to birds foraging closer to Lake. 5:23 pm. A pair flew from the more northerly of flock to others. 5:43 pm. Flock of birds moving towards Lake feeding.
16/04/2024	Targeted Flocking	32614	07:23	09:23	9.9	4	N	98	25	no	2	Australian Shelduck, Brolga, Black Swan, Black-shouldered Kite, Brown Falcon, Wedge-tailed Eagle, Whistling Kite, Little Pied Cormorant, Grey Teal, Eurasian Coot	4	8:00 am. 2 Brolga observed foraging in field. 8:15 am. 2 birds still feeding.
16/04/2024	Targeted Flocking	32614	16:23	18:03	17.7	13	SSW	64	40	no	2	Australian Shelduck, Black Swan, Black-shouldered Kite, Chestnut Teal, Eastern Great Egret, Grey Teal, Brolga	4	4:37 pm. 4 Brolga seen flying and feeding in field north of Lake. 4:43 pm. A flock of 11 Brolga feeding in area of field north of Lake. 5:03 pm. A flock of 37 Brolga oberved moving from edge of lake to field. 5:43 pm. Flock continues to feed in field next to Lake.
17/04/2024	Targeted Flocking	32614	07:18	09:43	10.9	6	S	100	100	yes	2	Australian Shelduck, Brolga, Black Swan, Grey Teal, Masked Lapwing		7:23 am. 2 Brolga flying north east from field adjacent to Lake. 8:15 am. A flock of 12 Brolga flew north east from field to other portion of Lake. 2 birds landed further north east, whilst 10 circled back to original location. The other pair returned. A total of 12 in one flock in field. 8:23 am. 5 bird flew into field to the east, feeding. A flock of 24 Brolga in the field location to the north of Lake. Flight movements between these two locations. 9:23 am. A flock of 5 birds flew to field with the other 22 birds. The Brolga foraging in field north of Lake.
17/04/2024	Targeted Flocking	30412	15:37	16:00	16.4	13	S	58	60	no	2	Brolga, Australian Shelduck, Grey Teal, Masked Lapwing	6	3:37 pm. A pair of Brolga feeding in field to the north of the Lake. 4:00 pm. A flock of 6 Brolga observed feeding in the field to the south of the Lake.
17/04/2024	Targeted Flocking	32614	16:31	18:03	15.1	15	S	58	90	no	2	Australian Shelduck, Black Swan, Grey Teal, Nankeen Kestrel, Wedge-tailed Eagle, Silver Gull, Whistling Kite, Brolga		5:00 pm. A Brolga observed feeding in field north of Lake.
18/04/2024	Targeted Flocking	32614	07:23	09:43	10.7	11	W	100	100	no	2	Australian Shelduck, Brolga, Masked Lapwing		7:23 am. 7 Brolga flying into field area between Lake Gellie and other lake north. Assumed that the flock of Brolga are utilising thr northerly lake. 7:37 am. A flock of 8 birds flew south closer to the north of Lake. 8:37 am. A flock of five of the Brolga moved closer to the northern part of Lake. 9:00 am. A pair moved further towards Lake. 3 birds foraging. 9:23 am. A flock of 10 Brolga foraging and moving around further north of the Lake. 9:27 am. A flock of 16 Brolga feeding in field north of Lake area.
18/04/2024	Targeted Flocking	32628	07:33	09:43	10.7	11	W	100	100	no	2	Australian Shelduck, Brolga, Grey Teal, Silver Gull, White-faced Heron, Pacific Black Duck, Little Pied Cormorant, Eastern Great Egret, Black Swan, Chestnut Teal	2	7:33 am. A flock of 5 Brolga and another pair flew into the field area between Lake Gellie and this wetland. Assumed to be closer to be utilsing this wetland. 7:37 am. A flock of 8 birds in the same area flying further south towards Lake Gellie as another bird observed flying in.
14/05/2024	Monthly Brolga monitoring	32614	13:16	13:24	13.2	7	SW	63	90	no	3	Australian Shelduck, Australian Raven, Nankeen Kestrel, Masked Lapwing, Willie Wagtail, Eurasian Skylark, Magpie-lark		

Survey date	Survey type	Wetland ID	Survey start time	Survey end time	Temp (C°)	Wind (km/h)	Wind direction	Humidity (%)	Cloud cover (%)	Rain	Water level	Bird species observed	Number of Brolga observed	Brolga Observation
14/05/2024	Monthly Brolga monitoring	32671	13:32	13:34	13.4	11	WSW	58	90	no	3	Grey Teal, Australian Shelduck		
14/05/2024	Monthly Brolga monitoring	32667	13:52	13:55	13.6	13	WSW	58	90	no	3	Musk Duck, Black Swan, Little Pied Cormorant, Chestnut Teal, Hoary-headed Grebe, Pacific Black Duck		
14/05/2024	Monthly Brolga monitoring	32664	14:16	14:19	13.6	13	WSW	56	95	no	3	Black Swan, Musk Duck, Pacific Black Duck		
14/05/2024	Monthly Brolga monitoring	32674	14:22	14:23	13.6	13	WSW	57	95	no	0			
14/05/2024	Monthly Brolga monitoring	30412	14:41	14:44	13.8	13	WSW	57	98	no	3	Straw-necked Ibis, Whistling Kite, Grey Teal, Brolga	6	Brolga pair;6 Adults
14/05/2024	Monthly Brolga monitoring	29773	14:57	15:01	13.7	13	WSW	57	90	no	3	Australian Shelduck, Hoary-headed Grebe, Masked Lapwing, Black Swan, Eurasian Coot		
14/05/2024	Monthly Brolga monitoring	29711	15:05		13.8	13	WSW	57	90	no	3	Australian Shelduck, Australasian Shoveler, Straw-necked Ibis, Masked Lapwing, Grey Teal		
14/05/2024	Monthly Brolga monitoring	29587	15:18	15:23	13.7	13	WSW	57	90	no	0			
14/05/2024	Monthly Brolga monitoring	29614	15:57		14	7	SW	64	90	no	0			
15/05/2024	Monthly Brolga monitoring	30401	10:53	11:00	14.6	15	WNW	58	10	no	3	Brolga, Australian Shelduck, Australian Wood Duck, Little Pied Cormorant, Masked Lapwing, Brown Falcon, Black Falcon	2	2 birds feeding in field adjacent to lake.
15/05/2024	Monthly Brolga monitoring	29627	11:17	11:17							0			
15/05/2024	Monthly Brolga monitoring	29813	11:32	11:32							0			
15/05/2024	Monthly Brolga monitoring	30215	11:33	11:35	14.8	15	WSW	56	10	no	0			
15/05/2024	Monthly Brolga monitoring	29753	11:40	11:44	14.8	15	WNW	63	10	no	0	Red Wattlebird, Little Raven, Australian Magpie		
15/05/2024	Monthly Brolga monitoring	29839	12:11	12:13	15.5	15	W	57	10	no	0			
15/05/2024	Monthly Brolga monitoring	32400	13:05	13:06	15.6	15	W	53	10	no	3	Little Raven, Straw-necked Ibis, Wedge-tailed Eagle		
15/05/2024	Monthly Brolga monitoring	32580	13:41	13:49	16.1	15	W	53	10	no	3	Black-winged Stilt, Hoary-headed Grebe, Masked Lapwing, Grey Teal, Brolga	2	A pair of Brolga on the other side of lake.
15/05/2024	Monthly Brolga monitoring	32565	13:55	13:56	16.4	15	W	53	10	no	0	Masked Lapwing		
15/05/2024	Monthly Brolga monitoring	32628	14:56	14:58	16.4	15	W	51	5	no	3	Black Swan, Little Pied Cormorant, Australian Shelduck		
16/05/2024	Monthly Brolga monitoring	32400	10:49	10:55	15.6	9	NNW	79	5	no	3	Brolga	46	
20/05/2024	Targeted Flocking	32400	13:10	13:21	6.6	11	SW	66	40	no	3	Australian Shelduck, Brolga	43	43 brolga foraging around wetland
20/05/2024	Targeted Flocking	30412	14:02	14:02	13	14	SSE	74	70	no	3	Australian Shelduck, Brolga, Little Raven	8	
18/06/2024	Monthly Brolga monitoring	32400	13:30	13:34	10	7	SSE	54	5	no	2		2	Brolga standing in plowed paddock
18/06/2024	Monthly Brolga monitoring	30401	14:55	14:01	10	7	SSE	54	2	no	3	Australian Shelduck, Pacific Black Duck, Australian White Ibis, Masked Lapwing, Grey Teal		
18/06/2024	Monthly Brolga monitoring	29627	15:18	15:21	10.8	11	NE	52	2	no	0			
18/06/2024	Monthly Brolga monitoring	32548	16:09	16:11	10.6	2	E	52	10	no	0			
19/06/2024	Monthly Brolga monitoring	30412	09:10	09:20	0.5	2	NNE	93	5	no	3	Brolga, Black Swan, Masked Lapwing, Black-winged Stilt, Australian Shelduck	18	18 brolga foraging in pasture next to wetland
18/06/2024	Monthly Brolga monitoring	32558	09:25	09:27	1.5	6	NNE	91	5	no	0			
19/06/2024	Monthly Brolga monitoring	29773	09:35	09:40	2.9	4	NNE	88	5	no	3	Black Swan, Chestnut Teal, Grey Teal, Eurasian Coot, Pacific Black Duck, Hoary-headed Grebe		
18/06/2024	Monthly Brolga monitoring	29711	09:42	09:47	2.9	4	NNE	88	5	no	3	Australasian Shoveler, Masked Lapwing, Australian Shelduck, Grey Teal, Pacific Black Duck		
18/06/2024	Monthly Brolga monitoring	29587	09:50	09:52	4	6	ENE	84	8	no	0			
19/06/2024	Monthly Brolga monitoring	29614	10:00	10:03	5.3	7	NE	81	10	no	0			
19/06/2024	Monthly Brolga monitoring	32565	10:24	10:26	7	6	NNE	76	10	no	0			
19/06/2024	Monthly Brolga monitoring	32580	10:34	10:38	7.5	9	NNE	73	10	no	3	Grey Teal, Chestnut Teal, Hoary-headed Grebe, Masked Lapwing		
19/06/2024	Monthly Brolga monitoring	32542	11:04	11:09	9.6	7	NNE	65	10	no	0	Brolga, Masked Lapwing	2	2 brolga foraging in dry wetland
19/06/2024	Monthly Brolga monitoring	32632	12:04	12:06	11.2	11	N	59	5	no	2	Eurasian Coot, Hoary-headed Grebe, Nankeen Kestrel		
19/06/2024	Monthly Brolga monitoring	29753	13:43	13:45	11.8	19	ENE	56	15	no	0			
19/06/2024	Monthly Brolga monitoring	29813	13:56	13:59	11.7	15	NNE	56	20	no	0	Brolga	2	2 adult brolga foraging in pasture
19/06/2024	Monthly Brolga monitoring	29857	14:51	14:51	11.3	15	N	60	30	no	0			

Survey date	Survey type	Wetland ID	Survey start time	Survey end time	Temp (C°)	Wind (km/h)	Wind direction	Humidity (%)	Cloud cover (%)	Rain	Water level	Bird species observed	Number of Brolga observed	Brolga Observation
19/06/2024	Monthly Brolga monitoring	32667	12:31	12:43	11.3	11	NNW	57	15	no	2	Grey Teal, Hoary-headed Grebe, Chestnut Teal, Welcome Swallow, Black Swan, Eurasian Coot, Musk Duck, Red-capped Plover		
19/06/2024	Monthly Brolga monitoring	32614	12:53		11.2	7	N	57	15	no	2	Australian Shelduck, Grey Teal, Eastern Great Egret, Masked Lapwing, Eurasian Coot		
19/06/2024	Monthly Brolga monitoring	32628	13:09	13:15	11.6	7	N	56	25	no	2	Little Pied Cormorant, Hoary-headed Grebe, Black Swan, Musk Duck, Eurasian Coot		
19/06/2024	Monthly Brolga monitoring	32664	13:25	13:31	11.9	7	N	56	15	no	2	Eurasian Coot, Black Swan		
19/06/2024	Monthly Brolga monitoring	30215	13:57	14:01	11.7	15	NNW	56	15	no	0	Eurasian Skylark		
24/06/2024	Targeted Flocking	30412	12:20	12:40	11	35	NE	58	60	no	2	Australasian Swamphen, Australian Shelduck, Australian White Ibis, Brolga, Eurasian Coot, Grey Teal, Masked Lapwing, Nankeen Kestrel, Straw-necked Ibis	21	Feeding on edge of wetland
26/06/2024	Targeted Flocking	32558	09:16	09:16	7.4	17	19	90	2	no	0	Brolga	3	3 Brolga. 2 dancing
26/06/2024	Targeted Flocking	30412	07:35	08:58	7	15	NW	100	15	no	2	Australian Shelduck, Grey Teal, Masked Lapwing, Brolga	21	4 brolga feeding in pasture ;8 brolga foraging in field ;8 birds flying to meet 10 birds already in wetland.
26/06/2024	Targeted Flocking	32664	08:59	09:07	6	8	NNE	100	12	no	2	Australian Shelduck, Black Swan, Brolga, Eurasian Coot, Grey Teal, Hoary-headed Grebe	2	
26/06/2024	Targeted Flocking	32400	08:24	08:55	6	3	NNE	100	10	no	2	Australian White Ibis, Australian Shelduck, Silver Gull		
24/06/2024	Targeted Flocking	32400	16:50	17:43	10	32	N	58	70	no	2	Australian White Ibis, Masked Lapwing, Brolga		
16/07/2024	Monthly Brolga monitoring	30412	12:44	12:59	11.6	26	SSW	89	99	yes	3	Masked Lapwing, Australian Shelduck, Brolga, Eurasian Coot	8	Foraging along edge of wetland
16/07/2024	Monthly Brolga monitoring	32558	13:22	13:25	11.6	26	SSW	92	90	no	0			
16/07/2024	Monthly Brolga monitoring	32664	13:36	13:41	11.8	26	SSW	92	98	no	2	Black Swan, Eurasian Coot, Musk Duck, Hoary-headed Grebe		
16/07/2024	Monthly Brolga monitoring	32674	13:33	13:35	11.8	26	SSW	92	95	no	0			
16/07/2024	Monthly Brolga monitoring	29813	14:38	14:42	12.1	26	SSW	89	100	yes	0			
16/07/2024	Monthly Brolga monitoring	29753	14:47	14:51	11.8	26	SSW	93	100	no	0			
16/07/2024	Monthly Brolga monitoring	29711	15:33	15:36	11.4	24	SSW	92	100	yes	2			
17/07/2024	Monthly Brolga monitoring	32565	10:52		10.7	17	S	92	98	yes	0			
17/07/2024	Monthly Brolga monitoring	29627	13:25	13:36	11.7	22	SSW	100	80	yes	0			
17/07/2024	Monthly Brolga monitoring	32667	15:40	15:48	10.3	20	SSW	89	80	no	2	Black Swan, Eurasian Coot, Grey Teal, Hoary-headed Grebe, Musk Duck		
16/07/2024	Monthly Brolga monitoring	32614	14:03	14:07	11.9	26	SSW	92	100	yes	2	Australian White Ibis		
16/07/2024	Monthly Brolga monitoring	32400	14:03	14:09	11.9	26	SSW	92	100	yes	2			
16/07/2024	Monthly Brolga monitoring	32632	14:17	14:21	12.4	22	SSW	90	100	yes	2	Eurasian Coot		
16/07/2024	Monthly Brolga monitoring	30215	14:43	14:45	12	22	SSW	100	100	yes	0	Grey Teal		
16/07/2024	Monthly Brolga monitoring	29614	15:09	15:13	11.7	28	SSW	93	90	yes	1	Little Raven, Masked Lapwing		
16/07/2024	Monthly Brolga monitoring	29773	15:27	15:31	11.4	30	SSW	90	100	yes	3	Eurasian Coot, Black Swan		
16/07/2024	Monthly Brolga monitoring	29587	15:43	15:45	11.7	22	SSW	90	100	yes	0			
17/07/2024	Monthly Brolga monitoring	32580	11:07	11:09	10.7	17	S	91	70	no	3	Masked Lapwing, Grey Teal		
17/07/2024	Monthly Brolga monitoring	32542	11:37	11:39	11.2	15	SSW	89	80	yes	0	Masked Lapwing, Brolga	2	2 brolga standing in dry lake
17/07/2024	Monthly Brolga monitoring	29857	12:01	12:03	11.8	15	S	89	80	yes	0			
17/07/2024		30401	12:53	13:07	10.8	24	S	91	90	no	3	Brolga, Australian Shelduck, Yellow-billed Spoonbill, Grey Teal, Pacific Black Duck, Masked Lapwing, Silver Gull, Little Pied Cormorant, Chestnut Teal	2	A pair of Brolga observed feeding in field adjacent to the lake. Flew north when approached..
17/07/2024	Monthly Brolga monitoring	29839	14:37	14:43	10.7	20	SSW	94	50	no	0	Masked Lapwing, Grey Teal, Australian Wood Duck, Pacific Black Duck, Yellow-rumped Thornbill		
17/07/2024	Monthly Brolga monitoring	32548	15:17	15:19	10.8	26	SSW	87	80	no	0			
17/07/2024	Monthly Brolga monitoring	32614	15:51	15:53	10.4	20	SSW	89	80	no	3	Grey Teal, Chestnut Teal, Eurasian Coot, Masked Lapwing		
17/07/2024	Monthly Brolga monitoring	30412	16:17	16:21	10	30	SSW	86	80	no	2	Brolga, Yellow-billed Spoonbill, Eurasian Coot, Australian Shelduck, Swamp Harrier	15	15 brolga foraging on edge of wetland

Survey date	Survey type	Wetland ID	Survey start time	Survey end time	Temp (C°)	Wind (km/h)	Wind direction	Humidity (%)	Cloud cover (%)	Rain	Water level	Bird species observed	Number of Brolga observed	Brolga Observation
23/07/2024	Targeted Breeding	30412	14:43	18:03	14.9	33	NNE	53	50	no	2	Brolga, Australian Shelduck, Grey Teal, Masked Lapwing, Silver Gull, Swamp Harrier, Australian White Ibis	12	12 brolga foraging on edge of wetland ;2 additional brolga - 14 total now
24/07/2024	Targeted Flocking	30412	07:45	10:39	7.3	22	N	73	40	no	2	Brolga, Australian Shelduck, Grey Teal, Swamp Harrier, Masked Lapwing, Black Swan	21	Foraging in pasture next to wetland ;A pair flew into field.;Brolga flock observed in field.;A pair in the field.;Foraging in pasture ;4 birds observed in field.
24/07/2024	Targeted Flocking	30412	07:45	10:51	7.3	22	N	73	40	no	2	Brolga, Australian Shelduck, Grey Teal, Swamp Harrier, Masked Lapwing, Black Swan	21	Foraging in pasture next to wetland ;A pair flew into field.;Brolga flock observed in field.;A pair in the field.;Foraging in pasture ;4 birds observed in field.
24/07/2024	Targeted Flocking	30412	16:09	18:03	13.7	32	NNE	62	40	no	2	Brolga, Grey Teal, Black Swan, Australian Shelduck, Masked Lapwing	21	Foraging in pasture next to wetland ;A pair flew into field.;Brolga flock observed in field.;A pair in the field.;Foraging in pasture ;4 birds observed in field.
25/07/2024	Targeted Flocking	30412	07:43	10:15	8.1	9	NW	100	90	no	2	Brolga, Grey Teal, Australian Shelduck, Swamp Harrier, Black Swan	22	A flock of 4 Brolga feeding adjacent to lake.;A flock of 22 observed in the lake.;A flock of 21 birds feeding in field adjacent to lake.;A pair of Brolga foraging in field.;A pair in the field.;8 Brolga feeding in lake.
25/07/2024	Targeted Flocking	30412	16:15	18:03	13.3	26	NW	58	20	no	2	Brolga, Australian Shelduck, Black Swan, Grey Teal, Masked Lapwing, Pacific Black Duck, Silver Gull, Whistling Kite	22	A flock of 4 Brolga feeding adjacent to lake.;A flock of 22 observed in the lake.;A flock of 21 birds feeding in field adjacent to lake.;A pair of Brolga foraging in field.;A pair in the field.;8 Brolga feeding in lake.
26/07/2024	Targeted Flocking	30412	07:41	09:43	6.9	24	NNE	93	5	no	2	Brolga, Australian Shelduck, Grey Teal, Masked Lapwing, Pacific Black Duck, Black Swan	22	2 Brolga observed feeding in the field.;A flock of 22 feeding in field.
21/08/2024	Monthly Brolga monitoring	30412	11:21	11:49	13.9	22	WNW	81	25	no	2	Australian White Ibis, Australian Shelduck, Australian Magpie, Black Swan, Brown Falcon, Grey Teal, Pacific Black Duck, Galah, Straw-necked Ibis, Masked Lapwing, Whistling Kite, Long-billed Corella		
21/08/2024	Monthly Brolga monitoring	32558	11:51	12:05	14.8	19	WNW	75	25	no	0	Brown Falcon, Australian Magpie, Yellow-rumped Thornbill		
21/08/2024	Monthly Brolga monitoring	29773	12:15	12:25	15.4	20	WNW	76	50	no	2	Black Swan, Pacific Black Duck, Silver Gull, Australian Pipit, Whistling Kite, Nankeen Kestrel		
21/08/2024	Monthly Brolga monitoring	29711	12:35	12:41	15.1	24	WNW	74	50	no	2	Grey Teal, Little Raven, Common Starling, Australian Pipit, Nankeen Kestrel		
21/08/2024	Monthly Brolga monitoring	29711	12:49	12:55	15	26	WNW	69	40	no	1	Pacific Black Duck, Masked Lapwing, Australian Wood Duck, Australian Magpie, Magpie-lark		
21/08/2024	Monthly Brolga monitoring	29614	13:35	13:49	15.9	26	WNW	65	50	no	2	Pacific Black Duck, Grey Teal, Masked Lapwing		
21/08/2024	Monthly Brolga monitoring	32400	14:09	14:21	15.5	22	WNW	65	90	no	2	Brolga, Black Swan, Eurasian Skylark	4	Four Brolga observed in field.
21/08/2024	Monthly Brolga monitoring	29753	14:41	14:45	14.8	22	NW	65	100	yes	1	Australian Magpie, Eurasian Skylark, Superb Fairy-wren		
21/08/2024	Monthly Brolga monitoring	30215	14:49	14:53	14.6	13	W	67	100	yes	1	Australian Shelduck, Australian Magpie		
21/08/2024	Monthly Brolga monitoring	29813	14:55	14:59	12.9	17	W	81	90	no	0	Australian Magpie, Eurasian Skylark		
21/08/2024	Monthly Brolga monitoring	32667	15:55	16:05	13.6	13	WNW	80	100	yes	2	Black Swan, Chestnut Teal, Eastern Rosella, Grey Teal, Hardhead, Hoary-headed Grebe, Little Raven, Masked Lapwing, Musk Duck, Pacific Black Duck, White-faced Heron, Willie Wagtail, Eurasian Coot, White-fronted Chat		
22/08/2024	Monthly Brolga monitoring	32580	09:53	10:07	12.5	20	NW	76	60	no	2	Australian Pipit, Black-winged Stilt, Brown Falcon, Grey Teal, Masked Lapwing, Pacific Black Duck, Little Raven, Australian White Ibis, Australian Shelduck, Australasian Swamphen, Red-necked Avocet		
22/08/2024	Monthly Brolga monitoring	32565	10:09	10:31	13.6	19	WNW	73	60	no	0	Masked Lapwing, Nankeen Kestrel, White-fronted Chat		
22/08/2024	Monthly Brolga monitoring	32542	10:49	10:53	13.1	19	WNW	69	30	no	0	Masked Lapwing, Little Raven, Yellow-rumped Thornbill		
22/08/2024	Monthly Brolga monitoring	29627	12:09	12:19	14.3	22	WNW	63	70	no	0	Galah, Black-shouldered Kite, Eastern Rosella, Barn Owl, Long-billed Corella		
22/08/2024	Monthly Brolga monitoring	30401	13:19		14.7	20	W	63	60	no	2	Australian Shelduck, Grey Teal, Galah, Little Pied Cormorant, Masked Lapwing, Pacific Black Duck, Wedge-tailed Eagle, European Goldfinch, Australian Magpie, Australian Wood Duck		

Survey date	Survey type	Wetland ID	Survey start time	Survey end time	Temp (C°)	Wind (km/h)	Wind direction	Humidity (%)	Cloud cover (%)	Rain	Water level	Bird species observed	Number of Brolga observed	Brolga Observation
22/08/2024	Monthly Brolga monitoring	30401	13:19	13:23	14.7	20	W	63	60	no	2	Australian Shelduck, Grey Teal, Galah, Little Pied Cormorant, Masked Lapwing, Pacific Black Duck, Wedge-tailed Eagle, European Goldfinch, Australian Magpie, Australian Wood Duck		
22/08/2024	Monthly Brolga monitoring	30212	13:31		14.8	24	WNW	63	60	no	1	Brolga	2	Two Brolga feeding in drainage line
22/08/2024	Targeted Flocking	30212	13:31	13:41	14.8	24	WNW	63	60	no	1	Brolga	2	Two Brolga feeding in drainage line
22/08/2024	Monthly Brolga monitoring	29839	14:37	14:41	15.2	17	WNW	60	25	no	1	Willie Wagtail, Yellow-rumped Thornbill, Red-rumped Parrot		
23/08/2024	Monthly Brolga monitoring	32664	09:31	09:45	11.7	22	N	86	70	no	2	Black Swan, Hoary-headed Grebe, Masked Lapwing, Musk Duck, Whistling Kite, Willie Wagtail, Australasian Shoveler, Eurasian Coot		
23/08/2024	Monthly Brolga monitoring	32548	12:01	12:09	13.8	20	N	73	100	no	0	Eurasian Skylark		
16/09/2024	Monthly Brolga monitoring	29773	13:19	13:23	10.7	15	SW	89	90	no	3	Brolga, Black Swan	2	Standing in pasture
16/09/2024	Monthly Brolga monitoring	29711	13:31	13:35	11.2	20	SW	80	90	yes	3	Masked Lapwing, Pacific Black Duck, Eurasian Coot		
16/09/2024	Monthly Brolga monitoring	32558	14:01	14:05	11.7	19	WSW	81	90	no	0	Australian Wood Duck, Brolga	2	Walking in paddock
16/09/2024	Monthly Brolga monitoring	32674	14:19	14:21	11.8	24	SW	89	90	no	0			
16/09/2024	Monthly Brolga monitoring	29813	15:15	15:19	11.2	15	SW	87	70	no	0			
16/09/2024	Monthly Brolga monitoring	32667	16:09	16:15	10.9	20	SW	85	70	yes	3	Australian Shelduck, Black Swan, Chestnut Teal, Grey Teal, Hoary-headed Grebe, Pacific Black Duck, Willie Wagtail, Australasian Swamphen, Eurasian Coot, Magpie-lark, Red-capped Plover		
17/09/2024	Monthly Brolga monitoring	32542	12:41	12:43	11.7	15	W	64	70	no	0	Brolga	2	Foraging in dry wetland
17/09/2024	Monthly Brolga monitoring	32580	13:19	13:23	11.9	22	W	59	70	no	3	Masked Lapwing, Grey Teal, Australian White Ibis, Straw-necked Ibis, Little Pied Cormorant, Australasian Swamphen		
16/09/2024	Monthly Brolga monitoring	29587	13:39		11.2	20	S	80	100	yes	1	Brolga, Australian Wood Duck, Pacific Black Duck	2	Foraging on edge of wetland
16/09/2024	Monthly Brolga monitoring	30412	13:50	13:55	11.7	19	WSW	81	90	no	3	Australasian Swamphen		
16/09/2024	Monthly Brolga monitoring	32664	14:18	14:32	11.8	24	SW	89	95	no	2	Australasian Shoveler, Black Swan, Brolga, Eurasian Coot, Hoary-headed Grebe, Musk Duck, Australian White Ibis, Straw-necked Ibis, Grey Teal, Chestnut Teal	1	1 brolga standing on edge of wetland
16/09/2024	Monthly Brolga monitoring	30215	15:13	15:16	11.2	15	SW	87	90	no	0			
16/09/2024	Monthly Brolga monitoring	29753	15:25	15:30	11.2	20	SW	82	98	yes	0			
16/09/2024	Monthly Brolga monitoring	32614	15:40	15:43	12.1	22	SW	79		yes	2	Australian White Ibis, Eastern Great Egret		
16/09/2024	Monthly Brolga monitoring	32400	15:44	15:47	12	22	SW	89		yes	3	Australian White Ibis		
17/09/2024	Monthly Brolga monitoring	30401	10:20	10:24	9.5	17	NW	69	98	no	2	Australian Shelduck, Pacific Black Duck, Australian Wood Duck, Yellow-billed Spoonbill, Masked Lapwing, Little Pied Cormorant, Black Swan		
17/09/2024	Monthly Brolga monitoring	29627	10:49	10:51	9.2	13	W	64	90	no	0	Australian Magpie		
17/09/2024	Monthly Brolga monitoring	29839	11:36	11:39	10.2	17	W	64	75	no	0	Eurasian Skylark		
17/09/2024	Monthly Brolga monitoring	32565	13:00	13:08	11.5	19	WSW	63	50	no	0	Little Raven, Masked Lapwing		
17/09/2024	Monthly Brolga monitoring	29614	14:10	14:13	13.2	15	W	56	50	no	2	Grey Teal, Eurasian Coot		
17/09/2024	Monthly Brolga monitoring	32548	14:38	14:40	13.4	15	W	57	40	no	0	Brolga, Wedge-tailed Eagle, Brown Falcon, Eurasian Skylark	2	A pair observed on wetland.
17/09/2024	Monthly Brolga monitoring	29864	15:00	15:05	13.3	15	WSW	53	40	no	2	Black-winged Stilt, Chestnut Teal, Grey Teal, Masked Lapwing, White-fronted Chat		
17/09/2024	Monthly Brolga monitoring	29857	15:07	15:09	13.3	15	WSW	57	40	no	0	Australian Magpie, Straw-necked Ibis		
14/10/2024	Monthly Brolga monitoring	32664	14:21	14:39	18.1	19	SE	62	70	no	2	Australasian Shoveler, Brolga, Grey Teal, White-faced Heron, Hoary-headed Grebe, Black Swan, Eurasian Coot, Whiskered Tern		A pair of Brolga flying over lake.
14/10/2024	Monthly Brolga monitoring	30215	14:59	15:01	17.9	19	ESE	64	50	no	0			
14/10/2024	Monthly Brolga monitoring	32400	15:15	15:19	19.4	19	E	58	40	no	2			
14/10/2024	Monthly Brolga monitoring	29857	15:37	15:39	19.3	17	ESE	58	58	no	0			
14/10/2024	Monthly Brolga monitoring	29773	13:05	13:12	16.4	17	ESE	71	100	no	3	Black Swan, Eurasian Coot, Hoary-headed Grebe		
14/10/2024	Monthly Brolga monitoring	29711	13:19	13:26	16.8	20	E	71	100	no	2	Grey Teal, Masked Lapwing, Pacific Black Duck, Red-necked Avocet		
14/10/2024	Monthly Brolga monitoring	29587	13:29	13:32	16.8	17	ESE	71	98	no	1	Masked Lapwing, White-faced Heron		

Survey date	Survey type	Wetland ID	Survey start time	Survey end time	Temp (C°)	Wind (km/h)	Wind direction	Humidity (%)	Cloud cover (%)	Rain	Water level	Bird species observed	Number of Brolga observed	Brolga Observation
14/10/2024	Monthly Brolga monitoring	30412	13:43	13:48	17.4	19	ESE	68	90	no	2	Australasian Swamphen, Grey Teal, Pacific Black Duck		
14/10/2024	Monthly Brolga monitoring	32558	13:52	13:58	17.1	19	ESE	67	85	no	0	Brolga, Australian Shelduck	2	2 brolga walking in dry wetland. One brolga loafing as we watched
14/10/2024	Monthly Brolga monitoring	32674	14:17	14:19	17.8	19	ESE	64	80	no	0			
14/10/2024	Monthly Brolga monitoring	29753	14:48	14:52	17.9	19	ESE	62	80	no	0	Brown Falcon		
14/10/2024	Monthly Brolga monitoring	29813	14:58	15:00	17.9	19	ESE	64	70	no	0			
14/10/2024	Monthly Brolga monitoring	29864	15:26	15:35	18.1	15	ESE	62	60	no	2	Black-winged Stilt, Chestnut Teal, Grey Teal, Masked Lapwing, Pacific Black Duck, Sharp-tailed Sandpiper, Willie Wagtail		
15/10/2024	Monthly Brolga monitoring	32580	12:01	12:03	23.7	19	NNW	48	50	no	3	Black-winged Stilt, Grey Teal, Chestnut Teal		
15/10/2024	Monthly Brolga monitoring	32542	12:19	12:21	24.3	13	NW	45	60	no	0			
15/10/2024	Monthly Brolga monitoring	32548	12:49	12:51	24.6	17	NW	46	70	no	0			
15/10/2024	Monthly Brolga monitoring	32667	13:25	13:43	23.4	19	NW	46	70	no	2	Chestnut Teal, Grey Teal, Hoary-headed Grebe, Pacific Black Duck, Musk Duck, Sharp-tailed Sandpiper, Black Swan, Eurasian Coot, Little Raven, Masked Lapwing, Little Pied Cormorant, Hardhead, Whiskered Tern		
16/10/2024	Monthly Brolga monitoring	30412	09:09	09:15	17.1	7	NNE	85	25	no	2	Brolga, Masked Lapwing, Australasian Swamphen	2	2 brolga standing in open pasture
14/10/2024	Monthly Brolga monitoring	30401	08:53	08:00	18.1	15	N	65	50	no	2	Pink-eared Duck, Pacific Black Duck, Masked Lapwing, Grey Teal, Australian Wood Duck, Silver Gull		
14/10/2024	Monthly Brolga monitoring	29627	09:21	09:27	20.4	20	NNE	57	40	no	0	Australian Magpie, Australian Pipit, Noisy Miner, Little Raven, Magpie-lark, Eurasian Skylark		
15/10/2024	Monthly Brolga monitoring	29839	10:14	10:19	21.9	15	NNE	51	60	no	0			
15/10/2024	Monthly Brolga monitoring	32565	10:51	10:59	23.7	19	NNW	48	90	no	0	Little Raven, Australian Magpie, Eurasian Skylark		
15/10/2024	Monthly Brolga monitoring	32614	12:48	12:55	24.7	13	NNW	46	90	no	2	Black Swan, Musk Duck, Grey Teal, Chestnut Teal, Hoary-headed Grebe, Eurasian Coot, Pink-eared Duck, Whiskered Tern, Australian Gull-billed Tern		
15/10/2024	Monthly Brolga monitoring	29614	13:28	13:31	23.1	17	NNE	45	100	no	0			

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