

Wind Farm in Scott River

Preliminary Bird and Bat Adaptive Management Plan

Synergy Renewable Energy Developments Pty Ltd

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Abbreviations

Abbreviation	Description
ASS	Acid Sulfate Soil
BACI	Before-After Control-Impact
BBAMP	Bird and Bat Adaptive Management Plan
BBRAS	Bird and Bat Risk Assessment Survey
BC Act	*Biodiversity Conservation Act 2016*
BIA	Bird/Bat Investigation Area
BUS	Bird Utilisation Surveys
CASA	Air Services Australia and Civil Aviation Safety Authority
CR	Critically Endangered
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EAAF	East Asian-Australasian Flyway
EN	Endangered
EP Act	*Environmental Protection Act 1986*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
MI	Migratory
NR	Not Recorded
OS	Other Specially Protected
P	Priority
PD Act	*Planning and Development Act 2005*
Phoenix	Phoenix Environmental Sciences
RSA	Rotor Swept Area
SynergyRED	Synergy Renewable Energy Developments Pty Ltd
VU	Vulnerable
WA	Western Australia

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1. Introduction

1.1. Background

The Wind Farm in Scott River (the Proposal) is located approximately 15 km northeast of Augusta, in the South West of Western Australia (WA), approximately 250 km south of Perth. The Proposal, which will include the construction and operation of up to 20 wind turbines, is part of an initiative by Synergy Renewable Energy Developments Pty Ltd (SynergyRED) to explore, scope and develop a range of renewable energy assets across WA, to meet the State Government's 2030 decarbonisation targets. The wind turbines will have a maximum height of 250 m, with an expected rotor swept area (RSA) of a minimum of 40 m above ground level to a maximum of 250 m above ground level.

1.2. Purpose & Objectives

This Preliminary Bird and Bat Adaptive Management Plan (BBAMP) has been prepared in accordance with the draft *Onshore Wind Farm Guidance Best practice approaches when seeking approval under Australia's national environment law* (DCCEEW 2024) to support applications and development under the:

- *Environmental Protection Act 198*6 (EP Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- *Planning and Development Act 2005* (PD Act).

The overall aim of this BBAMP is to provide a program for monitoring potential impacts of the Proposal on birds and bats and to detail a strategy for managing and mitigating any significant bird and bat impacts arising from the operation of the Proposal. The specific objectives of this BBAMP include:

- To provide baseline data on bird and bat populations that could potentially be affected by the development of the Proposal, particularly Threatened, Migratory and at-risk species
- To implement a monitoring program capable of detecting significant changes to the populations of birds and bats
- To directly record impacts on birds and bats through a robust carcass monitoring program
- To define impact trigger levels and document an agreed investigative process that outlines the specific actions to be taken in order to confirm any identified impacts on birds and bats
- To detail specific mitigation measures and related implementation strategies to mitigate any confirmed significant impacts on birds and bats
- To detail reporting requirements and the provision of data to relevant statutory authorities.

This BBAMP takes an adaptive management approach to allow for flexibility in all components of this plan, in response to monitoring findings and/or as more relevant information becomes available and experience is gained through ongoing research and monitoring of relevant bird and bat species and their populations. This is particularly important for monitoring and managing bird and bat impacts from Australian wind farms, as the majority of published works are from overseas.

1.3. Qualifications and Experience

This BBAMP has been developed with input from a suitably qualified ecologist, Tomas Kelly (CV provided in Appendix A), in accordance with the draft Onshore Wind Farm Guidance Best practice approaches

when seeking approval under Australia's national environment law (DCCEEW 2024). Tomas Kelly (Associate Ecologist) has over seven years' experience undertaking baseline bird and bat survey and assessment for wind energy Proposals and has worked on the development and implementation of BBAMPs for wind farms in WA, New South Wales and Queensland.

In addition, the risk assessment approach and initial risk levels for potential species of concern detailed within this BBAMP were based on the Bird and Bat Risk Assessment Survey (BBRAS) that was prepared by suitably qualified ecologists with relevant qualifications from Phoenix Environmental Sciences (Phoenix 2025a; Appendix B).

1.4. Study Area

The Proponent is proposing to construct and operate the Proposal within a 3,597 ha Development Envelope with an Indicative Disturbance Footprint of 107 ha (Figure 1-1), of which 1 ha of native vegetation is expected to be cleared. The Development Envelope is generally zoned as general agricultural and is situated across number freehold land and crown reserves.

The Development Envelope is primarily cleared for agricultural use (2,476.41 ha; 81%), with interspaced patches of remnant vegetation. Most (80%) remnant vegetation within the Development Envelope is in Completely Degraded to Degraded condition, based on the Keighery (1994) vegetation scale (Phoenix 2025b).

The Proposal occurs in proximity to several Department of Biodiversity, Conservation and Attractions (DBCA) managed lands with the closest being Scott National Park (adjacent to the Development Envelope), South Blackwood State Forest (approximately 300 m to the Development Envelope), Pagett Nature Reserve (approximately 30 m to the Development Envelope), Unnamed Nature Reserve (WA42942, approximately 1 km to the Development Envelope) and an un-named Nature Reserve (WA42377) that has been excised from the Development Envelope (Figure 1-1).

Several minor waterways intersect the Development Envelope. These typically flow towards the Blackwood River which is located approximately 3.8 km west of the Development Envelope, with some flowing south-east towards the Scott River, approximately 1 km to the south. The Scott River acts as a tributary to the Blackwood River and the confluence of the rivers is located approximately 5.4 km south-west of the Development Envelope (Figure 1-1).

Three wetland habitats have been mapped within the Development Envelope and include a mix of seasonally inundated Paperbark woodlands, shrublands and sedgelands, which are patchily distributed and collectively cover 317.55 ha (9.94%) of the Development Envelope (Phoenix 2025c). The wetlands are mostly ephemeral and shallow, with water levels of typically less than 1 m.

1.5. Key Proposal Terminology

The Proposal: Includes the construction and operation of up to 20 wind turbines and associated infrastructure and activities.

Development Envelope: Refers to the area where all Proposal activities will occur. This includes land parcels where consent has been granted for the development of the Proposal and is a total area of 3,597 ha.

Indicative Disturbance Footprint: Refers to the maximum area of land that will be disturbed for the Proposal within the Development Envelope (107 ha). It is based on the largest possible layout and has been used to calculate the maximum area of native vegetation clearing (1 ha of remnant native vegetation). Considering the maximum potential area in the impact assessment process ensures that the impacts to vegetation and habitat have been conservatively assessed.

The final design and placement of turbine infrastructure (including the number and height of turbines) will be dependent on several factors including the results of detailed geotechnical and Acid Sulfate Soil (ASS) investigations, market conditions, cost of construction, infrastructure availability and the capacity of the existing 132 kV transmission line. The BBAMP will be revised following detailed design as detailed in Section 8.

The above areas are illustrated on Figure 1-1.

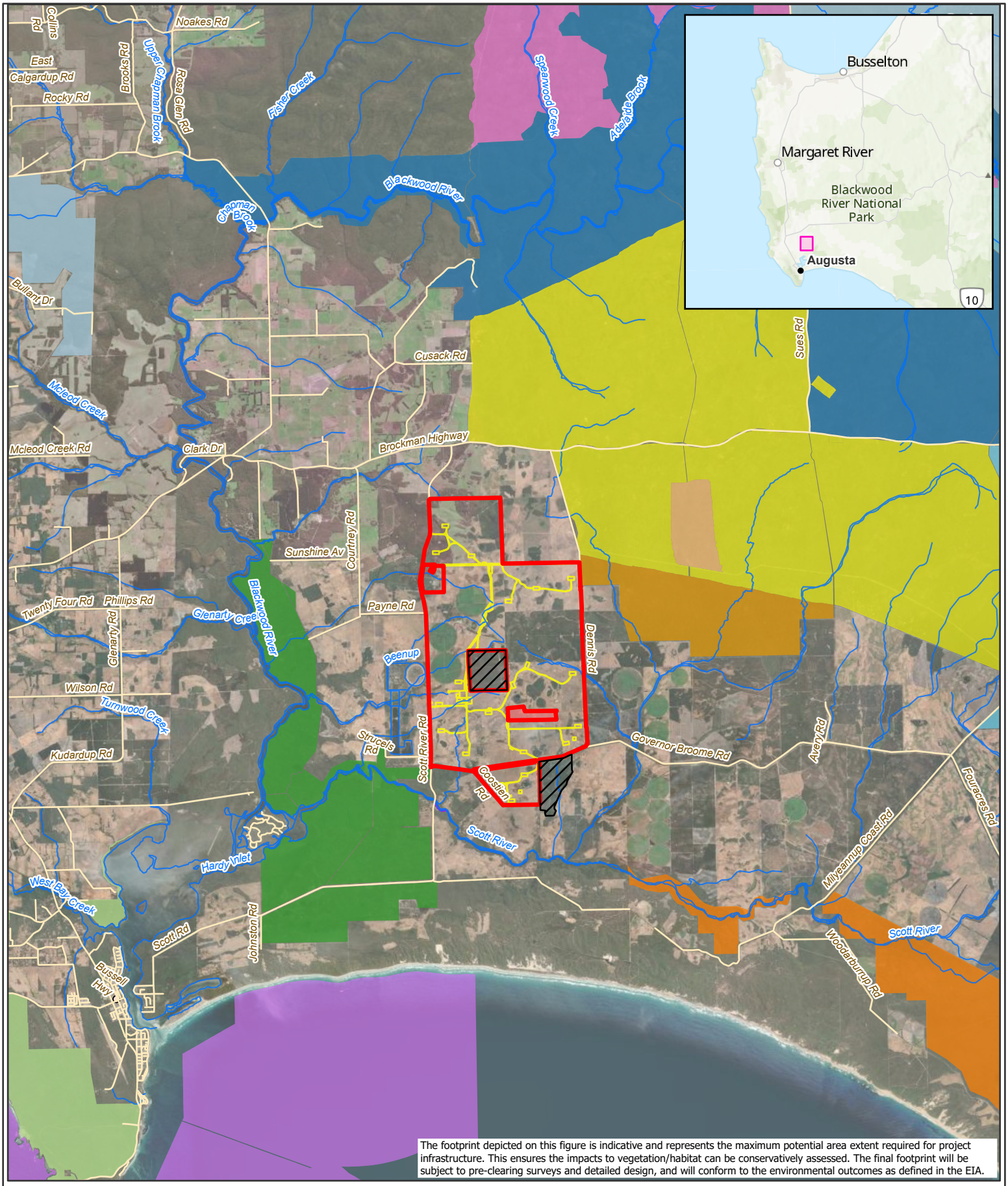


Figure 1-1: The Proposal

- Development Envelope
- Indicative Disturbance Footprint
- DBCA Lands of Interest (Crown Freehold Land)
- Watercourses
- Roads

DBCA managed lands

- Blackwood State Forest
- Milyeannup State Forest
- Ngari Capes Marine Park
- South Blackwood State Forest
- Forest Grove National Park
- Blackwood River National Park
- Leeuwin-Naturaliste National Park
- Scott National Park
- Pagett Nature Reserve
- Chester Nature Reserve
- Gingilup Swamps Nature Reserve
- Wiltshire-Butler National Park
- Unnamed WA42377 Nature Reserve
- Unnamed WA42942 Nature Reserve

0 1.5 3 6
Kilometers

Datum/Projection: GDA2020 MGA Zone 50

Project: 24PER7886-DH Date: 9/24/2025

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2. Baseline Bird and Bat Information

A Bird and Bat Risk Assessment was undertaken by Phoenix Environmental Sciences (Phoenix) to understand the potential risk from the operation of the Proposal to birds and bats (Phoenix 2025a). The objective of the risk assessment was to:

- Collect sufficient information on site and species characteristics to inform a preliminary assessment of risks to birds and bats from the Proposal
- Establish baseline monitoring sites for use in an ongoing monitoring program under a BBAMP
- Provide a preliminary assessment of risk to conservation significant and at-risk birds and bats from the Proposal.

The Bird and Bat Risk Assessment is provided in Appendix B, and a summary of the methodology and results from the assessment is provided below.

2.1. Desktop Assessment and Initial Site Inspection

An initial desktop assessment and site inspection was undertaken to identify potential habitat attributes and develop a comprehensive potential species list of birds and bats, including conservation significant species, that have the potential to occur within the Development Envelope and surrounds. Ten fauna habitat types were identified from the Basic and Targeted fauna survey, including three wetland habitats, two woodlands and five highly modified habitats (Phoenix 2025c). The desktop assessment and initial site inspection identified 198 bird species and seven bat species that have the potential to occur within a 10 km or 40 km radius desktop search extent, including 71 conservation significant species (many of these species have dual listings [i.e. as Threatened and Migratory], hence there appears to be more listings than the number of conservation significant species identified):

- 45 birds listed as Migratory [MI] under the Commonwealth EPBC Act and WA *Biodiversity Conservation Act 2016* (BC Act)
- 41 species listed as Threatened, Conservation Dependent or Specially Protected under the EPBC Act and/or BC Act
- Nine priority species listed by DBCA.

Three conservation significant species had been previously recorded within the Development Envelope, namely:

- Baudin's Cockatoo (*Zanda baudinii;* listed as Endangered [EN] under the EPBC Act and BC Act)
- Carnaby's Cockatoo (*Zanda latirostris;* listed as EN under the EPBC Act and BC Act)
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso;* listed as Vulnerable [VU] under the EPBC Act and BC Act).

2.2. Baseline Survey Methodology

A Bird and Bat Risk Assessment Survey (BBRAS) was undertaken across two years between 2023 and 2025. The main survey area was the Wind Farm Area, which includes the Development Envelope, while site characterisation was also undertaken for the Wind Farm Area with a 10 km buffer, referred to as the Bird/Bat Investigation Area (BIA). Regional Reference sites on the Hardy Inlet were added to the survey effort in Year Two (Table 2-1).

The Year One surveys occurred across four phases between August 2023 and January 2024 and involved a single survey each season to assess seasonal changes (Table 2-1; Phoenix 2025a). The Year Two surveys were conducted from September 2024 to March 2025. The Year Two scope involved monthly surveys over the activity periods for key species of concern identified during Year One (i.e. black cockatoos and migratory birds) as well as two regional migratory shorebird surveys (Table 2-1; Phoenix 2025a).

Table 2-1: Survey dates

Visit	Season	Dates	Area
Year One			
1	Autumn	24–26 May 2023	Development Envelope, BIA
2	Winter	14–16 August 2023	Development Envelope, BIA
3	Spring	17–20 November 2023	Development Envelope, BIA
4	Summer	10–12 January 2024	Development Envelope, BIA
Year Two			
5	Spring	27–30 September 2024	Development Envelope, Regional Reference Sites
6	Spring	17–18 October 2024	Development Envelope
7	Spring	21 October 2024	Development Envelope
8	Spring	13–14 November 2024	Development Envelope
9	Summer	2 December 2024	Regional Reference Sites
10	Summer	11–12 December 2024	Development Envelope
11	Summer	16–17 January 2025	Development Envelope
12	Summer	13–14 February 2025	Development Envelope
13	Autumn	06–07 March 2025	Development Envelope

The BBRAS field survey work included the following methodologies:

- Bird utilisation surveys
- Bat utilisation surveys
- Audio recordings for Masked Owl and black cockatoos.

Systematic Impact and Reference sites were established for the BBRAS to support a future monitoring program for the Proposal based on the Before-After Control-Impact (BACI) framework. At the time of survey commencement, exact turbine locations were not known, therefore systematic BBRAS sites were selected based on ease of access, general distribution relative to key environmental values (e.g. wetlands) and proximity to the most likely turbine locations (i.e. agricultural paddocks). Sites selected inside the Development Envelope were classified as Impact sites and sites outside the Development Envelope were classified as Reference sites in Year One of the survey program.

Following the completion of the Year One sampling period, preliminary turbine locations became available. The data was reviewed, and the sites were adjusted in response to identified data gaps and to reflect the BACI framework, given Impact and Reference Sites could be confidently assigned. Impact sites were classified as any site located <500 m from a proposed turbine, and Reference sites located between 500 m and 1,500 m of turbines. This resulted in ten of the 16 original sites from Year One not

being resampled in Year Two, six sites being sampled in both Year One and Year Two, and 12 new sites sampled in Year Two.

A total of 28 sites were sampled over the survey program (Figure 2-1). Nine sites were classified as Impact sites, 14 were Reference sites and five were additional Regional reference sites located at the Hardy Inlet.

In addition, the BBRAS considered the results from the Basic and Targeted fauna survey (Phoenix 2025c) which included habitat assessments, systematic avifauna censusing, additional microbat echolocation recordings, acoustic surveys for Australasian Bittern (*Botaurus poiciloptilus*) and habitat assessments for black cockatoos. This suite of additional work provided supplementary data for the Proposal, in lieu of, and considered by Phoenix (2025b) as a suitable substitute for, roaming surveys as recommended by Brett Lane and Associates (2005). Opportunistic records of birds were also made during both the BBRAS and Basic and Targeted fauna survey.

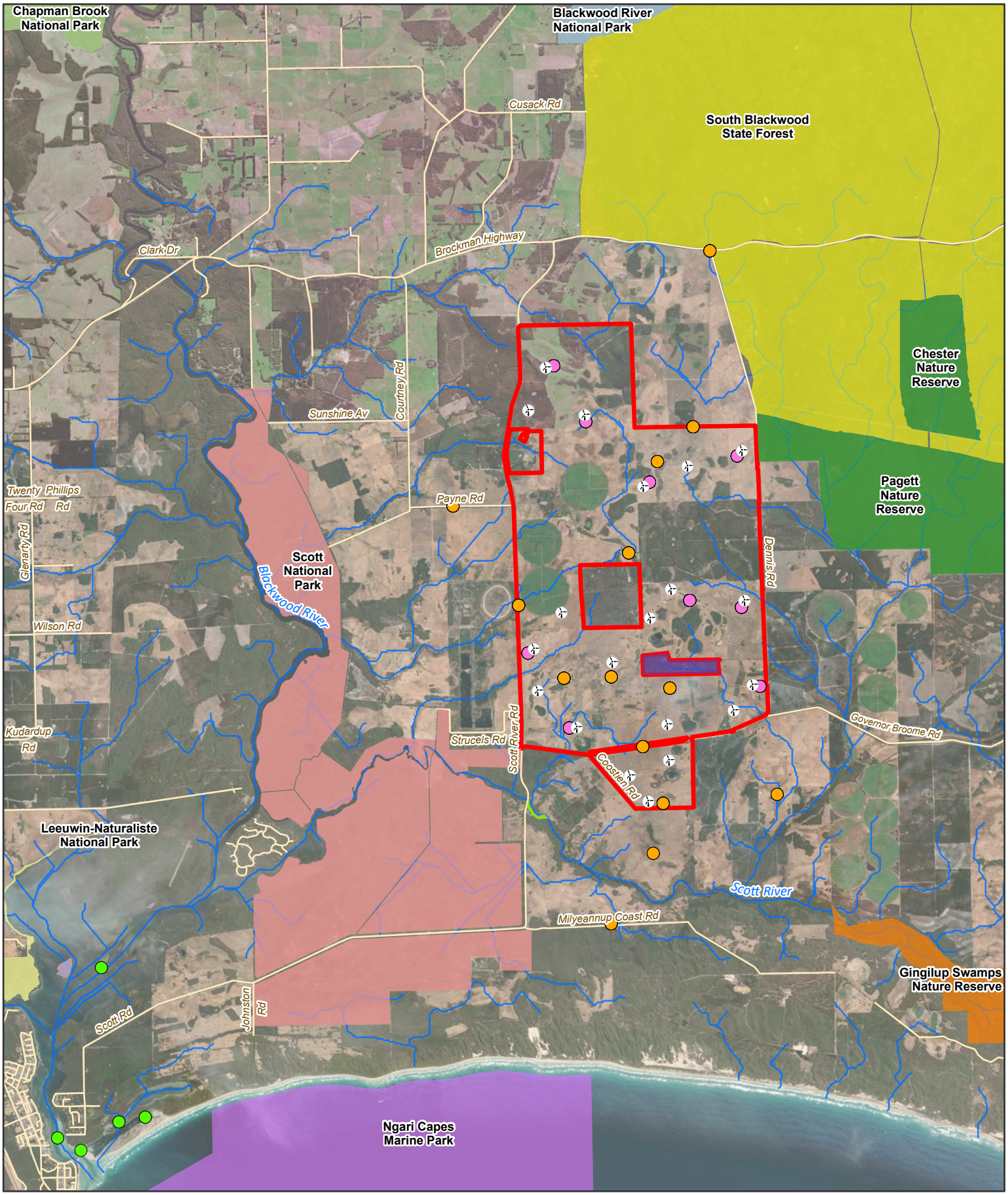


Figure 2-1: Survey Sites

- Development Envelope
- Wind Turbine
- Roads
- Rivers and Tributaries

Survey site

- Impact Sites
- Reference Sites
- Regional Reference Sites

DBCA managed lands

- Blackwood River National Park
- Chapman Brook National Park
- Chester Nature Reserve
- Gingilup Swamps Nature Reserve
- Leeuwin-Naturaliste National Park
- Pagett Nature Reserve
- Scott National Park
- Unnamed WA15185 Nature Reserve
- Unnamed WA42377 Nature Reserve
- Unnamed WA42942 Nature Reserve
- Ngari Capes Marine Park
- South Blackwood State Forest

0 1 2 4
Kilometers

Datum/Projection:
GDA2020 MGA Zone 50

Project: 24PER7886-DH Date: 9/11/2025

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2.2.1. Bird Utilisation Surveys

The Bird Utilisation Surveys (BUS) aimed to generate quantitative data and comprehensively identify the type, frequency, and behaviour of bird species within the Development Envelope and surrounding areas. The data was used to estimate the likelihood of impact and provide a ranked abundance of species use of the site, for birds at varying heights. The BUS comprised:

- Fixed-point counts at 28 locations (nine Impact sites, 14 Reference sites and five Regional reference sites) locations undertaken for 30 minutes each sample event, within a radius of 100 m for small birds and 800 m for larger birds
- Two to six counts (morning and afternoon) conducted in each survey phase at most Impact and Reference sites, including morning and afternoon counts
- Regional reference sites were sampled once each in spring and autumn, and as they were accessed by boat, they were sampled at variable times during the day dependent on tidal and weather conditions.

The following parameters were recorded at each site:

- The bird's distance from the fixed survey location, where a range finder was used to measure the distance to various 'reference points' from which distance could be estimated
- The estimated height so that presence and abundance can be related back to the potential RSA height. In Year One, height was recorded within one of five height categories as detailed below. This was changed to actual height estimates in Year Two to inform collision risk modelling.
    - The flight height categories applied in Year One were:

    Below the RSA

    - 0-25 m

    Within the RSA

    - 26-50 m
    - 51-75 m
    - 76-150 m
    - >150 m
- The direction of each bird/flock sighted to the nearest 45 degrees of the compass (i.e. cardinal and ordinal/inter-cardinal points)
- If flying across the landscape, the direction to and from, also to the nearest 45 degrees of the compass.

Habitat descriptions were recorded at all sites.

2.2.2. Bat Utilisation Surveys

The bat utilisation surveys were undertaken during Year One and aimed to generate quantitative data on bats within the study area and surrounds. The data was used to estimate likelihood of impact and provide a ranked abundance of species use of the site.

Echolocation recorders were placed at all 16 fixed-point count locations as the Year One BUS, at approximately 1 m height above the ground. Ultrasonic recordings were repeated for each season over a 12-month period. In each sample period, the recorders were operated for one night, unless conditions

were windy (approximately >20 knots), in which case additional nights were completed. The echolocation recorders were operated from 30 minutes before sunset to 30 minutes after sunrise; therefore, the total recording hours changed each season; however, were approximately 10-12 hours per night.

The echolocation data was analysed, with the species list and number of detections, treated as a surrogate for abundance, being provided per half hour, so that temporal differences in activity could be analysed, where required. Level of activity for each bat species was reported as the mean number of calls, being the sum of calls divided by the number of detections. Activity level for each species was assigned to one of three categories, based on all sites and samples, as follows:

- Low: 0-4.0
- Moderate: 4.1-11
- High: >11.

As bat presence was only assessed using ultrasonic recorders, data on flight height, direction and true abundance was not able to be determined.

2.2.3. Audio Recordings for Significant Bird Species

During the first seasonal survey phase in Year One BUS, an audio recorder positioned on the Scott River detected calls of the Masked Owl (*Tyto novaehollandiae novaehollandiae*; Priority 3 [P3]). Consequently, audio recorders were placed at each of the 16 sample sites for the remaining three sample periods in Year One BUS. Consistent with the bat utilisation surveys, the recorders were operated from 30 minutes before sunset to 30 minutes after sunrise.

The audio data analysis focused on Masked Owl and the three conservation significant black cockatoo species (Baudin's Cockatoo, Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo), as these were the most likely and easily detectable conservation significant species considered to occur. Any recorded black cockatoo calls were identified to a species level, where possible.

2.3. Baseline Results

A total of 96 bird species (including 14 conservation significant species) and eight bat species (including one conservation significant species) were recorded during the surveys. Eight of the conservation significant species were recorded within the Development Envelope and/or nearby Reference Sites, including:

- Baudin's Cockatoo (*Zanda baudinii*; listed as Endangered [EN] under the EPBC Act and BC Act)
- Carnaby's Cockatoo (*Zanda latirostris*; listed as EN under the EPBC Act and BC Act)
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*; listed as Vulnerable [VU] under the EPBC Act and BC Act)
- Wood Sandpiper (*Tringa glareola*; listed as Migratory [MI] under the EPBC Act and BC Act)
- Osprey (*Pandion haliaetus*; listed as MI under the EPBC Act and BC Act)
- Western False Pipistrelle (*Falsistrellus mackenziei*; listed as P4 by DBCA)
- Peregrine Falcon (*Falco peregrinus*; listed as Other specially protected (OS) under the BC Act)
- Masked Owl (southwest) (*Tyto novaehollandiae novaehollandiae*; listed as P3 by DBCA).

The remaining seven conservation significant species, were only recorded at Regional Reference sites within the Hardy Inlet (9 km south-west of the Development Envelope), during Year Two of the surveys including:

- Caspian Tern (*Hydroprogne caspia*; listed as MI under the EPBC Act and BC Act) – unlikely to occur in Development Envelope
- Fairy Tern (*Sternula nereis nereis*; listed as MI under the EPBC Act and BC Act) – unlikely to occur in Development Envelope
- Greater Crested Tern (*Thalasseus bergii*; listed as MI under the EPBC Act and BC Act) – unlikely to occur in Development Envelope
- Sharp-tailed Sandpiper (*Calidris acuminata*; listed as VU/MI under the EPBC Act) – may possibly occur in Development Envelope
- Sanderling (*Calidris alba*; listed as MI under the EPBC Act and BC Act) – unlikely to occur in Development Envelope
- Red-necked Stint (*Calidris ruficollis*; listed as MI under the EPBC Act and BC Act) – may possibly occur in Development Envelope
- Bar-tailed Godwit (*Limosa lapponica*; listed as MI under the EPBC Act and BC Act) – unlikely to occur in Development Envelope.

Full species assemblages for bird and bats recorded during the surveys is provided in Appendix B.

3. Bird and Bat Risk Assessment

3.1. Purpose

Incorporating the data from the BBUS, a risk assessment framework was developed to evaluate the potential risk of impact to bird and bat species of concern from the Proposal. This approach assesses risk using a combination of likelihood and consequence of impact, in accordance with relevant Australian standards for risk management (Phoenix 2025a; Standards Australia 2018). While the framework is primarily based on collision risk, the risk assessment also considered other impacts including displacement, avoidance behaviours, and habitat loss.

Through identifying species at a heightened risk and considering relevant factors such as their status, ecology and the nature of known and potential impacts, targeted monitoring and management measures can be developed. The preliminary risk assessment is provided in the Bird and Bat Risk Assessment provided in Appendix B (Phoenix 2025a) and is summarised below.

3.2. Risk Assessment Process

Based on the findings of the site and species characterisation and data collected during field surveys, 47 bird and bat species were considered 'potential species of concern' by Phoenix (2025a), including:

- 29 conservation significant species, including 28 bird species and one bat species (six recorded species and 22 species considered likely, or to possibly occur in the Development Envelope)
- 11 non-conservation significant raptors species (recorded within the Development Envelope)
- Seven non-conservation significant bats species (recorded within the Development Envelope).

A risk assessment was then undertaken for these species to determine the likely risk of impact from the Proposal to each (Phoenix 2025a; Appendix B). The risk assessment utilises a risk matrix (Table 3-3) that was developed in accordance with relevant Australian standards for risk management (Standards Australia 2018), which considers the likelihood of a potential impact occurring, as well as the consequence should the impact occur. The likelihood of direct impact from collision with turbines was classified into five categories (Almost certain, Likely, Potential, Unlikely, Rare), which considered species utilisation of the Development Envelope, including frequency and flight height and any previously recorded wind farm mortality for the species (Table 3-1). The consequence of impact was classified into five categories, from insignificant to severe, based on estimated loss of individuals relative to Australian population estimates or East Asian-Australasian Flyway (EAAF) populations for Migratory species (Table 3-2). The consequence categories for Migratory shorebirds were established in consideration of the industry guidelines for assessment of impacts to EPBC Act listed Migratory shorebirds (DoEE 2017).

The overall level of risk is determined by the combined likelihood and consequence of an impact occurring on a given bird or bat species as shown in the risk matrix (Table 3-3). The risk matrix should be considered a guide rather than a predictive tool, recognising that bird and bat behaviours are varied and complex, as can be their response to both natural and human-induced impacts.

Table 3-1: Likelihood definitions

Likelihood	Birds	Bats
Almost certain	It is very probable that the risk event could happen in any year. • species recorded frequently (>five times) and/or in large numbers (>30 individuals) within the RSA of the Development Envelope; **AND** • has observed windfarm mortality.	It is very probable that the risk event could happen in any year. • species displays **high** activity levels (see Section 2.2.2) within the Development Envelope; **AND** • suspected to fly at heights within the RSA of the Development Envelope; **AND** • has observed windfarm mortality.
Likely	It is more probable that the risk event could happen in any year. • species recorded frequently (>five times) and/or in large numbers (>30 individuals) within the RSA of the Development Envelope; **AND** • has no observed windfarm mortality.	It is more probable that the risk event could happen in any year. • species displays **moderate** activity levels (see Section 2.2.2) within the Development Envelope; **AND** • suspected to fly at heights within the RSA of the Development Envelope; **AND** • has no observed windfarm mortality.
Potential	It is equally probable that the risk event could happen in any year. • species recorded infrequently within the Development Envelope, or considered likely or possibly to occur; **AND** • is known or suspected to fly within the RSA of the Development Envelope and/or has observed windfarm mortality.	It is equally probable that the risk event could happen in any year. • species displays **low** activity levels (see Section 2.2.2) within the Development Envelope, OR considered likely or to possibly occur; **AND** • suspected to fly at heights within the RSA of the Development Envelope or in open/uncluttered air spaces and/or has observed windfarm mortality.
Unlikely	It is less probable that the risk event could happen in any year. • species recorded within the Development Envelope or considered likely or to possibly occur; **AND** • is not known or suspected to fly within the RSA of the Development Envelope and has no observed windfarm mortality **OR** • species is considered to possibly occur within the Development Envelope but only on rare occasions; **AND** • is suspected to fly within the RSA of the Development Envelope and/or has observed windfarm mortality.	It is less probable that the risk event could happen in any year. • species has not been recorded but is considered likely or to possibly occur within the Development Envelope; **AND** • is not suspected to fly at heights within the RSA of the Development Envelope or in open/uncluttered air spaces and has no observed windfarm mortality.
Rare	It is improbable that the risk event could happen in any year. • species has not been recorded but is considered to possibly occur within the Development Envelope but only on rare occasions; **AND** • species is unlikely to fly within the RSA and has no observed windfarm mortality.	It is improbable that the risk event could happen in any year. • species has been recorded, or considered likely or to possibly occur within the Development Envelope; **AND** • is unlikely to fly within the RSA of the Development Envelope given foraging and movement behaviour is restricted to cluttered air space and has no observed windfarm mortality.

Table 3-2: Consequence definitions

Consequence	Description	Group
Severe	Loss of greater than 1% of EAAF population over ten years.	Migratory shorebirds
	Loss in numbers of individuals, leading to reduction in population viability for a period of at least ten years.	All other birds and bats
Significant	Loss of at least 0.1% of EAAF population over ten years.	Migratory shorebirds
	Loss in numbers of individuals, leading to reduction population viability for between five and ten years.	All other birds and bats
Medium	Loss of at least 0.05% of EAAF population over ten years.	Migratory shorebirds
	Loss in numbers of individuals, leading to minor reduction in population viability for between one and five years.	All other birds and bats
Minor	Undetectable (<0.05%) loss of EAAF population over ten years.	Migratory shorebirds
	Occasional loss of small numbers of individuals but no reduction in population viability.	All other birds and bats
Insignificant	Undetectable loss (<0.005%) of EAAF population over ten years.	Migratory shorebirds
	Rare loss of individuals but no reduction in population viability.	All other birds and bats

Table 3-3: Risk matrix based on likelihood and consequence

Likelihood	Consequence				
	Insignificant	**Minor**	**Medium**	**Significant**	**Severe**
Almost certain	Negligible	Low	High	Extreme	Extreme
Likely	Negligible	Low	Moderate	High	Extreme
Potential	Negligible	Low	Moderate	High	High
Unlikely	Negligible	Negligible	Low	Moderate	Moderate
Rare	Negligible	Negligible	Negligible	Low	Moderate

3.3. Risk Assessment Results

The preliminary BBRAS (Phoenix 2025a), which was based on a minimum RSA height of 25 m, determined that of the 47 species considered 'potential species of concern' assessed:

- 34 species recorded a *Negligible* risk level
- Ten species recorded a *Low* risk level
- Three species, Baudin's Cockatoo (*Zanda baudinii),* Carnaby's Cockatoo (*Zanda latirostris)* and *Calyptorhynchus banksii naso* (Forest Red-tailed Black Cockatoo), recorded a *Moderate* risk level.

Following finalisation of the preliminary BBRAS, the minimum blade height was modified from 25 m to 40 m to minimise impacts to low flying at-risk bird and bat species, such as black cockatoos. The Proponent subsequently engaged Ron Johnstone (Johnstone 2025) to provide technical advice on the potential impacts to black cockatoos from the Proposal taking into consideration the revised minimum blade height.

Based on this advice (Johnstone 2025) and the changes to the revised minimum blade height, the preliminary BBRAS has been revised. Of the 47 species considered 'potential species of concern' assessed (Table 3-4):

- 35 species recorded a Negligible risk level
- 11 species recorded a Low risk level
- One species recorded a Moderate risk level, *Calyptorhynchus banksii naso* (Forest Red-tailed Black Cockatoo).

Given the above, mitigation and monitoring measures are proposed within this BBAMP to manage the risk of turbine collision and barotrauma from the operation of the Proposal, these measures also have a particular emphasis on monitoring potential impacts to black cockatoos.

Consistent with the adaptive management approach of this BBAMP, the risk level for each bird and bat species assessed in Table 3-4 will be revised in response to any impact trigger (Section 6) and updated as necessary during annual reporting (Section 7).

Table 3-4: Risk assessment for potential species of concern

Species	Cons. Status	Potential use in the Development Envelope	No. Records/ Individuals (birds) Activity level (bats)	Rec. Flight Height Range (m) (No. records)* [No. individuals]*	Potential impact	Likelhd.	Conseq.	Risk Rating	Justification
Calyptorhynchus banksii naso **(Forest Red-tailed Black Cockatoo)**	VU (EPBC & BC Acts)	Roosting Foraging Breeding	48 (206)	0-24 (3) [54] 25-50 (2) [11]	Direct collision/ barotrauma Displacement Habitat loss	Potential	Medium	Moderate	Recorded frequently in the Development Envelope, generally in low numbers (mostly singles). A large flock (>30 individuals) was recorded south of the Development Envelope. Heights were not recorded for many observations (e.g. audio recordings), and it was mostly observed at or below tree height. There were five flight height records for this species; three were below 24 m and two were within 25-50 m and therefore potentially within the RSA. In addition, flight height data was collected for black cockatoos which could not be identified to a species level, comprising 15 records of *Calyptorhynchus/Zanda* sp. Of these records, one was recorded within the adjusted RSA at 40 m. There has been no recorded wind farm mortality of black cockatoos in Australia (Phoenix 2025a; Johnstone 2025). Recognising the paucity of wind farm mortality data in Western Australia, consideration was given to *Zanda funerea* (Yellow-tailed Black Cockatoo), a surrogate species native to the south-east of Australia, with no recorded wind farm mortality (Phoenix 2025a). High and moderate quality foraging habitat is present within the Development Envelope. Foraging habitat also likely to be present in the (excised) conservation reserve and covenant areas in the centre of the Development Envelope. The Proposal includes only minor loss of native foraging habitat (1 ha, including no more than 0.5 ha of Moderate – High quality). While suitable habitat is present within the Development Envelope, there is extensive habitat present within adjacent conservation areas such as national parks. The presence of these habitat values in the vicinity likely encourages black cockatoo flights across the Development Envelope, stopping to forage as needed (Phoenix 2025c). As such, it is considered that the Development Envelope contains habitats that are unlikely to be critical but rather provide supplementary foraging habitat for Forest Red-tailed Black Cockatoo (Phoenix 2025c). No known breeding or roost sites within the Development Envelope. This species is known to mainly forage in the canopy and lower levels of Jarrah-Marri forests, and when moving from site-to-site generally flies just above the canopy (Johnstone 2025), as was supported by most of the flight observations within the BBUS, which were below 25 m. The average and maximum recorded canopy height for Marri trees, the tallest species within the Development Envelope, is 17.3 m and 28 m respectively, which is well below the RSA. However, this species is generally a poorer flier and less agile than Carnaby's and Baudin's cockatoos and therefore potentially more susceptible to turbine collision (Johnstone 2025). Therefore, a likelihood of impact rating of Potential was considered appropriate. Forest Red-tailed Black Cockatoo has a small total population, pair bonding and slow breeding (Phoenix 2025a). Loss in numbers of individuals may lead to minor reduction in population viability for between one and five years. Based on the above the risk to this species from the operation of the Proposal is considered Moderate. Potential impacts to this species from the operation of the Proposal will be managed through the BBAMP to ensure no significant impacts to this species.

Species	Cons. Status	Potential use in the Development Envelope	No. Records/ Individuals (birds) Activity level (bats)	Rec. Flight Height Range (m) (No. records)* [No. individuals]*	Potential impact	Likelhd.	Conseq.	Risk Rating	Justification
Zanda baudinii (Baudin's Cockatoo)	EN (EPBC & BC Acts)	Roosting Foraging Breeding	7 (57)	0-24 (3) [11]	Direct collision/ barotrauma Displacement Habitat loss	Unlikely	Medium	Low	Recorded frequently in the Development Envelope, generally in low numbers (mostly singles, small flocks). All recorded flight heights were below RSA (0-24 m). In addition, flight height data was collected for black cockatoos which could not be identified to a species level, including 15 records of *Calyptorhynchus/Zanda* sp. and two records of white-tailed black cockatoos (*Zanda* sp.). Of these records, all but one (*Calyptorhynchus/Zanda* sp.) were below the adjusted RSA, with the single record at 40 m. There has been no recorded wind farm mortality of black cockatoos in Australia (Phoenix 2025a; Johnstone 2025). Recognising the paucity of wind farm mortality data in Western Australia, consideration was given to *Zanda funerea* (Yellow-tailed Black Cockatoo), a surrogate species native to the south-east of Australia, with no recorded wind farm mortality (Phoenix 2025a). High and moderate quality foraging habitat is present within the Development Envelope. Foraging habitat also likely to be present in the (excised) conservation reserve and covenant areas in the centre of the Development Envelope. The Proposal includes only minor loss of foraging habitat (1 ha, including no more than 0.5 ha of Moderate – High quality). While suitable habitat is present within the Development Envelope, there is extensive habitat present within adjacent conservation areas such as national parks. The presence of these habitat values in the vicinity likely encourages black cockatoo flights across the Development Envelope, stopping to forage as needed (Phoenix 2025c). As such, it is considered that the Development Envelope contains habitats that are unlikely to be critical but rather provide supplementary foraging habitat for Baudin's Cockatoo (Phoenix 2025c). No known breeding sites within the Development Envelope, but two known *Zanda* spp. roosts are located within 12 km of the Development Envelope. Black cockatoos are known to forage in areas up to 20 km from night roosting habitat during the non-breeding season (Phoenix 2025a). The species generally flies at about 5 to 15 m above the ground (Johnstone 2025), which was confirmed by the results of the BBUS. Therefore, this species is most likely to fly below the RSA. It may occasionally fly above canopy height and therefore potentially within the RSA; however, it is considered a very competent flyer with excellent vision at night and in poor light and is therefore capable of avoiding wind turbines on the rare occasions that it flies within the RSA (Johnstone 2025). The average and maximum recorded canopy height for Marri trees, the tallest species within the Development Envelope, is 17.3 m and 28 m respectively, which is well below the RSA. Therefore, the likelihood of impact is considered unlikely. Baudin's Cockatoo has a small total population, pair bonding and slow breeding (Phoenix 2025a). Loss in numbers of individuals may lead to minor reduction in population viability for between one and five years. Based on the above the risk to this species from the operation of the Proposal is considered Low. Potential impacts to this species from the operation of the Proposal will be managed through the BBAMP to ensure no significant impacts to this species.

Species	Cons. Status	Potential use in the Development Envelope	No. Records/ Individuals (birds) Activity level (bats)	Rec. Flight Height Range (m) (No. records)* [No. individuals]*	Potential impact	Likelhd.	Conseq.	Risk Rating	Justification
Zanda latirostris **(Carnaby's Cockatoo)**	EN (EPBC & BC Acts)	Roosting Foraging	38 (154)	0-24 (22) [97] 30 (2) [2]	Direct collision/ barotrauma Displacement Habitat loss	Unlikely	Medium	Low	Recorded frequently in the Development Envelope, generally in low numbers (mostly singles, small flocks). All recorded flights were below RSA, with 92% of recorded flights below 25 m, and two records (8% of flights) at flight height of 30 m. In addition, flight height data was collected for black cockatoos which could not be identified to a species level, including 15 records of *Calyptorhynchus/Zanda* sp. and two records of white-tailed black cockatoos (*Zanda* sp.). Of these records, one (*Calyptorhynchus/Zanda* sp.) was recorded within the adjusted RSA at 40 m. Cataby is one of the few areas where there is an operating wind farm (Yandin) close to a small breeding population of Carnaby's Cockatoo which has been monitored for over 20 years (Johnstone 2025). Foraging habitat is present within a few hundred metres of turbines and breeding habitat as close as 3.5-4 km. This small breeding population has remained stable since the wind farm was commissioned in 2021. Further, during the monitoring of this population no Carnaby's Cockatoo were anecdotally observed flying towards the wind turbines (Johnstone 2025). There has been no recorded wind farm mortality of black cockatoos in Australia (Phoenix 2025a; Johnstone 2025). Recognising the paucity of wind farm mortality data in Western Australia, consideration was given to *Zanda funerea* (Yellow-tailed Black Cockatoo), a surrogate species native to the south-east of Australia, with no recorded wind farm mortality (Phoenix 2025a). High and moderate quality foraging habitat is present within the Development Envelope. Foraging habitat also likely to be present in the (excised) conservation reserve and covenant areas in the centre of the Development Envelope. The Proposal includes minor loss of foraging habitat (1 ha, including no more than 0.5 ha of Moderate – High quality). While suitable habitat is present within the Development Envelope, there is extensive habitat present within adjacent conservation areas such as national parks. The presence of these habitat values in the vicinity likely encourages black cockatoo flights across the Development Envelope, stopping to forage as needed (Phoenix 2025c). As such, it is considered that the Development Envelope contains habitats that are unlikely to be critical but rather provide supplementary foraging habitat for Carnaby's Cockatoo (Phoenix 2025c). No known roosting sites within the Development Envelope but two known *Zanda* sp. roosts located within 12 km of the Development Envelope. Black cockatoos are known to forage in areas up to 20 km from night roosting habitat during the non-breeding season (Phoenix 2025a). The species generally flies at about at about 5 to 15 m above the ground (Johnstone 2025), which was confirmed by the results of the BBUS and therefore is most likely to fly below the RSA. It may occasionally fly above canopy height and therefore potentially within the RSA; however, it is considered a very competent flyer with excellent vision at night and in poor light and is therefore capable of avoiding wind turbines on the rare occasions that it flies within the RSA (Johnstone 2025). The average and maximum recorded canopy height for Marri trees, the tallest species within the Development Envelope, is 17.3 m and 28 m respectively, which is well below the RSA. Therefore, the likelihood of impact is considered unlikely. Carnaby's Cockatoo has a small total population, pair bonding and slow breeding (Phoenix 2025a). Loss in numbers of individuals may lead to minor reduction in population viability for between one and five years. Based on the above the risk to this species from the operation of the Proposal is considered Low. Potential impacts to this species from the operation of the Proposal will be managed through the BBAMP to ensure no significant impacts to this species.
Falsistrellus mackenziei **(Western False Pipistrelle)**	P4 (DBCA list)	Roosting Foraging Breeding	Low	Not Recorded (NR)	Direct collision/ barotrauma	Potential	Minor	Low	Infrequently detected in the Development Envelope but low number of calls (one mean detection per night). Suspected to fly at heights within RSA. No mortality monitoring data available for this species but there are recorded moderate mortalities (10–100) in carcass monitoring for closely related species *Falsistrellus tasmaniensis*. Consistent single detections suggest rare/occasional movement through cleared habitats between remnant patches, and thus foraging typically close to vegetation, rather than open paddocks. Some limited roosting opportunities within the Development Envelope (Phoenix 2025c). May breed in best examples of Marri-Jarrah-Peppermint woodland, where the potential breeding tree assessment (Phoenix 2025c) recorded the most trees with hollows, many of which would be considered suitably sized to support the species. Occasional loss of small numbers of individuals possible but unlikely to lead to reduction in local population viability. Based on the above the risk to this species from the operation of the Proposal is considered Low. Potential impacts to this species from the operation of the Proposal will be managed through the BBAMP to ensure no significant impacts to this species.

Species	Cons. Status	Potential use in the Development Envelope	No. Records/ Individuals (birds) Activity level (bats)	Rec. Flight Height Range (m) (No. records)* [No. individuals]*	Potential impact	Likelhd.	Conseq.	Risk Rating	Justification
Botaurus poiciloptilus (Australasian Bittern)	EN (EPBC & BC Acts)	Roosting Foraging Breeding	-	-	Direct collision/ barotrauma	Unlikely	Medium	Low	No record from surveys, nor desktop records within 10 km of the Development Envelope. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Known from Hardy Inlet ~12 km south-west of the Development Envelope and the Gingilup/Quitchup/Jasper wetlands ~30 km south-east (dates of records unknown). The latter is an important wetland suite for the species. Potential for occasional use of the larger wetlands in the Development Envelope but unlikely a regular visitor or regularly transit through the Development Envelope. WA population is very small therefore any loss of individuals may have temporary impact on local population viability. Based on the above the risk to this species from the operation of the Proposal is considered Low. Potential impacts to this species from the operation of the Proposal will be managed through the BBAMP to ensure no significant impacts to this species.
Pandion haliaetus (Osprey)	MI (EPBC & BC Acts)	Occasional foraging	7 (7)	0-24 (2) [2] 25-50 (3) [6] 51-75 (1) [1]	Direct collision/ barotrauma	Potential	Insignificant	Negligible	Recorded only once in the Development Envelope across all surveys. Only recorded flying within RSA heights at regional reference sites. No mortalities recorded in carcass monitoring from reviewed sources at Australian sites, but collision deaths have been reported overseas. Common and widely distributed in coastal regions across most of the country. Many individual Osprey are known in the Busselton to Augusta region (B. Wykes pers. comm. cited in Phoenix 2025a). The population is limited by viable nest sites, not biological factors. Desktop records are nearly all south-west of the Development Envelope associated with Hardy Inlet, Augusta beaches, Scott and Blackwood Rivers. Sampling at the Regional reference sites supports this, with several records made during the Year 2 surveys at the Hardy Inlet coastal sites. Unlikely to utilise habitats in study area regularly because it primarily feeds on fish, though may be an occasional foraging site. Potential for rare loss of individuals but no reduction in population viability. Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Oxyura australis (Blue-billed Duck)	P4 (DBCA list)	Roosting Foraging Breeding	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys; however, desktop records within 10 km of the Development Envelope. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Potential for occasional use of the open water present within wetlands in the Development Envelope but unlikely to be a regular visitor. A few records from the artificial wetlands west of the Development Envelope but limited desktop records returned within 10 km, and all from 2010 or older. Potential for rare loss of individuals but no reduction in population viability. Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Apus pacificus (Fork-tailed Swift)	MI (EPBC & BC Acts)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, nor desktop records within 10 km of the Development Envelope. Suspected to fly at heights within RSA. Only one mortality recorded in carcass monitoring from reviewed sources. Common species, considered to possibly occur on occasion. Potential for rare loss of individuals but undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Tyto novaehollandiae novaehollandiae (Masked Owl (southwest))	P3 (DBCA list)	Roosting Foraging Breeding	2 (2)	NR	Direct collision/ barotrauma Displacement	Unlikely	Insignificant	Negligible	Recorded at two locations outside the Development Envelope, as singles. Only likely to fly at RSA heights when displaying courtship over a prospective nest site of which none are present in study area. Unlikely to fly within RSA while hunting. No mortality monitoring data available for this species. No other Masked Owl mortalities from reviewed sources. May hunt in woodland habitats of the Development Envelope and transit through but not likely to utilise extensively. Potential for rare loss of individuals but unlikely to lead to reduction in population viability. Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Pluvialis fulva (Pacific Golden Plover)	MI (EPBC & BC Acts)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys; however, desktop records <10 km of the Development Envelope. Desktop records all south-west of the Development Envelope associated with the Hardy Inlet and Scott River. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Mainly uses coastal habitats. Potential for occasional use of paddocks and the larger wetlands in the Development Envelope but unlikely a regular visitor to the Development Envelope when present in the region, noting very limited overlap between species arrival in region (December) and persistence of suitable foraging habitat in the Development Envelope. Potential for rare loss of individuals but undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.

Species	Cons. Status	Potential use in the Development Envelope	No. Records/ Individuals (birds) Activity level (bats)	Rec. Flight Height Range (m) (No. records)* [No. individuals]*	Potential impact	Likelhd.	Conseq.	Risk Rating	Justification
Anarhynchus bicinctus (Double-banded Plover)	MI (EPBC & BC Acts)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although may possibly occur within the Development on very rare occasion. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Utilises terrestrial wetlands and pasture near the coast but rarely occurs in WA. Previous desktop records within 10 km of Development Envelope but old (1979-80). Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Anarhynchus mongolus (Siberian Sand Plover)	EN/MI (EPBC Act); EN (BC Act)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although may possibly occur within the Development Envelope on rare occasion. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Utilises terrestrial wetlands and pasture near the coast but rarely occurs in WA. Previous old (1980) desktop record within 10 km of Development Envelope but mainly uses coastal habitats such as beaches, mudflats and sandflats. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Pluvialis squatarola (Grey Plover)	VU/MI (EPBC Act); MI (BC Acts)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although may possibly occur within the Development Envelope on rare occasion. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Mainly utilises coastal habitats but potential for rare use of wetlands in Development Envelope. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Hydroprogne caspia (Caspian Tern)	MI (EPBC & BC Acts)	None	6 (62)	0-24 (4) [59] 25-50 (2) [3]	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	Recorded at Hardy Inlet during surveys however no records within the Development Envelope, although may possibly occur within the Development Envelope on rare occasions. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Previous desktop record within 10 km of Development Envelope. Known to utilise near-coastal terrestrial wetlands. May occur as a visitor but the wetlands present in the Development Envelope are too shallow to provide the species' preferred food source (fish). Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Calidris tenuirostris (Great Knot)	VU/MI (EPBC Act); CR (BC Act)	Foraging	-	-	Direct collision/ barotrauma	Potential	Insignificant	Negligible	No record from surveys, although may possibly occur within the Development Envelope on very rare occasion. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Old (1980) desktop records within 10 km of the Development Envelope from near artificial wetlands. Occurs mostly in coastal intertidal habitats, but rare use of swamps. Potential presence in the Development Envelope is considered likely very rare. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Motacilla cinerea (Grey Wagtail)	MI (EPBC & BC Acts)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although may possibly occur within the Development Envelope on rare occasion. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. No previous desktop records within 10 km of Development Envelope. Occurs in a wide range of habitats. Potential for rare loss of individuals but no reduction in population viability.
Calidris falcinellus (Broad-billed Sandpiper)	MI (EPBC & BC Acts)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although may possibly occur within the Development Envelope on rare occasion. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Mainly utilises coastal habitats but occasional records from swamps and lakes so potential for rare use of wetlands in Development Envelope. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Falco peregrinus (Peregrine Falcon)	OS (BC Act)	Foraging	1 (1)	25-50 (1) [1]	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	Recorded in the Development Envelope only once across all surveys. Recorded flying at height between 26-50 m above ground level. Recorded mortalities in carcass monitoring from reviewed sources. The Development Envelope considered foraging habitat within a resident bird's home range. Unlikely to nest in the Development Envelope. Several desktop records, nearly all south-west of the Development Envelope, mainly associated with the Hardy Inlet and Scott River. Individuals/pairs may hunt in the Development Envelope on occasion as part of their large home range, and or transit through. Potential for rare loss of individuals but unlikely to lead to reduction in population viability. Based on the above the risk to this species from the operation of the Proposal is considered Negligible.

Species	Cons. Status	Potential use in the Development Envelope	No. Records/ Individuals (birds) Activity level (bats)	Rec. Flight Height Range (m) (No. records)* [No. individuals]*	Potential impact	Likelhd.	Conseq.	Risk Rating	Justification
Actitis hypoleucos (Common Sandpiper)	MI (EPBC & BC Acts)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys; however, desktop records within 10 km of the Development Envelope. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Most desktop records associated with the Hardy Inlet south-west of the study area. Does not form large flocks (mainly occurs singly or in pairs). Potential for occasional use of the larger wetlands in the Development Envelope, but unlikely a regular visitor or regular transit through the Development Envelope when present in the region. Limited overlap between species arrival (September-October) and when wetlands in the Development Envelope have suitable foraging habitat. Potential for rare loss of individuals but undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Calidris acuminata (Sharp-tailed Sandpiper)	VU/MI (EPBC Act); MI. (BC Act)	Foraging	1 (40)	0-24 (1) [40]	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	Recorded in survey only from a regional site. Record is from Hardy Inlet in much more suitable and extensive habitat than the Development Envelope. Desktop records all south-west of the Development Envelope associated with Hardy Inlet and Scott River, with one record from artificial wetlands west of the Development Envelope. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. May arrive in Augusta area from September. Potential for occasional occurrence in the Development Envelope, but unlikely a regular visitor or regular transit through the Development Envelope when present in the region. Limited overlap between species arrival and when wetlands/dams in the Development Envelope have suitable foraging habitat. Potential for rare loss of individuals but undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Calidris ferruginea (Curlew Sandpiper)	CR/MI (EPBC Act); CR (BC Act)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys; however, desktop records within 10 km of the Development Envelope. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Desktop records nearly all south-west of the Development Envelope associated with Hardy Inlet, which aligns with its preferred foraging habitats. Desktop records indicate arrival from September. Potential for occasional use of paddocks, wetland habitats and dams in the Development Envelope, but unlikely a regular visitor or regular transit through the Development Envelope when present in the region. Limited overlap between species arrival and when wetlands/paddocks in the Development Envelope have suitable foraging habitat. Potential for rare loss of individuals but undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Calidris melanotos (Pectoral Sandpiper)	MI (EPBC & BC Acts)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys; however, desktop record just outside the Development Envelope, on the Hardy Inlet. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Arrives in the southwest in spring. Potential for occasional use of paddocks and in the Development Envelope, but unlikely a regular visitor or regular transit through the Development Envelope when present in the region. Potential for rare loss of individuals but undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Limosa lapponica (Bar-tailed Godwit)	Mig. (EPBC & BC Acts)	Foraging	1 (1)	0-24 (1) [1]	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	One record within the during the surveys at Hardy Inlet, although may possibly occur within the Development Envelope on very rare occasion. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Old (1980) desktop records within 10 km of the Development Envelope from near artificial wetlands and at Blackwood River. Occurs mostly in coastal habitats but occasionally observed at inland wetlands and paddocks. Potential presence in the Development Envelope is considered likely very rare. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Limosa limosa (Black-tailed Godwit)	EN/MI. (EPBC Act); MI (BC Act)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although may possibly occur within the Development Envelope on very rare occasion. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Old (1980) desktop records within 10 km of the Development Envelope from artificial wetlands. Occurs mostly in coastal habitats but occasionally uses near-coastal wetlands and floodplains. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.

Species	Cons. Status	Potential use in the Development Envelope	No. Records/ Individuals (birds) Activity level (bats)	Rec. Flight Height Range (m) (No. records)* [No. individuals]*	Potential impact	Likelhd.	Conseq.	Risk Rating	Justification
Tringa brevipes (Grey-tailed Tattler)	MI (EPBC and BC Acts); P4 (DBCA list)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although may possibly occur within the Development Envelope on very rare occasion. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Old (1981) desktop records within 10 km of the Development Envelope. Occurs mostly in coastal habitats but occasionally observed at near-coastal wetlands. Potential presence in the Development Envelope is considered likely very rare. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Calidris ruficollis (Red-necked Stint)	MI (EPBC & BC Acts)	Foraging	2 (72)	0-24 (2) [72]	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	Recorded in survey only from regional sites. Records are from Hardy Inlet in much more suitable and extensive habitat than the Development Envelope. Desktop records also mainly south-west of the Development Envelope, associated with Hardy Inlet. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Arrives in the South West in spring. Potential for occasional use of paddocks, wetland habitats and dams in the Development Envelope, but unlikely a regular visitor or regular transit through the Development Envelope when present in the region. Potential for rare loss of individuals but undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Tringa glareola (Wood Sandpiper)	MI (EPBC & BC Acts)	Foraging	1 (3)	0-24 (1) [3]	Direct collision/ barotrauma	Potential	Insignificant	Negligible	Three individuals recorded in a single observation within the Development Envelope, across all surveys. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Limited desktop records (only two just west of the Development Envelope). Mainly occurs singly, in pairs or small flocks. Arrives in south-west in spring, though more common from summer to autumn when habitat in the Development Envelope mainly unsuitable (largely dried out). Occasional use of wetlands in the Development Envelope and transit through the Development Envelope by small numbers of birds. Potential for rare loss of individuals but undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Tringa nebularia (Common Greenshank)	EN/MI (EPBC Act) MI (BC Act)	Foraging	-	-	Direct collision/ barotrauma	Potential	Insignificant	Negligible	No record from surveys; however, desktop records within 10 km of the Development Envelope. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Desktop records all south-west of the Development Envelope, mainly associated with Hardy Inlet, Scott River, but also recorded from artificial wetlands directly west of the Development Envelope. Arrives in the southwest in early spring. Occasional use of the paddocks/ wetland habitats in the Development Envelope. Potential for rare loss of individuals but undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Tringa stagnatilis (Marsh Sandpiper)	MI (EPBC & BC Acts)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No records from surveys, nor recorded within 10 km of the Development Envelope but suitable habitat present in the Development Envelope when they arrive in early spring. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Limited desktop records, south-west of the Development Envelope at Augusta. Occasional use of paddocks, wetland habitats in the Development Envelope. Potential for rare loss of individuals but undetectable loss of EAAF population over 10 years (<0.005%). Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Aquila audax (Wedge-tailed Eagle)	-	Foraging Roosting Breeding	37 (50)	0-24 (2) [3] 25-50 (12) [15] 51-75 (3) [3] 76-150 (11) [17] >150 (7) [10]	Direct collision/ barotrauma	Almost certain	Minor	Low	Frequently recorded in the Development Envelope, as singles/pairs. Frequently recorded flying at RSA heights. Recorded moderate mortalities (10–100) in carcass monitoring from reviewed sources. Likely uses the Development Envelope regularly for foraging. Potential for breeding but no known nest sites in the Development Envelope. Occasional loss of individuals likely but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability. Based on the above the risk to this species from the operation of the Proposal is considered Low. Potential impacts to this species from the operation of the Proposal will be managed through the BBAMP to ensure no significant impacts to this species.

Species	Cons. Status	Potential use in the Development Envelope	No. Records/ Individuals (birds) Activity level (bats)	Rec. Flight Height Range (m) (No. records)* [No. individuals]*	Potential impact	Likelhd.	Conseq.	Risk Rating	Justification
Circus approximans (Swamp Harrier)	-	Foraging Roosting Breeding	57 (66)	0-24 (33) [37] 25-50 (12) [12] 51-75 (3) [4] 75-150 (3) [6]	Direct collision/ barotrauma	Almost certain	Minor	Low	Frequently recorded in the Development Envelope, as singles/pairs. Frequently recorded flying at RSA heights. Recorded moderate mortalities (10–100) in carcass monitoring from reviewed sources. Likely uses the Development Envelope regularly for foraging. Potential for breeding but no known nest sites in the Development Envelope. Occasional loss of individuals likely but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability. Based on the above the risk to this species from the operation of the Proposal is considered Low. Potential impacts to this species from the operation of the Proposal will be managed through the BBAMP to ensure no significant impacts to this species.
Elanus axillaris (Black-shouldered Kite)	-	Foraging Roosting Breeding	4 (4)	0-24 (1) [1] 25-50 (1) [1]	Direct collision/ barotrauma	Potential	Minor	Low	Infrequently recorded in the Development Envelope, as singles. Recorded flying at RSA height. Recorded moderate mortalities (10–100) in carcass monitoring from reviewed sources. Likely to forage in the Development Envelope. Potential for breeding but no known nest sites in the Development Envelope. Widespread, abundant species. Occasional loss of individuals likely but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability. Based on the above the risk to this species from the operation of the Proposal is considered Low. Potential impacts to this species from the operation of the Proposal will be managed through the BBAMP to ensure no significant impacts to this species.
Haliaeetus leucogaster (White-bellied Sea-Eagle)	-	Foraging	2 (2)	76-150 (2) [2]	Direct collision/ barotrauma	Potential	Insignificant	Negligible	Only one record in the Development Envelope of a bird flying over. Recorded flying at RSA height. Only one recorded mortality in carcass monitoring from reviewed sources. Mostly occurs in coastal habitats. May hunt for waterbirds in the Development Envelope on occasion, or transit through but no breeding and unlikely to be a regular visitor. Territorial and occur sparsely across their range. Rare loss of individuals possible but reduction in population viability unlikely. Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Haliastur sphenurus (Whistling Kite)	-	Foraging Roosting Breeding	8 (9)	25-50 (3) [3] 51-75 (1) [1] 76-150 (2) [2]	Direct collision/ barotrauma	Potential	Insignificant	Negligible	Infrequently recorded in the Development Envelope, as singles, one pair. Recorded flying at heights within RSA. Recorded low mortalities (<10) in carcass monitoring from reviewed sources. Likely to forage in the Development Envelope. Potential for breeding but no known nest sites in the Development Envelope. Rare loss of individuals possible but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability. Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Hieraaetus morphnoides (Little Eagle)	-	Foraging Roosting Breeding	3 (3)	76-150 (2) [2]	Direct collision/ barotrauma	Potential	Insignificant	Negligible	Infrequently recorded in the Development Envelope, as singles recorded flying at RSA height. Recorded low mortalities (<10) in carcass monitoring from reviewed sources. Likely to forage in the Development Envelope. Potential for breeding but no known nest sites in the Development Envelope. Rare loss of individuals possible but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability. Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Tachyspiza cirrocephala (Collared Sparrowhawk)	-	Foraging Roosting Breeding	4 (4)	0-24 (2) [2] 25-50 (1) [1] 76-150 (1) [1]	Direct collision/ barotrauma	Potential	Insignificant	Negligible	Infrequently recorded in the Development Envelope, as singles. Recorded flying at heights within RSA. Recorded low mortalities (<10) in carcass monitoring from reviewed sources. Highly manoeuvrable species. Likely to forage in the Development Envelope. Potential for breeding but no known nest sites in the Development Envelope. Rare loss of individuals possible but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability. Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Tachyspiza fasciata (Brown Goshawk)	-	Foraging Roosting Breeding	6 (7)	0-24 (1) [2] 51-75 (1) [1] 76-150 (2) [2]	Direct collision/ barotrauma	Potential	Minor	Negligible	Infrequently recorded in the Development Envelope, as singles, one pair. Recorded flying at heights within RSA. Recorded moderate mortalities (10–100) in carcass monitoring from reviewed sources. Likely to forage in the Development Envelope. Potential for breeding but no known nest sites in the Development Envelope. Occasional loss of individuals possible but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability. Based on the above the risk to this species from the operation of the Proposal is considered Negligible.

Species	Cons. Status	Potential use in the Development Envelope	No. Records/ Individuals (birds) Activity level (bats)	Rec. Flight Height Range (m) (No. records)* [No. individuals]*	Potential impact	Likelhd.	Conseq.	Risk Rating	Justification
Falco berigora (Brown Falcon)	-	Foraging Roosting Breeding	17 (21)	0-24 (8) [9] 25-50 (4) [6] 51-75 (1) [1] 76-150 (1) [1]	Direct collision/ barotrauma	Almost certain	Minor	Low	Frequently recorded in the Development Envelope, as singles, pairs. Recorded flying at heights within RSA. Recorded high mortalities (>100) in carcass monitoring from reviewed sources. Relatively heavy slow flight. Likely to forage in the Development Envelope regularly. Potential for breeding but no known nest sites in the Development Envelope. Occasional loss of individuals likely but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability. Based on the above the risk to this species from the operation of the Proposal is considered Low. Potential impacts to this species from the operation of the Proposal will be managed through the BBAMP to ensure no significant impacts to this species.
Falco cenchroides (Australian Kestrel)	-	Foraging Roosting Breeding	47 (58)	0-24 (34) [44] 25-50 (8) [9] 76-150 (3) [3]	Direct collision/ barotrauma	Almost certain	Minor	Low	Frequently recorded in the Development Envelope, as singles, pairs. Recorded flying at heights within RSA. Recorded high mortalities (>100) in carcass monitoring from reviewed sources. Observed foraging in the Development Envelope and likely to hunt there regularly. Potential for breeding but no known nest sites in the Development Envelope. Loss of individuals likely but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability. Based on the above the risk to this species from the operation of the Proposal is considered Low. Potential impacts to this species from the operation of the Proposal will be managed through the BBAMP to ensure no significant impacts to this species.
Falco longipennis (Australian Hobby)	-	Foraging Roosting Breeding	3 (4)	0-24 (2) [2] 51-75 (1) [2]	Direct collision/ barotrauma	Potential	Insignificant	Negligible	Infrequently recorded in the Development Envelope, as singles, one pair. Recorded flying at height within RSA. Only one mortality in carcass monitoring from reviewed sources. Occasional foraging in the Development Envelope likely but not a regular inhabitant. Potential for breeding but no known nest sites in the Development Envelope. Rare loss of individuals possible but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability. Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Austronomus australis (White-striped Free-tailed Bat)	-	Foraging Roosting Breeding	High	NR	Direct collision/ barotrauma	Almost certain	Minor	Low	Activity levels highest within the Development Envelope. Second highest total number of calls recorded, overall. Largely absent in winter and autumn. Suspected to fly at heights within RSA. Recorded high mortalities (>100) in carcass monitoring from reviewed sources. Often represents the species with highest documented mortality. Loss in numbers of individuals likely but is a widespread and relatively abundant species in the Development Envelope and surrounds, therefore unlikely to lead to reduction in population viability. Based on the above the risk to this species from the operation of the Proposal is considered Low. Potential impacts to this species from the operation of the Proposal will be managed through the BBAMP to ensure no significant impacts to this species.
Chalinolobus gouldii (Gould's Wattled Bat)	-	Foraging Roosting Breeding	Low	NR	Direct collision/ barotrauma	Potential	Insignificant	Negligible	Low activity levels in the Development Envelope all year. Suspected to fly at heights within RSA. Recorded moderate mortalities (10–100) in carcass monitoring from reviewed sources. Rare loss of individuals due to low activity in the Development Envelope, reduction in population viability unlikely. Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Chalinolobus morio (Chocolate Wattled Bat)	-	Foraging Roosting Breeding	Low	NR	Direct collision/ barotrauma	Potential	Insignificant	Negligible	Low activity levels in the Development Envelope. Far more active in summer by a factor of 10-20 compared with other seasons. Suspected to fly at heights within RSA. Recorded moderate mortalities (10–100) in carcass monitoring from reviewed sources. Rare loss of individuals due to low activity in the Development Envelope, reduction in population viability unlikely. Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Nyctophilus geoffroyi (Lesser Long-eared Bat)	-	Foraging Roosting Breeding	Low	NR	Direct collision/ barotrauma	Potential	Insignificant	Negligible	Low activity levels in the Development Envelope all year. Suspected to fly at heights within RSA. Recorded moderate mortalities (10–100) in carcass monitoring from reviewed sources. Rare loss of individuals due to low activity in the Development Envelope, reduction in population viability unlikely. Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Nyctophilus holtorum (Holt's Long-eared Bat)	-	Foraging Roosting Breeding	Low	NR	Direct collision/ barotrauma	Potential	Insignificant	Negligible	Low activity levels in the Development Envelope and present in summer and autumn only. Suspected to fly at heights within RSA. No data found on wind farm mortalities but was previously classified within *C. gouldii* (ref Parnaby), therefore assume similar mortality risk to this species (moderate mortalities). Rare loss of individuals due to low activity in the Development Envelope, reduction in population viability unlikely. Based on the above the risk to this species from the operation of the Proposal is considered Negligible.

Species	Cons. Status	Potential use in the Development Envelope	No. Records/ Individuals (birds) Activity level (bats)	Rec. Flight Height Range (m) (No. records)* [No. individuals]*	Potential impact	Likelhd.	Conseq.	Risk Rating	Justification
Nyctophilus major (Greater Long-eared Bat)	-	Foraging Roosting Breeding	Low	NR	Direct collision/ barotrauma	Potential	Insignificant	Negligible	Low activity levels in the Development Envelope, all year, almost absent in winter. Suspected to fly at heights within RSA. No data found on wind farm mortalities. Rare loss of individuals due to low activity in the Development Envelope, reduction in population viability unlikely. Based on the above the risk to this species from the operation of the Proposal is considered Negligible.
Vespadelus regulus (Southern Forest Bat)	-	Foraging Roosting Breeding	Moderate	NR	Direct collision/ barotrauma	Almost certain	Minor	Low	Moderate activity levels in the Development Envelope and high activity levels within the 10 km buffer. Active all seasons. Suspected to fly at heights within RSA. Recorded moderate mortalities (10–100) in carcass monitoring from reviewed sources. Loss in numbers of individuals likely but is a widespread and relatively abundant species in the Development Envelope and surrounds, therefore unlikely to lead to reduction in population viability. Based on the above the risk to this species from the operation of the Proposal is considered Low. Potential impacts to this species from the operation of the Proposal will be managed through the BBAMP to ensure no significant impacts to this species.

*Not all records included flight details; therefore the no. of flight height records does not necessarily match the number of records/individuals for all bird species.

[3]Not Recorded.

4. Preventative Management and Mitigation Measures

Mitigation measures are required as part of an adaptive management framework to avoid and minimise potential risks to bird and bat species assessed as at moderate and high risk of impact from the operation of the Proposal. Table 4-1 details preventative mitigation measures that will be implemented to prevent and avoid risk. These mitigation measures can also be implemented to reduce risk following the identification of associated impacts.

Table 4-1: Preventative management and mitigation measures

Management measure	Management action	Timing and frequency of monitoring	Reporting
Carrion Removal	The Site Manager will be responsible for ensuring a carrion removal protocol is implemented and includes the following activities: • Educate staff and landowners to immediately report any stock, introduced or native animal carcasses within the Development Envelope and specifically within 120 m of any turbine that may attract raptors • Any carcasses and/or remains found that are within the Development Envelope will be collected and disposed or relocated as soon as practicable, in a manner that will avoid attracting raptors close to turbines in consultation with the landowner • Any bird and bat carcasses within 200 m of a turbine must be collected and disposed of by authorised personnel in accordance with the carcass recording and handling and storage protocols (Section 5.4.6.2).	Commissioning and during operation	Carcasses will be recorded in a dedicated carrion removal register maintained by the Site Manager. This register will inform an annual summary of carcass removal to be provided in the annual reports.
Stock Control	Where possible and agreed to by landholders, grain feeding of stock will be restricted to paddocks more than 200 m from operational turbines to reduce the risk of birds being attracted to the area. The implementation of this mitigation measure will require close coordination with landholders through discussion and notification of feeding areas and annual BBAMP implementation program.	Commissioning and during operation	Stakeholder engagement register.
Feral Animal Reporting	All site personnel will be responsible for the opportunistic recording of feral animals including Red Fox, Feral Cat, Feral Rabbits and Feral Pigs to monitor their occurrence across the Development Envelope. If opportunistic feral fauna sightings show an increase in European Rabbits occurrence over an extended period during construction, investigate the cause and establish further mitigation measures, including: • Targeted control measures in consultation with landholders, DBCA and any regional control programs • Staff training and reinduction if measures are not implemented or incident reporting indicates management processes such as carrion removal protocols and waste management measures are not being followed and contributing to increased feral fauna records.	Commissioning and during operation	Opportunistic feral animal sightings will be recorded and summarised in monthly reports.
Turbine and Met Mast Design	• Turbines will be designed with smooth and rounded surfaces where possible to minimise the availability for raptor perches. • Visual bird diverters will also be installed on guy wires of permanent met masts to minimise the risk of collision. • All site personnel will be responsible for the opportunistic recording of raptors perching on Wind Farm infrastructure.	Design	Opportunistic reporting of raptor perch sightings.
Lighting Design	Lighting on turbines and other Proposal infrastructure will be kept to a minimum to avoid attracting birds, bats, and insects. Specific measures to reduce potential impacts of lighting will include the following: • The use of directional lighting, hoods, sensor lighting and red lights as opposed to white or yellow lights, where practicable • Assessments to date do not indicate that lighting on the wind turbines will be required. Aviation lighting will only be installed on wind turbines where required by Air Services Australia and Civil Aviation Safety Authority	Commissioning and during operation	Opportunistic reporting of lighting malfunctions. Lighting requirements will be detailed within contractual agreements.

Management measure	Management action	Timing and frequency of monitoring	Reporting
	(CASA)/emergency services. In this instance, if lighting is required by the approving authorities, the Proponent will work with aviation and emergency services to assess lighting solutions.		
Transmission line design	• Visual bird diverters will be installed along the Proposal's transmission line to minimise the risk of collision with transmission lines.	Commissioning and during operation	Opportunistic reporting of effectiveness of bird diverters.

5. Operational Bird and Bat Monitoring Program

The Proposal's operational phase monitoring program has been designed for implementation during the initial two-years of full operation. Whilst the methodology and schedule of monitoring is detailed explicitly in the following sections, the monitoring program will be implemented within the broader adaptive management framework of this BBAMP. The main objectives of the monitoring program are to assess both direct and indirect impacts and identify any requirements for adaptive management and/or mitigation. The monitoring program comprises the following components:

- BUS - Monitoring of bird utilisation throughout the initial phase of operations, to be analysed comparatively to pre-operational data (Section 5.1).
- Bat utilisation surveys - Monitoring of bat activity throughout the initial phase of operations, to be analysed comparatively to pre-operational data (Section 5.2).
- Opportunistic flight behaviour and tracking - Recording of Threatened, Migratory and at-risk bird species flight behaviour and activity (Section 5.3).
- Carcass search monitoring program - A robust operational phase carcass search monitoring program to detect birds and bats that collide fatally with turbines, in order to estimate overall bird and bat mortality rates at the Proposal (Section 5.4).

Section 5.1 through to Section 5.4 describes the survey methodologies to be implemented once the Proposal becomes operational.

5.1. Bird Utilisation Surveys

Operational phase BUS will be undertaken utilising a selection of the same sites (excluding the Regional reference sites) and methods used for the pre-construction surveys (see Section 2.2.1). BUS will occur twice annually between September and February over the first two years of operation and will be timed to coincide with the seasonal migration/movement of conservation significant bird species that have been recorded or considered likely to occur in the area, including the three black cockatoo species. Data from operational phase BUS will be compared to pre-construction data to assess the extent and likely causes of any changes in bird species composition or activity recorded during the initial operational phase. The requirement for any additional BUS will be determined following the completion of the Year Two operational BBAMP annual report.

5.2. Bat Utilisation Surveys

Operational phase bat utilisation surveys will be undertaken utilising a selection of the same sites and methods used for the pre-construction surveys (see Section 2.2.2). Bat utilisation surveys will occur twice annually over the first two years of operation and will be timed to coincide with the seasonal BUS. Data from operational phase bat utilisation surveys will be compared to pre-construction data, to assess the extent and likely causes of any changes in bat species composition or activity during the initial operational phase. The requirement for any additional bat utilisation surveys will be determined following the completion of the Year Two operational BBAMP annual report.

5.3. Opportunistic Flight Behaviour and Tracking

The behaviour and flight path of all Threatened, Migratory and at-risk bird species observed opportunistically outside of the BUS will be recorded via spatially enabled digital software such as ESRI Field Maps. The following data will be recorded for each bird:

- GPS location of recorder
- Bird's distance from the recorder
- Direction of each bird sighted
- If flying across the landscape, the direction to and from
- Estimated flight height
- Count of individuals
- Age class of individuals (e.g. juveniles, adults).

5.4. Carcass Monitoring Program

5.4.1. Key Terms

The following key terms are relevant to the carcass monitoring program:

- Mortality: any dead bird or bat or feather clump (a clump of five or more feathers) located within the search zone, unless there are obvious signs of another cause of death.
- Mortality Rate: the estimated annual number of individuals that collide fatally with turbines.

5.4.2. Overview

A carcass monitoring program will be implemented to determine the direct impact of turbine strike on bird and bat species and calculate the mortality rate over an annual period. Collection of carcass monitoring data is important to inform adaptive management that may be implemented to reduce collision risk, monitor impacts to Threatened, Migratory and at-risk species and trigger the requirement for additional monitoring and/or management intervention.

The carcass monitoring program has been designed to generate a robust dataset that can derive estimates of both bird and bat mortality rates, along with monitoring precision. This is achieved by accounting for carcass persistence and searcher efficiency factors which can reduce the quantity of bird and bat carcasses recorded during monitoring. Experimental trials form part of the monitoring program so that 'correction factors' can be applied to the estimated annual mortality rate.

The carcass monitoring program will be implemented in a progressive manner. The three phases will include:

1. Commissioning carcass monitoring program – to be implemented progressively across the Proposal as turbines commence operations (Section 5.4.3).
2. Full carcass monitoring program – to be implemented after all turbines are able to operate and export electricity simultaneously. This program will run for a minimum of two years (Section 5.4.4).
3. Long-term carcass detection/monitoring program – to be implemented following review and consultation of the full carcass monitoring program (Section 5.4.5).

5.4.3. Commissioning Carcass Monitoring Program

Not all turbines will be completely installed and operational simultaneously. However, there remains an elevated risk relative to baseline conditions of bird and bat strikes once a turbine component has been completely installed and commissioning commenced. As such, a commissioning carcass monitoring program is proposed to be implemented, commencing once approximately 50% of the selected turbines (see Section 5.4.6.1) are commissioned and able to be operated simultaneously. Once this has commenced, the program will be progressively expanded to include additional turbines as they are commissioned. This program will continue until all selected turbines have been commissioned, when the full carcass monitoring program phase will commence (Section 5.4.4).

The commissioning carcass monitoring program is proposed to occur monthly.

5.4.4. Full Carcass Monitoring Program

Once all selected turbines have been commissioned and are able to be operated simultaneously, the full carcass monitoring program will commence. The full carcass monitoring program is proposed to be carried out monthly across the first two years (Year One to Year Two) of full operations. Monthly carcass searches will be conducted to capture coverage across the year and will be undertaken in accordance with the Carcass Monitoring Program Methodology (Section 5.4.6) within a 120 m radius of each turbine.

After the completion of the full carcass monitoring program, the Year Two annual report will review the program and assess any requirement for ongoing monitoring (Section 5.4.5).

5.4.5. Long-term Carcass Monitoring Program

Threatened birds and bats can collide at any time during the life of the wind farm operations and; therefore, incidental carcass detection will remain in place for the life of the Proposal operations, along with the management actions in response to impact triggers (Section 6).

After two years of the full carcass monitoring program period, the possibility of changes to the intensity and protocols for further long-term carcass monitoring, if warranted, will be evaluated, as informed by the outcomes of mortality rate estimates. The results of carcass monitoring will be used to objectively determine whether the Proposal imposes a low, moderate, or high impact risk for any Threatened, Migratory or at-risk bird or bat species to provide justification for any proposed changes to the monitoring program. If no triggers are met during full carcass monitoring program, and the risk rating for all species of concern is considered Low or lower, incidental carcass finds will continue to be recorded for the life of the wind farm.

5.4.6. Methodology

5.4.6.1. Search Protocol

Carcass searches aim to quantify the total collision mortality of a species or species group and will be undertaken by qualified ecologists or personnel trained in carcass searches and regularly assessed by the supervising ecologist. Mortality resulting from turbine collision is defined as any dead bird or bat or feather clump (a clump of five or more feathers) located within the search zone, unless there are obvious signs of another cause of death.

Based on the findings of Hull and Muir (2010), inner and outer search zones have been designated for the program. The inner zone targets the detection of the carcasses of bats and small to medium sized birds. Meanwhile, the outer zone will ensure the adequate detection of medium to large sized bird carcasses, such as raptors, which can fall further away from the turbines. The proposed carcass search effort is as follows:

- 10 turbines (50%) searched to a radius of 60 m (inner zone) and 120 m (outer zone).

Turbines will be selected using stratified sampling to ensure representative coverage of different vegetation/habitat types, turbine locations and other factors that may influence bird and bat activity and collision risk. In the inner zone, a circle is formed with a 60 m radius from the turbine base and transects are spaced concentrically within this zone every 6 m (or greater if using a detection dog) (Figure 5-1). The outer zone will comprise the zone between 60 m and 120 m radius. Searched transects in this zone will be spaced concentrically every 12 m (or greater if using a detection dog).

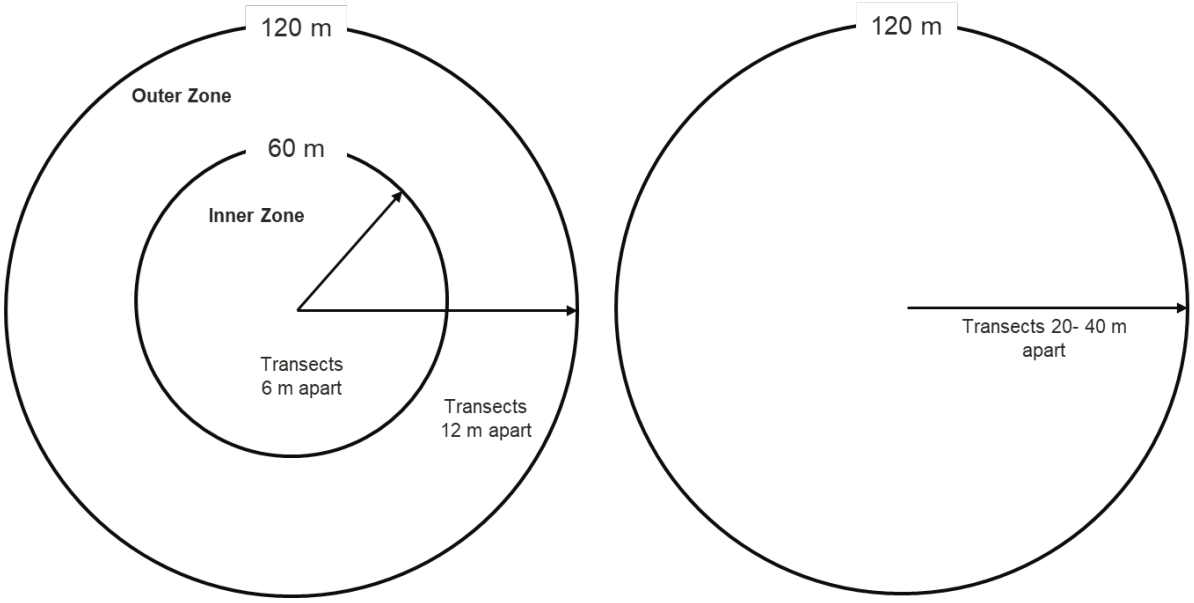


Figure 5-1: Inner and Outer Search Zones for Human and Dog Detection

A second follow-up search, known as a "pulse search", will be undertaken during spring and summer at selected turbines, within several days of the first search, to detect additional mortality of conservation significant species of concern with a Moderate risk rating (Forest Red-tailed Black Cockatoo). Pulse searches will be undertaken within a 120 m radius using 12 m spaced concentric transects, to ensure the adequate detection of conservation significant species of concern (noting Forest Red-tailed Black Cockatoos are considered medium sized, in accordance with the archetypes defined in Hull and Muir (2010). The pulse search allows for the rate of carcass strikes to be more accurately determined, by lessening the potential for carcasses to be lost to scavenging between monthly carcass monitoring events. Pulse searches will be undertaken at select turbines located in proximity habitat values of

conservation significant species of concern that have a Moderate risk rating (i.e. Forest Red-Tailed Black Cockatoo). The selected turbines for the pulse searches will take into consideration High quality foraging habitat, potential nesting trees and areas of higher activity based on baseline survey results. In addition, if a monthly carcass monitoring event identifies mortality of conservation significant bird species at a particular turbine not surveyed as part current pulse search, this turbine will be included in future pulse searches.

Trained detection dogs, if available, may be used for carcass searches and where weather conditions and the terrain of the search areas are suitable for a safe and effective search. The use of detection dogs will be subject to landholder agreement and the availability of suitably trained and experienced detection dog operators. Detection dogs have been successfully used for carcass monitoring across existing Australian wind farms and have advantages with regard to detection efficiency and accuracy (Stark and Muir 2020). However, there are limited detection dog teams available in WA trained for detections, at the time of preparation of this plan.

If detection dogs are to be used, this will generally involve a dog and handler traversing the 120 m search with wider transect spacing, approximately 20–40 m from one another, depending on wind speed (high winds potentially impacting scent detection). The spacing of the paths within this range would be determined by the handler. The dog would be fitted with a GPS unit to provide a measure of coverage completed during each survey. Dog handlers will be trained and experienced in identification of all bird and bat species that may occur within the Development Envelope or otherwise supported by an ecologist.

The results from searches undertaken by detection dogs will be compared with the results of subsequent human searches, and a correction factor applied to human results where differences occur, to ensure an accurate estimate of strike rates per turbine.

5.4.6.2. Carcass Recording and Handling

Bird and bat carcasses located during monitoring and opportunistically will be recorded digitally using geo-referenced data collection software (such as ESRI ArcCollector) with the following data to be recorded:

- GPS location along with distance (m) and compass bearing from the turbine (excludes incidental carcass finds)
- Time and date
- Nearest turbine ID number
- Species, age, and sex (where identifiable)
- Signs of injury and/or predation
- Estimated carcass age
- Groundcover type and height
- Immediately surrounding broad vegetation type (250 m radius)
- Presence and distance to key habitat features such as wetlands or other surface water, and Potential breeding trees
- Current weather conditions and any extreme or unusual weather events since the time of estimated death

- Photographs (to be provided to qualified ecologist for identification, if required, within two business days).

All recorded carcasses will be:

- Removed from search zone to prevent re-counting and scavenging
- Handled by authorised personnel using hand protection (e.g. rubber gloves)
- Packed into a plastic bag
- The bag will be clearly labelled with the time, date, the turbine it was collected from and the species name (if identifiable) and placed in the onsite storage freezer.

A carcass register will be maintained to document all bird and bat carcasses (including feather clumps) recorded both during monitoring and opportunistically across the Development Envelope. This will include recording those carcasses stored in the onsite storage freezer in accordance with Section 5.4.6.2. The registers will be held on a secure online platform (such as Microsoft Excel Online) so that both operational personnel and Proposal ecologists can access and update the register as required. Carcasses would then be utilised for positive species identification, use in scavenger and detectability trials, detection dog training, and for donation to museum collections.

5.4.6.3. Scavenger Rates and Trials

Scavenger Trials will involve the placement of bird and bat carcasses within the search zone of turbines to quantify the rate of carcass removal. The metric calculated is referred to as the survival function, which determines the probability that a carcass will 'survive' in the field past a given time then provides a mean and confidence interval on the time to scavenge of a given carcass.

Placed carcasses will be paired with a motion-sensing and colour/infra-red compatible remote camera positioned directly on the carcass. The utilisation of remote cameras allows for an accurate recording of the time and species responsible for scavenging of each placed carcass. The trial period will take place across 30 days, after which the cameras will be retrieved for analysis and any remaining carcasses (or part thereof) removed. Carcasses and cameras will be checked throughout the duration of the trial. Scavenger Trials may be undertaken concurrently with Detectability Trials (see Section 5.4.6.4) and monthly monitoring to re-position carcasses if necessary, and also to maximise efficiency and resources.

The turbines used for the Scavenger Trial will be a subset of the turbines monitored each month and will represent the range of surrounding broad vegetation types and adequate spatial distribution across the site. Scavenger Trials will be undertaken on two occasions over the first and second year of the full carcass monitoring program, with one trial to be undertaken in winter/early-spring and the other trial to be undertaken in summer/early-autumn, to account for seasonal variation.

To account for potential variation in scavenger rates based on carcass size, three different carcass sizes will be used for each trial, microbat, small/medium bird, and large bird. The carcass quantities per size class required to obtain a reasonable measure of average scavenging rates are detailed in Table 5-1.

Should insufficient quantities of carcasses be available for the trial, substitute carcasses for these trials will be of similar size, colour and general appearance of the target species group (e.g. mice as substitute for microbats).

Table 5-1: Carcass classes and quantities required for Scavenger Trials

Trial	Microbat	Small/medium bird	Large bird
Winter/ early-spring	10	10	10
Summer/ early-autumn	10	10	10

5.4.6.4. Detectability (Observer) Trials

Observer detectability is another factor which needs to be accounted for in calculating annual mortality rates, as the detectability of carcasses under turbines varies depending on a range of factors such as efficacy of the observer, size of carcass and type of groundcover (particularly given the presence of cropping). Detectability trials aim to quantify the probability that a searcher will detect a carcass in their search zone, whilst undertaking the prescribed carcass search protocol.

Two detectability trials will be undertaken over the first and second year of the full carcass monitoring program, one during winter and one during summer. The carcass classes and quantities used will also be consistent with those used for the Scavenger Trials (Table 5-1). Given this, and to maximise efficiencies in timing and resources, detectability trials may be undertaken concurrently with the Scavenger Trials and/or monthly carcass searches. However, where completed concurrently, it is important that the detectability trials are completed in one day, being the first day of the Scavenger Trial and prior to the setup of remote cameras to monitor the carcasses. This will minimise the opportunity for the carcasses to be scavenged and ensure the validity of the trial. To achieve the most applicable result, only personnel who have carried out monthly searches within the Development Envelope will be involved in the Detectability Trials.

Carcasses will be placed within the search zone of a given turbine. A carcass controller (a third party, independent from the monthly carcass searches) will throw each carcass into the air, allowing it to land in a manner somewhat consistent with a bird/bat which has collided with a turbine. The carcass controller will collect details on the coordinates, species, timing and groundcover of each placed carcass. The results of these trials will be used to calibrate the findings of the monthly carcass search program.

Should insufficient quantities of carcasses be available for the trial, substitute carcasses for these trials will be of similar size, colour and general appearance of the target species group (i.e. mice as substitute for microbats) and may include stuffed replica, or visually and similar sized proxies.

5.5. Key Personnel

Suitably qualified and trained people will be engaged to implement this BBAMP. BUS and bat utilisation surveys are to be undertaken by qualified and trained ecologists. Carcass searches will also be undertaken by qualified and trained ecologists or by dog handlers trained and experienced in identification of all bird and bat species that may occur or otherwise supported by an ecologist.

Select number of site personnel will be trained in key components of the implementation of this BBAMP. Such components include the Carcass Recording and Handling (Section 5.4.6.2), Storage Register (Section 5.4.6.2) and Injured Bird and Bat (Section 5.6) protocols, impact triggers (Section 6), and notification and reporting requirements (Section 7). The protocols will be relayed to all Proposal staff as part of the site induction.

5.6. Injured Bird and Bat Protocol

All Proposal staff who locate injured birds and bats are to report the find to the Proposal site manager immediately. Only trained and authorised staff are to handle wildlife. The coordinates and/or specific

location of the injured animal is to be recorded (along with photos where safe and able) and risks to the animal and staff assessed. If it is deemed safe to proceed then the animal should be collected in a towel or cloth bag, then placed immediately into a dark place (e.g. ventilated cardboard box or wildlife carrier) for transfer to a wildlife carer or veterinarian.

5.7. Monitoring summary for Threatened, Migratory and at-risk bird and bat species

A summary of the monitoring requirements for Threatened, Migratory and at-risk bird and bat species is detailed in Table 5-2.

Table 5-2: Operational monitoring of Threatened, Migratory and at-risk species / species groups

Survey	Species group	Methodology	Timing	Period
BUS	Conservation significant birds Other at-risk bird species	Section 2.2.1	Twice annually, in Spring and Summer following commencement of full operation.	2 years
Bat utilisation surveys	Conservation significant bat Other at-risk bat species	Section 2.2.2	Twice annually, in Spring and Summer following commencement of full operation.	2 years
Opportunistic Flight Behaviour and Tracking	Conservation significant birds Other at-risk bird species	Section 5.3	Opportunistically during BUS, bat utilisation surveys, carcass search protocols and trials.	2 years
Carcass Search Protocol	Conservation significant bats and birds Other at-risk bird and bat species	Commissioning Carcass Monitoring Program (Section 5.4.3)	Monthly during commissioning, once 10 turbines have been commissioned.	Until commencement of full operations.
		Full Carcass Monitoring Program (Section 5.4.4)	Monthly following commencement of full operations. Pulse searches to be undertaken monthly during spring and summer.	2 years
		Long-term Carcass Monitoring Program (Section 5.4.5)	To be confirmed following the evaluation of mortality rate estimates informed by the full carcass monitoring program.	
Scavenger Rates and Trials	Conservation significant bats and birds Other at-risk bird and bat species	Section 5.4.6.3	Biennially, once in winter / early-spring and once in summer / early-autumn.	2 years
Detectability (Observer) Trials	Conservation significant bats and birds Other at-risk bird and bat species	Section 5.4.6.4	Biennially. May be undertaken concurrently with the scavenger trials.	2 years

6. Impact Triggers

This section of the BBAMP defines impact triggers for both listed Threatened, Migratory or Priority species and non-listed species, as well as detailing the notification requirements, process for investigation and the implementation of mitigation strategies following an impact trigger.

6.1. Non-listed Species Impact Trigger

An impact trigger has been defined for bird and bat species which are not conservation listed but are considered to have a higher potential for collision with turbines (e.g. raptors and microbats).

The impact trigger for non-listed species is the confirmation of a carcass or injured individuals as recorded during the carcass detection program or detected within 120 m of turbines incidentally during other activities a total of four or more times at the same or adjacent turbine within two successive searches.

6.2. Conservation Significant Species Impact trigger

Impact triggers have been defined for bird and bat species listed as Threatened and/or Migratory under the EPBC Act or BC Act or Priority by DBCA.

The impact trigger for Threatened and Priority species is the confirmation of one dead or injured individual during the carcass detection program or detected within 120 m of turbines incidentally during other activities. The impact trigger for species listed as Migratory under the EPBC Act or BC Act is the confirmation of four dead or injured individuals detected within 120 m of any turbine during the species migratory season.

Table 6-1 outlines the rationale for the proposed outcome-based management trigger criteria, response actions, management measures and monitoring requirements.

Table 6-1: Outcome-based management for bird and bat species of concern

Key impact/risk	Trigger criteria	Trigger level actions
Direct injury or mortality of a species listed as Threatened under the BC Act or EPBC Act or as Priority by DBCA	Any Threatened species listed under the BC Act or EPBC Act or Priority by DBCA is found dead or injured beneath or adjacent (120 m radius) to a turbine.	• Immediately notify site manager who will notify the Proposal ecologist and State and Commonwealth agencies within five working days. • Increase carcass monitoring to fortnightly for an initial period of six weeks, subject to the availability of qualified ecologists and in consultation with the relevant regulator. If additional carcasses are recorded, monitoring is to continue fortnightly for another six weeks, subject to the availability of qualified ecologists and in consultation with the relevant regulator, or if no carcasses are recorded, return to monthly monitoring.
Direct injury or mortality of a species listed as Migratory under the BC Act or EPBC Act	Four or more carcasses from the same migratory species are recorded beneath or adjacent (120 m radius) to any turbine during the species migratory season.	• Subject to the results of the carcass monitoring and consultation with the relevant regulators, implement targeted monitoring at the impact turbine/s and any subsequent turbines where impacts are recorded, along with locations the target species has been previously sighted to better understand the reason for the injury or mortality to inform any updates to the risk assessment. For example, whether the impact is likely to be an isolated event or the result of regular seasonal movement. Targeted monitoring methodology and timing should be specific to the impacted species and should be developed in consultation with the relevant regulator. • Based on the results of the carcass and targeted monitoring update the risk assessment for the species by re-assessing the species risk level and determining whether the impact trigger has resulted in a significant impact to the species or is likely to result in a significant impact if repeated. • Within a timeframe agreed to by the relevant regulator, a report will be prepared confirming the likely cause of death, contributing factors and the results of additional carcass and targeted monitoring undertaken to determine whether the impact has resulted in a significant impact. • Where the impact has resulted, or is likely to result, in a significant impact, implement appropriate adaptive mitigation strategies, including use of deterrents (e.g. noise, visual) or turbine curtailment in response to high-risk environmental factors (e.g. low wind speed, periods of high species activity). • Where the impact has resulted, or is likely to result, in a significant impact, additional targeted monitoring will be implemented to assess the efficacy of any adaptive mitigation strategies implemented. • A summary will be included within the annual report confirming the likely cause of death, contributing factors, results of any additional monitoring undertaken and the efficacy of any adaptive mitigation strategies implemented.

Key impact/risk	Trigger criteria	Trigger level actions
Direct injury or mortality of a species not listed as Threatened or Migratory under the BC Act or EPBC Act or as Priority by DBCA	Four or more carcasses from the same species are recorded beneath or adjacent (120 m radius) to the same turbine in two successive searches. This impact trigger does not apply to introduced species or those listed as declared pests.	• Immediately notify site manager. • Instigate a desktop investigation within five working days to confirm the cause of death and any likely contributing factors or circumstances. Review site conditions, existing monitoring data for the species, and document consultation with State agencies and other relevant parties to determine whether any additional monitoring is warranted. • If required by State agencies, as subject to the above consultation, within a timeframe agreed to by the relevant regulator, a report will be prepared confirming the likely cause of death, contributing factors, the results of additional monitoring undertaken, re-assessment of the risk level for the species and determining whether the impact trigger has resulted in a significant impact to the species or is likely to result in a significant impact if repeated. • Where the impact has resulted, or is likely to result, in a significant impact, implement appropriate adaptive mitigation strategies, including use of deterrents (e.g. noise, visual) or turbine curtailment in response to high-risk environmental factors (e.g. low wind speed, periods of high species activity). • Where the impact has resulted, or is likely to result, in a significant impact, additional targeted monitoring will be implemented to assess the efficacy of any adaptive mitigation strategies implemented. • A summary will be included within the annual report confirming the likely cause of death, contributing factors, results of any additional monitoring undertaken and the efficacy of any adaptive mitigation strategies implemented.
Presence of a threatened or at-risk bird nest close to a wind turbine	Confirmed active nest (excluding hollows) of Threatened or at-risk bird species within 200 m of operational turbine.	• Consider relocating the nest and/or tree once the breeding event has concluded. • Conduct monthly checks of the nest and/or tree after the likely fledging period for the species, to confirm whether the breeding event has concluded and whether the nest is suitable for relocation. • Summary will be included in the annual report detailing any relocation that has occurred and the results of the monthly checks.

7. Reporting

Monthly carcass monitoring reporting

At the conclusion of each monthly carcass monitoring event, a brief report will be prepared and sent from the Proposal ecologist to relevant Proposal personnel, outlining the survey results. The report will include the species, quantity and location of recorded carcasses, a review against impact triggers (Section 6), and any other ecologically significant matter (e.g. presence of feral fauna from opportunistic sightings). The report will also include the results of the scavenger and detectability trials, when relevant. In preparing the monthly report, the Proposal ecologist will also review and consider any incidental finds recorded within the carcass and storage register, as well as ensure the register is updated with monthly carcass monitoring finds. The report (as described in Table 6-1) will be prepared within 20 days of the completion of the monitoring event.

Annual reporting

The results of the Operational Bird and Bat Monitoring Program will be detailed in an annual report, to be prepared within three months of the completion of both Year One and Year Two operations. The annual report will present the results of the operational BUS and bat utilisation surveys, the Carcass Monitoring Program and include details of any trigger response or adaptive management measures implemented in the previous 12-month reporting period.

The Year Two annual report will present a detailed analysis of the initial two-year full carcass monitoring program and discuss the requirement for any further monitoring, adaptive management and/or mitigation.

Statistical analysis of carcass monitoring results will provide an estimate of bird and bat mortality resulting from turbine collision. Overall mortality estimates will be provided for birds, bats, and where necessary, individual species. Statistical estimates of total mortality will be undertaken via the combined use of carcass monitoring data and scavenger and detectability trial data. Estimates will also take into account the limitations of the data inputs, with regard to the select area and number of turbines searched as part of the monitoring program.

Statistical analysis will also be undertaken to determine if there has been any significant decline ($p = <0.05$) in species richness of bird and/or bat utilisation and/or Significant decline or increase in abundance of Moderate or High risk level Threatened, Migratory or at risk bird and bat species of concern post construction.

Results will be presented alongside their relevant confidence intervals and any applicable standard error. Analyses will also aim to identify any spatial, temporal, morphological or other species-specific trends evident within the data. This will ensure that any high-risk species and/or turbines are identified so that adaptive management and mitigation measures can be implemented.

Consistent with the adaptive management approach of this BBAMP, the risk level for each bird and bat species assessed in Table 3-4 will be revised in response to any impact trigger (Section 6) and updated as necessary during annual reporting.

Threatened and Priority species mortality notification

Any dead or injured Threatened or Priority species will require notification of Department of Climate Change, Energy, the Environment and Water (DCCEEW) and/or DBCA as soon as practicable (generally within five working days of the impact being known). The Proponent will liaise with these regulatory authorities to ascertain the significance of impact to these species and where required develop suitable adaptive management and mitigation measures to be incorporated into this Plan.

Incident/Impact Trigger reporting

As detailed in Table 6-1, if direct injury or mortality of a species listed as Threatened under the BC Act or as Priority by DBCA a report will be prepared in a timeframe agreed by the relevant regulator. This report will detail the likely cause of death, contributing factors and the results of any additional carcass and targeted monitoring undertaken.

If any of the other impact criteria are triggered a summary of the incident will be included within the annual report.

8. Adaptive Management and Review

This BBAMP will be revised prior to construction commencing and following detailed design to account for the final turbine layout and model, and to align with any future approval conditions under the EPBC Act, EP Act or the PD Act, as required.

This BBAMP will then be reviewed at least annually following the completion of each year's operational bird and bat monitoring program, and following any incident (i.e. exceedance of trigger) that results in:

- Changes to the risk assessment
- Change in monitoring or management requirements.

Any recommended changes to the BBAMP will be detailed within the annual reports described in Section 7.

9. References

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Phoenix Environmental Sciences (Phoenix) 2025c. *Basic and Targeted vertebrate fauna survey for a Proposed Wind Farm in Scott River*. Report prepared for SynergyRED.

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Appendix A Suitably Qualified Ecologists CV



Tom Kelly

Associate Ecologist

Tom commenced work for Eco Logical Australia (ELA) in May 2015 out at our Greater Western Sydney office before relocating to ELA's Mudgee office in November 2015 to take up a Graduate Ecologist position. Since this time, Tom has developed into an experienced Associate Ecologist, performing a wide range of tasks including ecological monitoring and surveys, environmental impact assessments, targeted threatened species surveys, management plan preparation and associated reporting. In performing these tasks, Tom has developed specialised knowledge and skills relevant to the environment and biodiversity, particularly with regards to the bird and bat species of south-eastern Australia. After over six years living and working in Mudgee, Tom relocated to ELA's Sydney office in February 2022.

Tom is an experienced project manager delivering a diverse range of projects, from small scale assessments and expert advice to long-term biodiversity monitoring programs for industry, government and community clients.

Upon graduating from the University of Wollongong with a Bachelor of Science degree, Tom continued his studies at the National Environment Centre, gaining an Advanced Diploma of Applied Environmental Management, which he completed in 2014.

QUALIFICATIONS

- Bachelor of Science – Physical Geography/Environmental Science Major, University of Wollongong
- Advanced Diploma of Applied Environmental Management, Riverina Institute – National Environment Centre
- Respond to Wildlife Emergencies (AHCFAU301)
- Conduct Local Risk Control (RIIRIS201D)
- Comply with Operation Work Processes / Procedures (RIIGOV201D)
- Apply Risk Management Processes (RIIRIS301D)
- Drive and Recover a 4WD Vehicle (SISODRV302A)
- Provide cardiopulmonary resuscitation (HLTAID001)
- Provide basic emergency life support (HLTAID002)
- Provide first aid (HLTAID003)

PROFESSIONAL MEMBERSHIPS

- Australian Bird Study Association
- Australasian Bat Society
- Birdlife Australia and Australian Raptor Group

KEY PROJECT EXPERIENCE RELATING TO RENEWABLES

BIODIVERSITY MONITORING

- Proposed Wind Farm Site near Darkan, WA . Bird and Bat Utilisation survey. Synergy Renewable Energy Developments (2025)
- Proposed Wind Farm Site near Burekup, WA . Bird and Bat Utilisation survey. Synergy Renewable Energy Developments (2025)
- Beryl Rd Solar Farm flora and fauna impact assessment. Mid Western Regional Council (2018)
- Bookham Wind Farm Biodiversity Development Assessment Report and Bird and Bat Adaptive Management Plan. Squadron Energy. Squadron Energy (2024)
- Euroley Wind Farm ecological constraints assessment. apa (2024)
- Jeremiah Wind Farm Bird and Bat Adaptive Management Plan. CWP Renewables (2020-24)
- Crudine Ridge Wind Farm Bird and Bat Adaptive Management Plan. CWP Renewables (2020-24)
- Coopers Gap Wind Farm Bird and Bat Adaptive Management Plan implementation. GE Renewables (2021-23)
- Ruby Hills Wind Farm Biodiversity Development Assessment Report and Bird and Bat Utilisation Surveys. Origin Energy (2023-24)
- Uungula Wind Farm Bird and Bat Adaptive Management Plan. CWP Renewables (2021-23)
- Kareela Grey-headed Flying-fox camp monitoring. Sutherland Shire Council (2015)
- Parkes to Manildra transmission line nest box monitoring. TransGrid (2015-16)
- Murrumbidgee to Googong Biodiversity Offset Area ecological monitoring. Icon Water (2016)
- Hunter North Coast Littoral Rainforest baseline monitoring. Office of Environment and Heritage NSW – National Parks & Wildlife Service (2018)
- Northwest Forests diurnal bird surveys and fauna habitat assessment. Forico (2022)
- Great Northern Forests diurnal bird monitoring. National Parks and Wildlife Service NSW (2024)

IMPACT ASSESSMENTS

- Wind Farm in Scott River Part IV Environmental Review Document. Synergy Renewable Energy Developments (2024-2025)
- Bookham Wind Farm Biodiversity Development Assessment Report. Squadron Energy (2024)
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- Valley of the Winds Wind Farm Biodiversity Development Assessment Report. UPC\AC Renewables Australia (2020-21)
- Stubbo Solar Farm Biodiversity Development Assessment Report. UPC\AC Renewables Australia (2020-21)
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- Uungula Wind Farm Biodiversity Assessment Report. CWP Renewables (2018-20)
- Spring Gully EPBC Act targeted threatened flora and fauna impact assessment. Origin Energy (2018)
- Narrabri and Boggabri bridge replacement and road re-alignment flora and fauna impact assessment. Narrabri Shire Council (2018)
- Ulan Rd upgrade flora and fauna impact assessment. Mid Western Regional Council (2016)
- Ulan-Wollar Rd intersection flora and fauna impact assessment. Wilpinjong Coal Pty Ltd (2016)
- Avisford 4WD Park flora and fauna impact assessment. Central West 4WD Park (2016)
- EL6288 flora and fauna impact assessment. Moolarben Coal Operations (2016)

- Open Cut 3 Modification biodiversity impact assessment. Moolarben Coal Operations (2017)
- ML1715 flora and fauna impact assessment. Moolarben Coal Operations (2017)
- UG4 Modification Biodiversity Assessment. Moolarben Coal Operations (2018)
- Slate Gully microbat assessment. Wilpinjong Coal Mine Pty Ltd (2016)
- Migratory shorebird targeted surveys and assessment. Water Corporation WA (2023)

BIODIVERSITY MANAGEMENT PLANS AND PROCEDURES

- Uungula Wind Farm Bird and Bat Adaptive Management Plan. Squadron Energy (2021-23)
- Jeremiah Wind Farm Bird and Bat Adaptive Management Plan. Squadron Energy (2023-24)
- Crudine Ridge Wind Farm Bird and Bat Adaptive Management Plan. Squadron Energy (2020-24)
- Cudgegong River Flying-fox Camp Management Plan. Mid-Western Regional Council (2017)
- Lamberts North Biodiversity Offset Management Plan. Energy Australia NSW (2019)

Appendix B Bird and Bat Risk Assessment

PHOENIX
ENVIRONMENTAL SCIENCES

Bird and bat risk assessment for a proposed wind farm in Scott River – Level Two investigation

Prepared for Synergy Renewable Energy Developments Pty Ltd

August 2025

Final v1.0



Bird and bat risk assessment for a proposed wind farm in Scott River–Level Two investigation

Prepared for Synergy Renewable Energy Developments Pty Ltd

Version history

Author/s	Reviewer/s	Version	Version number	Date submitted	Submitted to
P. Williams, J. Clark	J. Clark	Draft for client comments	0.1	13-Mar-24	N. Bell
K. Crews, J. Clark	K. Crews, E. Broom	Draft for client comments	0.2	04-Mar-25	N. Bell
J. Clark, K. Crews	P. Strickland	Update with Year 2 results	0.3	18-Jun-25	N. Bell
J. Clark	K. Crews	Addressed client comments	1.0	20-Aug-25	N. Bell

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ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
AGL	Above ground-level
BACI	Before, After, Control, Impact
BC Act	*Biodiversity Conservation Act 2016*
BIA	Bird/Bat Investigation Area
BBRAS	Bird and bat risk assessment survey
CAMBA	China-Australia Migratory Bird Agreement
CR	Critically Endangered
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EAAF	East Asian-Australasian Flyway
EIA	Environmental impact assessment
EN	Endangered
EP Act	*Environmental Protection Act 1986*
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESA	Environmentally Sensitive Areas
IBRA	Interim Biogeographic Regionalisation of Australia
JAMBA	Japan-Australia Migratory Bird Agreement
Mig.	Migratory
NES	National Environmental Significance
OS	Species otherwise in need of special protection
RAMSAR	A RAMSAR site is a wetland site designated to be of international importance under the Ramsar Convention
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement
RSA	Rotor swept area
SP	Specially protected
TEC	Threatened Ecological Community
VU	Vulnerable
WA	Western Australia
WAPC	Western Australian Planning Commission
WFA	Wind Farm Area

EXECUTIVE SUMMARY

Synergy Renewable Energy Developments Pty Ltd is investigating the feasibility of a Proposed Wind Farm in Scott River (the Project), located approximately 15 km north-east of Augusta, Western Australia. Phoenix Environmental Sciences Pty Ltd (Phoenix) has undertaken a bird and bat risk assessment survey (BBRAS) to identify potential risks to bird and bat species from the Project.

The BBRAS comprised:

- a desktop assessment (regional overview) to define the site and species characteristics
- bird and bat utilisation surveys undertaken over 2 years between May 2023 to March 2025
- risk assessment for species identified as potentially of concern for the Project based on the regional overview and field surveys.

An adaptive approach was taken for this survey program, with adjustments made to site locations after the completion of Year 1, following review of the first year of sampling results, and the provision of proposed turbine locations. The main 'study area' for this survey was the wind farm area (WFA), within which 20 turbines are proposed to be located. Site characterisation was conducted for the study area plus a 10 km buffer, referred to as the Bird/Bat Investigation Area (BIA). Regional reference sites on the Hardy Inlet (outside the BIA, except for one site) were added to the survey program in Year 2 to collect contextual regional data for Migratory shorebirds, in response to the Year 1 survey results. The study area is 3,882.2 ha and the BIA is 86,347.9 ha.

Fixed-point counts for birds were undertaken at a total of 28 sites, comprising 9 Impact sites, 14 Reference sites and 5 Regional reference sites. Echolocation recordings for bats were undertaken at all 16 Year 1 fixed-point count sites. Audio recordings for birds were also undertaken at the 16 Year 1 sites targeting 4 conservation significant species: Masked Owl (*Tyto novaehollandiae novaehollandiae*), Baudin's Cockatoo (*Zanda baudinii*), Carnaby's Cockatoo (*Zanda latirostris*) and Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*).

In addition to the BBRAS, a Basic and Targeted fauna survey was conducted for the Project that is reported separately. Bird and bat species records from that survey, however, have only been included in this report where necessary, such as for the risk assessment conducted for potential species of concern. Fauna habitat mapping undertaken for the WFA in the Basic and Targeted survey was also utilised to in this report.

The Project site is located predominantly within the Warren Interim Biogeographic Regionalisation of Australia bioregion (Warren subregion). Large areas of intact forest occur north and east of the study area, with several conservation reserves present in the BIA. One nature reserve occurs within, but is excised from, the WFA boundary. Notable surface water features include the Scott River, located directly south of the WFA and the Blackwood River, which runs through the western and northern parts of the BIA outside the WFA and flows into the Hardy Inlet. The Beenup artificial wetlands created at the old Beenup mine are located ~1 km west of the WFA.

Topography of the WFA is generally flat/undulating. Three native wetland habitats are present, a mix of seasonally inundated paperbark woodlands, shrublands and sedgelands, collectively covering 9.7% of its extent. Two woodland habitats, Marri-Jarrah-Peppermint woodland and degraded Open woodland of Peppermint trees, are present and cover 10.7% of the study area. The remainder of the WFA (79.6%) is highly modified and mostly cleared paddock, much of which is inundated during winter.

The species characterisation identified 41 conservation significant species that may occur in the study area. This includes species listed as Threatened and/or Migratory under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); species listed as Threatened, Conservation

Dependent, Otherwise in need of special protection and/or Migratory under the *Biodiversity Conservation Act 1999* (BC Act); and Priority species listed by the Department of Biodiversity, Conservation and Attractions. Records of 199 bird species and 7 bat species were identified within the area of the desktop searches.

A total of 313 fixed-point count samples taken from the 28 BBRAS sites resulted in a total bird species richness of 96 and total abundance of 13,471 birds. Bird species richness was lower at Impact sites (n=60), than at Reference sites (n=74). Species richness at Regional reference sites was 31; however, sampling at those sites represented just 2.5% of total sampling effort, therefore relative to survey effort, the Regional reference sites at Hardy Inlet are more species rich than the Impact and Reference sites. Abundance was also higher at the Regional reference sites when adjusted for survey effort.

Number of bird records and abundance counts were higher in Year 2 (1,599 records, 8,315 total abundance) compared with Year 1 (1,075 records, 5,156 total abundance), but this reflects a higher sampling effort conducted in Year 2.

Seasonally, autumn in Year 1 had the highest mean bird abundance followed by summer in Year 2 and winter in Year 1. Species richness was highest in summer of Year 2, spring of Year 2 and spring of Year 1. Other than total abundance in summer Year 2, the summary parameters did not vary substantially between seasons.

Eight bat species were recorded in the BBRAS, all of which were recorded at Impact sites, and 7 of which were recorded at Reference sites. Bats were detected in most (43 of 55) recording nights but at generally low activity levels in the WFA. Recorded bat activity was considerably higher in summer than in the other 3 seasons.

Fourteen bird species of conservation significance were recorded across the BBRAS survey and/or the Basic and Targeted fauna survey, including 7 that were recorded in the WFA and/or wider BIA (and likely to occur in the WFA), and 7 that were only recorded at Regional reference sites (variable likelihood of occurrence in the WFA). One conservation significant bat species was also recorded.

Based on the findings of the site and species characterisation, and the field surveys, 29 conservation significant species were considered potential species of concern to the Project, including 8 species that were recorded in the WFA or wider BIA (7 birds, one bat) and 21 additional significant species considered likely, or to possibly occur in the WFA, or possibly occur on rare occasion only. Based on the risk assessment conducted for these species, 3 were considered at moderate risk of impact from the Project, Forest Red-tailed Black Cockatoo, Baudin's Cockatoo and Carnaby's Cockatoo. Two other conservation significant species were considered at low risk, Australasian Bittern and Western False Pipistrelle. Risk was assessed as negligible for the remaining 24 conservation significant species.

In addition to the conservation significant species, 11 non-significant raptors were identified as potential species of concern, as were the 7 other (non-significant) bat species recorded. Eight of these species (6 birds and 2 bats) were assessed as at low risk from the Project, Wedge-tailed Eagle, Swamp Harrier, Black-shouldered Kite, Brown Goshawk, Brown Falcon, Australian Kestrel, White-striped Free-tailed Bat and Southern Forest Bat. Risk rating was assessed as negligible for the remaining 10 species.

In conclusion, while the risk to most species is considered low to negligible, the data suggests that raising the minimum blade height to 50 m above ground-level would substantially reduce the risk to most species, including black cockatoos, leading to a 54% reduction in species flying within the RSA and just 3.8% of flights occurring within the RSA. As well as raising the minimum blade height, collision risk could be further reduced by limiting the concentration of turbines and maintaining a sufficient separation distance, approximately 100 m, between turbines and important habitat, to maintain adequate open areas for bird and bat movement.

1 INTRODUCTION

Synergy Renewable Energy Developments Pty Ltd (SynergyRED) is a wholly owned subsidiary of Synergy Pty Ltd located in Perth, Western Australia (WA). SynergyRED is investigating the feasibility of a proposed wind farm in Scott River (the Project), located approximately 15 km north-east of Augusta, WAFigure 1-1. In April 2023, Phoenix Environmental Sciences Pty Ltd (Phoenix) was commissioned by SynergyRED to undertake a bird and bat risk assessment survey (BBRAS) for the Project in accordance with the approach outlined in Brett Lane and Associates (2005).

The renewable energy sector has grown rapidly in recent years, including wind farms, with guidance on bird and bat impact studies for proposed wind farms evolving in response to emerging knowledge. At the time of engagement, no detailed government authored methodology existed for conducting bird and bat risk assessments (and the supporting studies that inform these) for proposed wind farms. Interim guidance on bird and bat management by the Australian Government (DAWE 2021) provides a broad outline of key requirements of desktop studies, field surveys and impact risk assessments for onshore wind farms, and has been considered here. For detailed methods for conducting risk assessments for birds however, including the supporting desktop and field studies, Brett Lane and Associates (2005) is a current accepted approach.

In May 2024, after completion of field surveys, the Australian Government released new draft guidance for onshore windfarms (DCCEEW 2024) that provides an overarching framework for the referral, assessment and approval process for proposed onshore wind farm projects, with a focus on bird and bat management. DAWE (2021) and DCCEEW (2024) consider it best practice to conduct at least 24 months of site utilisation surveys to provide sufficient baseline data about bird and bat usage of the site and surrounds, with surveys conducted in each relevant season over this period.

This report presents the results of a two-year survey program for the Project. The work completed represents a Level Two investigation in line with Brett Lane and Associates (2005). At the commencement of the program no turbine layout was available and as such Impact and Reference sites could not be confidently placed. Sites were therefore located in areas considered most likely to support turbines at that time. In May 2024 a proposed turbine layout was provided. In response several sites were dropped and new sites established so that a balanced mix of Impact and Reference sites were achieved. Due to a lack of Migratory species being detected in Year 1, the decision was made to survey the Hardy Inlet as it is a known local hotspot for Migratory species, to compare the assemblage there with that of the WFA. These Regional reference sites were only sampled during the migratory season.

1.1 OBJECTIVES AND SCOPE OF WORK

The scope of work for the bird and bat risk assessment survey was as follows:

- undertake a Level Two investigation, comprising
    - regional overview
    - bird and bat utilisation surveys
    - risk assessment
- ensure the works completed satisfy the following guidelines, by employing adequate survey methodology and effort by suitably qualified and experienced practitioners
    - *Wind Farms and Birds: Interim Standards for Risk Assessment, Australian Wind Energy Association Report* (Brett Lane and Associates 2005)

- *Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020)
- *EPBC Act Policy Statement 3.21: Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed Migratory shorebird species* (DoEE 2017)
- *Survey guidelines for Australia's Threatened birds. Guidelines for detecting birds listed as Threatened under the Environment Protection and Biodiversity Conservation Act 1999* (DEHWA 2010)
- *Survey guidelines for Australia's Threatened bats. Guidelines for detecting bats listed as Threatened under the Environmental Protection and Biodiversity Conservation Act 1999* (DEWHA 2010).

Where possible, this assessment has considered the new draft guidance: *Onshore Wind Farm Guidance: Best practice approaches when seeking approval under Australia's national environment law* (DCCEEW 2024).

The objectives of this study were to:

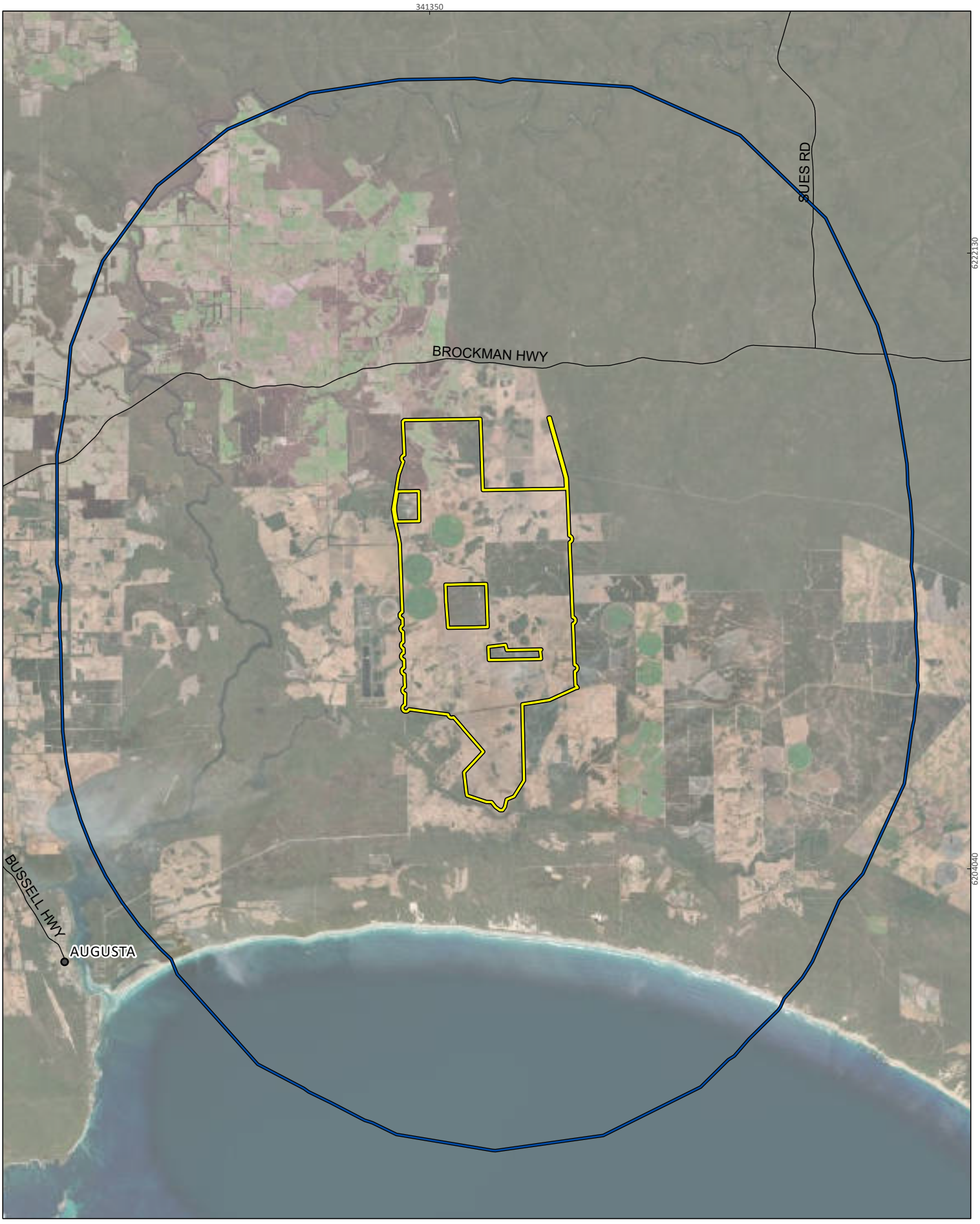
- collect sufficient information on site and species characteristics to inform a preliminary assessment of risks to birds and bats from the Project
- establish baseline monitoring sites for use in an ongoing monitoring program under a bird and bat management plan
- provide an assessment of risk to conservation significant and 'at-risk' birds and bats from the Project.

Phoenix also conducted a Basic and Targeted fauna survey for the Project in 2023/2024 (Phoenix 2025a). Species records from that survey have only been included in this report where necessary, such as for the risk assessment of conservation significant and other potential species of concern.

1.2 STUDY AREA

The main focus 'study area' for this survey was the wind farm area (WFA), within which turbines are proposed to be located (Figure 1-1). Site characterisation was conducted for the study area plus a 10 km buffer, referred to as the Bird/Bat Investigation Area (BIA; Figure 1-1). Regional reference sites on the Hardy Inlet included in Year 2 but are outside the BIA, except for 1 site further upstream, which is within the BIA but has been treated as a Regional reference site (see Section 3.2 for details).

The study area is 3,882.2 ha and the BIA is 86,347.9 ha.





SynergyRED
Scott River Wind Fam

Project No	1585
Date	12/06/2025
Drawn by	BK
Map author	BA

0 2.5 5
Kilometers

1:143,615 (at A4) GDA 1994 MGA Zone 50

All information within this map is current as of 12/06/2025. This product is subject to COPYRIGHT and is property of Phoenix Environmental Sciences (Phoenix). While Phoenix has taken care to ensure the accuracy of this product, Phoenix make no representations or warranties about its accuracy, completeness or suitability for any particular purpose.

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Study area
Bird/Bat Investigation Area
Roads

Figure 1-1

Project location and study area

PHOENIX ENVIRONMENTAL SCIENCES

2 LEGISLATIVE AND POLICY CONTEXT

Impacts to birds and bats from proposed wind farms need to be considered under both Federal and State environmental approval frameworks, i.e.:

- assessments of proposals under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- assessments of proposals under Part IV of the State *Environmental Protection Act 1986* (EP Act).

2.1 COMMONWEALTH

Under the EPBC Act, actions that have, or are likely to have, a significant impact on a matter of National Environmental Significance (NES), require approval from the Australian Government Minister for the Environment (the Minister) through a formal referral process. The EPBC Act provides for the listing of both Threatened fauna, and Migratory bird species protected under international agreements, as matters of NES. When considering whether a proposed wind farm requires approval under the EPBC Act, the Minister must consider all adverse impacts to matters of NES resulting, either directly or indirectly, from the action (DCCEEW 2024).

Threatened fauna listed as matters of NES under the EPBC Act are assigned to one of 4 categories:

- Extinct in the Wild (EW)
- Critically Endangered (CR)
- Endangered (EN)
- Vulnerable (VU).

International agreements applicable to listed Migratory species are the Japan-Australia Migratory Bird Agreement (JAMBA), China-Australia Migratory Bird Agreement (CAMBA), Convention on the Conservation of Migratory Species of Wild Animals (Bonn) and Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

2.2 STATE

In WA, proposals which, if implemented, are likely to have a significant impact on specified environmental factors, are assessed by the Environmental Protection Authority (EPA) and approved by the State Government Minister for the Environment under Part IV of the *Environmental Protection Act 1986* (EP Act). Assessment of potential impacts to birds and bats from proposed wind farms falls under the EPA's environmental factor 'terrestrial fauna'.

The EPA's objective for terrestrial fauna (EPA 2016) is "to protect terrestrial fauna so that biological diversity and ecological integrity are maintained". It recognises significant fauna species, habitats and assemblages as requiring consideration in environmental impact assessment (EIA). Significant fauna includes Threatened and Priority species, species with restricted distributions, species subject to historical impact from threatening processes and those providing important ecological functions. Fauna habitats may be significant if they provide habitat important to the life history of a significant species, i.e. breeding, feeding and roosting or aggregation areas, or where they are unique or isolated habitats in the landscape or region (EPA 2016).

The *Biodiversity Conservation Act 2016* (BC Act) provides for the listing of Threatened fauna species in WA under 3 categories (Government of Western Australia 2022): Critically Endangered (CR),

Endangered (EN) and Vulnerable (VU). The BC Act also provides for the listing of specially protected (SP) species under 3 categories: species of special conservation interest (conservation dependent fauna, CD), Migratory species (Mig.) including birds subject to international agreement and species otherwise in need of special protection (OS).

Priority fauna as identified by the Department of Biodiversity, Conservation and Attractions (DBCA) are not protected under the BC Act but are still considered to be of conservation significance – that is they may be Threatened – but cannot be considered for listing until there is adequate understanding of threat levels imposed on them. Species on the Priority fauna list are assigned to one of 4 Priority (P) categories, P1 (highest)–P4 (lowest), based on level of knowledge/concern.

2.3 POTENTIAL IMPACTS TO BIRDS AND BATS FROM PROPOSED WIND FARMS

Federal guidelines for wind farms (DAWE 2021; DCCEEW 2024; DEWHA 2009) identify the following as the main risks to birds and bats:

- direct impacts
    - habitat loss through clearing for turbines and other infrastructure
    - mortality or injury from collisions by birds or bats with operating wind turbines
    - mortality or injury from barotrauma (damage to body tissues from a drop in air pressure when animals fly too close to turbines)
- indirect impacts
    - displacement, when birds or bats avoid the area due to wind farm construction and operation (e.g. due to rotor movement, artificial noise or light sources), which can result in breeding disturbances or force longer flights to access feeding areas
    - alienation of important sites, such as those where Threatened species concentrate when roosting, feeding, breeding or on migration.

The potential for collision with turbines is often the most significant risk to birds and bats at wind farms. Risk to individual species is influenced by many factors including utilisation of the WFA, flight behaviour, flight heights, flight speeds, manoeuvrability, bird size and/or turbine parameters (such as turbine height, blade size-, rotor swept area) (Brett Lane and Associates 2005; Smales *et al.* 2013).

There is currently insufficient data to demonstrate barotrauma as a common cause of bird/bat mortality/injury from wind turbines. Different studies for bats have provided conflicting evidence (e.g. Baerwald *et al.* 2008; Lawson *et al.* 2020); limited research has been conducted for birds. The pressure variation necessary to cause barotrauma is so close to the blade surface that there is a higher probability of direct contact with blades (Guest & Hein 2023). Risk of barotrauma is therefore treated together here with collision risk.

Many studies have been conducted globally on the displacement effects of wind farms on birds and bats. A systematic review of 84 peer-reviewed studies (Tolvanen *et al.* 2023a) found that 63% of cases reported displacement for birds and 72% displacement for bats. Displacement effects on birds were variable across studies, groups and species, but included reduced bird density, reduced number of breeding birds, changes in flight behaviour and changes in selection of roosting and feeding areas (Tolvanen *et al.* 2023a). Waterfowl, raptors, passerines and waders were displaced on average up to 500 m in cases where displacement was observed. Bats were displaced on average up to 1 km, with responses influenced by the foraging environment and the echolocation range of particular species (Tolvanen *et al.* 2023a), for example species with short-range echolocation showed reduced abundance and activity around turbines.

Some studies have observed localised impacts (close to turbines) from turbine noise on birds or bats. For example, decline in abundance (Lehnardt *et al.* 2024) and masking of territorial defence behaviour (Zwart *et al.* 2016) has been observed in songbird species. Displacement of narrow-space foraging forest bats has also been potentially attributed to turbine noise (Ellerbrok *et al.* 2024). Lighting has been suggested to disturb birds and have adverse effects on communication (Gomez-Catasus et al 2018, 2022, Leddy et al 1999, in Tolvanen *et al.* 2023b). Red aviation lights have been also suggested as a reason for bat displacement (Barre *et al.* 2018).

EPBC Act Policy Statement 2.3 (DEWHA 2009), which provides guidance to proponents on whether referral of a wind farm proposal is required under the EPBC Act, identifies the following groups most at-risk and situations where they are most affected:

- waterbirds that are listed Threatened species, listed Migratory species, and/or part of the ecological character of a RAMSAR wetland
- seabirds that are listed Threatened species, listed Migratory species and/or part of the ecological character of a RAMSAR wetland–in the case of coastal and offshore wind farms
- listed Migratory species and listed Threatened species that migrate within Australia–where wind farms are situated on migration routes
- species that are at-risk of extinction (Endangered or Critically Endangered), particularly certain species of bats and birds where wind farms are situated on a site they frequent.

The matters of NES significant impact guidelines 1.1 (DoE 2013) and EPBC Act Policy Statement 3.21 (DoEE 2017), for Migratory shorebirds, provide guidance for assessing impacts to EPBC Act listed birds and bats.

In addition to listed Threatened or Migratory species, some non-conservation significant bird and bat species have been identified as being at-risk of impact from wind farms. Some raptor species, such as *Aquila audax* (Wedge-tailed Eagle) and *Falco cenchroides* (Australian Kestrel), are particularly vulnerable to collision risk due to their morphology, behaviour, flight type and habitat use (Dohm *et al.* 2019; Moloney *et al.* 2019a; Stark & Muir 2020b). Similarly, some bat species, such as *Austronomus australis* (White-striped Free-tailed Bat) and *Chalinolobus gouldii* (Gould's Wattled Bat), are frequently recorded in mortality monitoring at wind farms (Moloney *et al.* 2019a; Stark & Muir 2020b).

3 METHODS

The Level Two investigation was largely conducted in accordance with the methods described in Brett Lane and Associates (2005) and comprised the following:

- regional overview, entailing desktop assessment and site inspection to–
    - provide a qualitative overview of bird usage of the study area and the surrounding region
    - characterise the bird and bat species potentially occurring in or near the study area, including conservation significant species, i.e. those listed under the EPBC Act, BC Act and/or Priority species
    - define the study area characteristics and habitats in or near the study area
    - identify species or groups that are at-risk of potential impact and conduct a preliminary risk assessment
- on-ground surveys to ground-truth the results of the regional overview, including –
    - bird utilisation surveys
    - bat utilisation surveys
    - targeted species surveys.

Additional sampling was conducted as part of the Basic and Targeted fauna survey (Phoenix 2025a) data from which was used in the risk assessment for conservation significant species and other species of potential concern.

The methods also largely comply, where applicable, with the other guidelines mentioned in the scope of work (Section 1.1) with respect to survey timing, replication, experience of practitioners and reporting standards. While Brett Lane and Associates (2005) specifically applies to birds, the overarching approach to the field surveys and risk assessment was also applied to bats, where possible. A significant departure from the bird observation methods was that bats were detected via echolocation recording rather than direct observation; therefore, it was not possible to determine flight heights, or distance and direction from the recording device. Further, basic biological attributes important to conducting a collision risk assessment for a windfarm, such as mean and maximum flight and foraging heights, are not known for many bat species.

3.1 REGIONAL OVERVIEW

3.1.1 Site characterisation

A preliminary site characterisation was undertaken by interrogating several desktop information sources on the region to identify potential habitat attributes for birds and bats in the BIA, including:

- Interim Biogeographic Regionalisation of Australia (IBRA) bioregions (DoEE 2016) and land systems (Purdie et al. 2004)
- conservation reserves
- Environmentally Sensitive Areas (ESAs) as gazetted under the Environmental Protection (Environmentally Sensitive Areas) Notice 2005 (Government of Western Australia 2005)
- significant wetlands, including RAMSAR wetlands (DCCEEW 2019) and nationally important wetlands (DEWHA 2008)

- the occurrence of other wetlands and coastal habitats that could support listed Migratory species that could fly across the site, including geomorphic wetlands (WRC 2017)
- Threatened and Priority Ecological Communities of relevance to birds/bats
- geographical features evident on aerial photography (Google Earth®) that might concentrate bird or bat movements on or near the BIA, such as promontories, isthmuses, waterways and ridgelines with soaring birds of prey
- known or potential nesting, roosting or foraging areas for conservation significant birds/bats
- potential corridors or zones of bird/bat movement.

3.1.2 Species characterisation

Searches of several biological databases (at 10 km or 40 km buffer of the study area) were undertaken to identify and prepare a list of birds and bats, including conservation significant species, that may occur within the BIA (Table 3-1). A literature search was also conducted for accessible reports for biological surveys conducted within 40 km of the study area to build on the list developed from the database searches (Table 3-2).

Atlas of Living Australia data (ALA 2024) on Migratory shorebird records was interrogated for a larger area encompassing roughly the Cape Naturaliste to Cape Leeuwin region to determine when Migratory species arrive in the southwest.

A full potential assemblage list was developed for birds and bats from the regional overview. Desktop characterisation was undertaken for all conservation significant species. The following species characteristics were defined for each species:

- habitat preferences
- behaviour
- flight behaviour
- demographic factors.

Table 3-1 Database searches conducted for the regional overview

Database	Search coordinates and extent
Protected Matters Search Tool (DCCEEW 2023)	Approximate centre point of study area (115.300, -34.225) with 10 km buffer
DBCA Threatened and Priority Fauna Database (DBCA 2023c)	Study area plus a 10 km buffer
Dandjoo biodiversity data platform (formerly DBCA NatureMap Database) (DBCA 2023a)	Study area plus a 10 km buffer
BirdLife Birdata (Birdlife Australia 2023)	Study area plus a 10 km buffer
Index of Biodiversity Surveys for Assessment (IBSA) database (IBSA 2023) for nearby survey reports and data[1]	Study area plus a 40 km buffer

[1]No data was returned in this search.

Table 3-2 Survey reports included in the regional overview

Report author	Survey description	Project
LEC (1990)	Comprehensive fauna survey	Heavy minerals mine Beenup
Biota (2009)	Windfarm survey	Milyeannup wind farm terrestrial fauna survey

Report author	Survey description	Project
Ninox (2011)	Wetland bird monitoring	Beenup Mineral Sands Mine site 2005–2011
Litoria Ecoservices (2016)	Level 1 fauna assessment, Level 1 terrestrial vertebrate fauna	Expansion of recreational facilities at Gloucester Park, Margaret River
Litoria Ecoservices (2017)	Western Ringtail Possum habitat assessment	Augusta Boat Harbour to Dead Finish Pathway Project
ELM (2017)	Fauna assessment	Lot 2602 McDonald Road, Karridale Flora and Fauna Assessment
Harewood (2018)	Targeted vertebrate fauna survey assessment	Turner Caravan Park, Augusta
Ecosystem Solutions (2020)	Fauna significance assessment	Margaret River Senior High School (well outside BIA and therefore no records entered – reviewed for context only)

3.1.3 Initial site inspection

As it became apparent from the regional overview that potential species of concern were likely to utilise the study area, the initial site inspection was incorporated into the first bird and bat utilisation survey. The site inspection identified suitable habitat for conservation significant species, such as wetlands and remnant woodlands, and confirmed appropriate selection of survey sites.

3.2 FIELD SURVEYS

Field surveys were undertaken over 13 survey periods between May 2023 and March 2025 (Table 3-3). BBRAS survey effort per site is presented in Table 3-4. The following survey work was undertaken:

- bird utilisation surveys (section 3.2.1)
- bat utilisation surveys (section 3.2.2)
- audio recordings for Masked Owl and black cockatoos (section 3.2.3).

Table 3-3 Survey dates and personnel

Event/Round	Season	Dates	Personnel[1]	Area
1	Autumn	24–26 May 2023	J. Clark, B. Wykes	WFA, BIA
2	Winter	14–16 August 2023	J. Clark, B. Wykes	WFA, BIA
3	Spring	17–20 November 2023	B. Wykes, S. Pynt	WFA, BIA
4	Summer	10–12 January 2024	J. Clark, B. Wykes	WFA, BIA
5	Spring	27–30 September 2024	B. Wykes, A. Green	WFA, Hardy Inlet
6	Spring	17–18, 21 October 2024	B. Wykes, A. Green	WFA
7	Spring	13–14 November 2024	B. Wykes, A. Green	WFA
8	Summer	2 December 2024	B. Wykes, A. Green	Hardy Inlet
9	Summer	11–12 December 2024	B. Wykes, A. Green	WFA
10	Summer	16–17 January 2025	B. Wykes, A. Green	WFA
11	Summer	13–14 February 2025	B. Wykes, A. Green	WFA
12	Autumn	06–07 March 2025	B. Wykes, A. Green	WFA

[1]Jarrad Clark (BSc Env. Mgt), Boyd Wykes (BSc Science (Hons); PhD Zoology), Simon Pynt (BSc Zoology).

Systematic Impact and Reference sites were established for the BBRAS surveys to support a future monitoring program for the Project based on the Before-After Control-Impact (BACI) framework. At

the time of commencement of the Year 1 surveys, proposed turbine locations were not known, therefore systematic BBRAS sites were selected based on general distribution relative to key environmental values (e.g. wetlands) and proximity to the most likely turbine locations. Sites selected inside the study area were classified as Impact sites and sites outside the study area were classified as Reference sites in Year 1 of the survey program.

At the completion of Year 1 sampling, the data was reviewed and soon after that turbine locations became available. An adaptive approach was taken and the decision made to adjust sites in order to respond to identified data gaps and better reflect the BACI framework, given that Impact and Reference sites could now be confidently assigned. Impact sites were classified as any site located <500 m from a proposed turbine, and Reference sites located between 500 m and 1,500 m of turbines. Accordingly, some sites were re-classified.

The identified data gaps following Year 1 surveys were associated with Migratory shorebirds and black cockatoos. The Migratory birds were addressed in this program by sampling intensively through the migratory shorebird season within the WFA, and by expanding the survey to include Regional reference sites at the Hardy Inlet (between 10 and 14 km from the study area) to collect contextual data on Migratory shorebird activity. Further survey effort concerning black cockatoo foraging, breeding and roosting was also undertaken during the breeding season for all 3 species, and is reported in Phoenix (2025a).

A total of 28 sites were sampled over the survey program (Table 3-4; Figure 3-1; Appendix 1). Sixteen sites were sampled in Year 1 between autumn 2023 and summer 2024 (i.e., one sample event per season). Significant revisions were subsequently made to site selection following the completion of the Year 1 surveys, with 12 new sites added. Ten original sites from Year 1 were not resampled in Year 2. Changes were made in response to findings from the Year 1 surveys, and most importantly in relation to the proposed turbine placement. In total, 18 sites were sampled monthly in Year 2 between September 2024 (spring) and March 2025 (autumn; Table 3-4).

Based on the proposed turbine placement, 9 sites are classified as Impact sites (< 500 m from turbines) and 14 are classified as Reference sites (500–1,500 m from turbines), with 5 additional Regional reference sites located at the Hardy Inlet (Table 3-4; Figure 3-1). Two sites (BUS035 and BUS012; Table 3-4) were only sampled in a single season in Year 1 due to land access constraints.

In addition, the Basic and Targeted fauna survey (Phoenix 2025a) included habitat assessments, systematic avifauna censusing, additional bat echolocation recordings, acoustic surveys for Australasian Bittern and habitat assessments for black cockatoos (Table 3-5). This suite of additional work provided supplementary data for the study area in lieu of roaming surveys recommended by Brett Lane and Associates (2005). Opportunistic records of birds were also made whenever observed during both the BBRAS and basic/targeted survey.

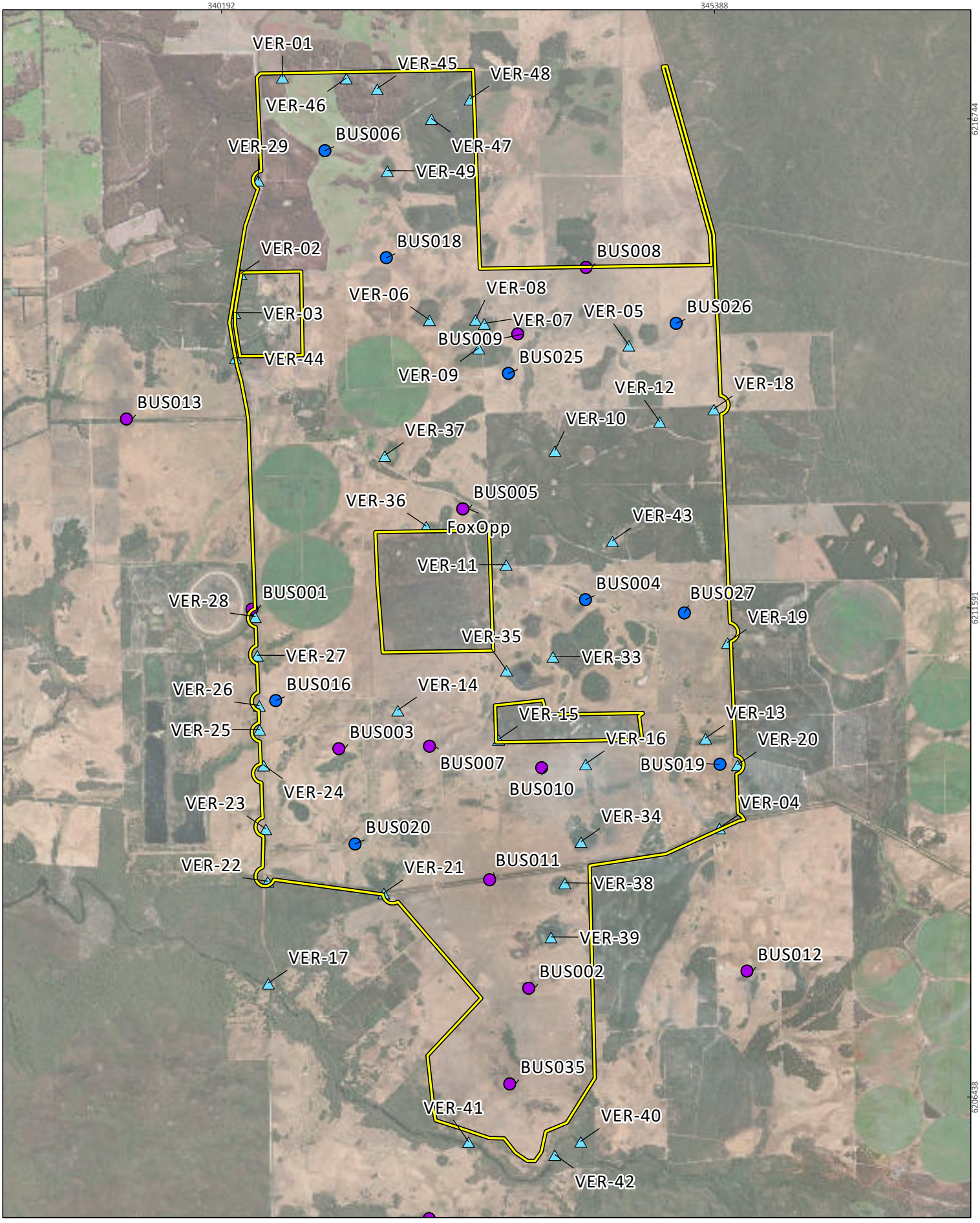
Table 3-4 Sample effort–BBRAS

Site type	Site name	Monitoring year	Season	Sampling method		
				Fixed-point count (minutes)	Audio recording (nights)	Ultrasonic recording (nights)
Impact	BUS004	Yr1	Autumn	60		1
		Yr1	Winter	30		
		Yr1	Spring	60	1	1
		Yr1	Summer	60	1	1
		Yr2	Spring	180		
		Yr2	Summer	180		
		Yr2	Autumn	60		
	BUS006	Yr1	Autumn	60		3

Site type	Site name	Monitoring year	Season	Sampling method		
				Fixed-point count (minutes)	Audio recording (nights)	Ultrasonic recording (nights)
		Yr1	Winter	60	1	1
		Yr1	Spring	60	1	1
		Yr1	Summer	60	3	3
	BUS016	Yr2	Spring	180		
		Yr2	Summer	180		
		Yr2	Autumn	60		
	BUS018	Yr2	Spring	180		
		Yr2	Summer	180		
		Yr2	Autumn	60		
	BUS019	Yr2	Spring	180		
		Yr2	Summer	180		
		Yr2	Autumn	60		
	BUS020	Yr2	Spring	180		
		Yr2	Summer	180		
		Yr2	Autumn	60		
	BUS025	Yr2	Spring	180		
		Yr2	Summer	180		
		Yr2	Autumn	60		
	BUS026	Yr2	Spring	180		
		Yr2	Summer	180		
		Yr2	Autumn	60		
	BUS027	Yr2	Spring	180		
		Yr2	Summer	180		
		Yr2	Autumn	60		
Reference	BUS001	Yr1	Autumn	60		1
		Yr1	Winter	60	1	1
		Yr1	Spring	60	1	1
		Yr1	Summer	60	3	3
		Yr2	Spring	180		
		Yr2	Summer	180		
		Yr2	Autumn	60		
	BUS002	Yr1	Autumn	60		1
		Yr1	Winter	60	1	1
		Yr1	Spring	60	1	1
		Yr1	Summer	60	3	3
		Yr2	Spring	180		
		Yr2	Summer	180		
		Yr2	Autumn	60		
	BUS003	Yr1	Autumn	60		1
		Yr1	Winter	60	1	1
		Yr1	Spring	60	1	1
		Yr1	Summer	60	1	1
	BUS005	Yr1	Autumn	60		1
		Yr1	Winter	30		
		Yr1	Spring	60	1	1
		Yr1	Summer	60	1	1
	BUS007	Yr1	Autumn	60		1
		Yr1	Winter	60	1	1

Site type	Site name	Monitoring year	Season	Sampling method		
				Fixed-point count (minutes)	Audio recording (nights)	Ultrasonic recording (nights)
		Yr1	Spring	60	1	1
		Yr1	Summer	60	1	1
	BUS008	Yr1	Autumn	60		1
		Yr1	Winter	60	1	1
		Yr1	Spring		1	1
		Yr1	Summer	60	1	1
		Yr2	Spring	180		
		Yr2	Summer	180		
		Yr2	Autumn	60		
	BUS009	Yr1	Autumn	60		1
		Yr1	Spring	60	1	1
		Yr1	Summer	60	1	1
	BUS010	Yr1	Autumn	60		1
		Yr1	Winter	60	1	1
		Yr1	Spring	60	1	1
		Yr1	Summer	60	1	1
		Yr2	Spring	180		
		Yr2	Summer	180		
		Yr2	Autumn	60		
	BUS011	Yr1	Autumn	60		1
		Yr1	Winter	60	1	1
		Yr1	Spring	30	1	1
		Yr1	Summer	60	3	3
		Yr2	Spring	180		
		Yr2	Summer	180		
		Yr2	Autumn	60		
	BUS012	Yr1	Winter	60	1	1
	BUS013	Yr1	Autumn	60		1
		Yr1	Winter	60	1	1
		Yr1	Spring	60	1	1
		Yr1	Summer	60	3	3
	BUS014	Yr1	Autumn	60		1
		Yr1	Winter	60	1	1
		Yr1	Spring	60	1	1
		Yr1	Summer	60	3	3
	BUS015	Yr1	Autumn	60		1
		Yr1	Winter	60	1	1
		Yr1	Spring	60	1	1
		Yr1	Summer	60	3	3
	BUS035	Yr1	Spring	60	1	1
Regional ref.	BUS030	Yr2	Spring	30		
		Yr2	Summer	30		
	BUS031	Yr2	Spring	30		
		Yr2	Summer	30		
	BUS032	Yr2	Spring	30		
		Yr2	Summer	30		
	BUS033	Yr2	Spring	30		
	BUS034	Yr2	Spring	30		

Site type	Site name	Monitoring year	Season	Sampling method		
				Fixed-point count (minutes)	Audio recording (nights)	Ultrasonic recording (nights)
		Yr2	Summer	30		
Total effort				**150 hours**	**55 nights**	**71 nights**





SynergyRED
Scott River Wind Fam

Project No	1585
Date	18/06/2025
Drawn by	BK
Map author	KC

0 1 2
Kilometers

1:51,526 (at A4) GDA 1994 MGA Zone 50

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Study area
Basic and targeted survey sites (Phoenix 2025)

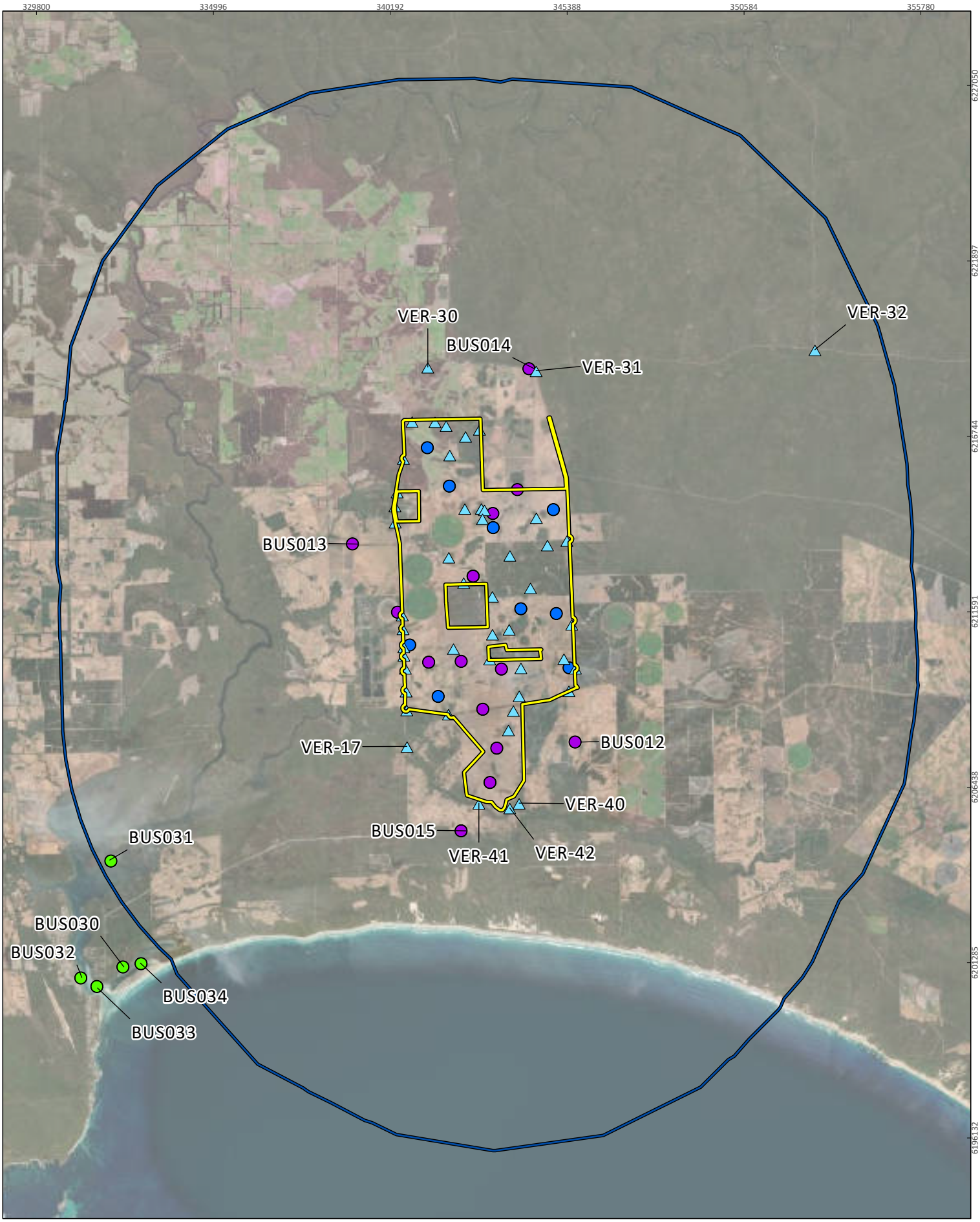
BBRAS sites

Impact
Reference

Figure 3-1a

Survey sites

PHOENIX ENVIRONMENTAL SCIENCES





SynergyRED
Scott River Wind Fam

Project No	1585
Date	12/06/2025
Drawn by	BK
Map author	KC

0 2.5 5
Kilometers

1:143,600(at A4) GDA 1994 MGA Zone 50

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- Study area
- Bird/Bat Investigation Area
- Basic and targeted survey sites (Phoenix 2025)

BBRAS sites

- Impact
- Reference
- Regional reference

Figure 3-1b

Survey sites

PHOENIX ENVIRONMENTAL SCIENCES

3.2.1 Bird utilisation surveys

The utilisation surveys aimed to generate quantitative data on birds within the study area and surrounds. The data was used to estimate likelihood of impact and provide a ranked abundance of species use of the site, for birds at varying heights. The bird utilisation survey comprised:

- fixed-point counts at 28 locations (9 Impact sites, 14 Reference sites and 5 Regional reference sites) undertaken for 30 minutes each sample event, within a radius of 100 m for small birds and 800 m for larger birds (e.g. raptors like Wedge-tailed Eagle)
- between 2 and 6 counts conducted in each survey phase at most Impact and Reference sites, including morning and afternoon counts
- Regional reference sites were sampled once each in spring and autumn, they were accessed by boat sampled at variable times during the day dependent on tide and weather conditions.

Total survey effort of the bird utilisation surveys was 150 hours, comprising 63.5 hours from Impact sites, 82.0 hours from Reference sites and 4.5 hours at Regional reference sites (Table 3-4Table 3-4). The following parameters were recorded:

- the bird's distance from the fixed location, where a range finder was used to measure the distance to various reference points from which distance could be estimated
- estimated height so that presence and abundance can be related back to the potential rotor swept area (RSA) height – in Year 1, height was recorded within one of 5 height categories; this was changed to actual height estimates in Year 2 to inform collision risk modelling but also classified, per year 1, post-field
- the direction of each bird/flock sighted to the nearest 45 degrees of the compass
- and if flying across the landscape, the direction to and from, also to the nearest 45 degrees of the compass.

The flight height categories applied in Year 1 were:

Below the RSA

1) 0-24 m

RSA

2) 25-50 m
3) 51-75 m
4) 76-150 m
5) 151-250 m

Above RSA

6) >250 m.

Habitat descriptions were recorded at all sites (Appendix 2).

Due to the adaptive approach taken in the survey program, sample effort was variable between some sites and was therefore not consistent when analysing the data between years, seasons, and location (i.e. Impact vs Reference). To account for this most analyses and presented data uses summary statistics, such as mean and median counts, per 30-minute sample, or per species. In some cases, however, the data had to be aggregated over an entire sites' dataset.

3.2.2 Bat utilisation surveys

Bat utilisation surveys were undertaken during Year 1 of the survey program. The utilisation surveys aimed to generate quantitative data on bats within the study area and surrounds. The data was used to estimate likelihood of impact and provide a ranked abundance of species use of the site.

Echolocation recorders were placed at all 16 Year 1 sites at ~1 m high (Figure 3-1). In each sample period, the recorders were operated for one night, unless conditions were windy (~>20 knots), in which case additional nights were completed. The echolocation recorders were typically operated from 30 minutes before sunset to 30 minutes after sunrise; therefore, total recording hours changed each season. A total of 71 nights of echolocation recordings were gathered, comprising 60 nights from Reference sites and 11 nights from Impact sites (Table 3-4).

The echolocation data was analysed by Bob Bullen of WA Bat Call, with the species list and number of calls being provided per half hour, so that temporal activity could be analysed if needed, for example, where rotor management might be required to mitigate impacts to an important bat species that frequents an area at particular times. It must be noted however, that the number of bat calls detected is not the equivalent of abundance as recorded for directly observed birds. For example, 100 calls from a bat species in a 30-minute period could be 100 individuals calling once each as they fly past or could be one individual calling 100 times as it actively hunts in close proximity to the recorder. The number of calls is therefore considered a surrogate for abundance.

Level of activity for each bat species was reported as the mean number of calls, being the sum of calls divided by the number of detections. Activity level for each species was assigned to one of 3 categories, based on all sites and samples, as follows:

- Low - 0–4.0
- Moderate- 4.1–11
- High - >11.

As bat presence was only assessed using ultrasonic recorders flight height and direction data were not captured.

3.2.3 Audio recordings for significant bird species

In autumn 2023, during the Basic and Targeted fauna survey, an audio recorder opportunistically positioned on the Scott River (on the Scott River Road crossing; site Mowl01 on Figure 3-1) detected Masked Owl (*Tyto novaehollandiae novaehollandiae*; P3). Consequently, audio recorders were placed at each of the 16 sample sites for subsequent sampling periods in Year 1, with most sites sampled in each of the remaining 3 periods. The recorders were operated from 30 minutes before sunset to 30 minutes after sunriseTable 3-4.

Analysis of the audio data was undertaken by Patrick Williams and Jarrad Clark of Phoenix. The analysis focused on Masked Owl and the 3 black cockatoo species (Baudin's Cockatoo *Zanda baudinii*, EN; Carnaby's Cockatoo *Zanda latirostris*, EN and Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso*, VU) as the most likely and easily detected species possibly occurring.

In total, 55 nights of bird data was gathered and analysed using Kaleidoscope Pro v5.6.4. Fifty example calls of Masked Owl were utilised to create a simple classifier to identify Masked Owl calls within the raw data. For black cockatoos, the full audio dataset was analysed using cluster analysis and all sounds were grouped into clusters based on their characteristics; this analysis typically assigns one or more species to a cluster. Clusters containing black cockatoo calls were identified and the entire cluster then screened. The black cockatoo calls were identified to species level where possible.

3.2.4 Surveys conducted as part of the Basic and Targeted fauna survey (Phoenix 2025a)

The following additional survey work relevant to birds and bats was undertaken as part of the Basic and Targeted fauna survey (Phoenix 2025a), over 3 survey phases (Figure 3-1):

Phase 1

- Site reconnaissance, wetland boundary mapping review, habitat descriptions and waterbird records at sites across the WFA (Appendix 1)

Phase 2

- systematic avifauna censusing (20-minute censuses) at 17 sites, in all main habitat types (additional 11.8 hours; Table 3-5)
- additional bat echolocation recordings (Song Meter SM2 recordings) at 4 sites, deployed for 4 nights, positioned in areas of habitat likely to have increased bat activity (additional 14 nights; Table 3-5)
- acoustic surveys for Australasian Bittern (*Botaurus poiciloptilus*; EN), with autonomous recording units (ARUs) employed at 5 sites in Phase 1 in suitable habitat for the species (additional 19 nights; Table 3-5)

Phase 3

- acoustic recordings for black cockatoos at 7 sites located in remnants that contained potential breeding trees (PNT) with hollows and/or black cockatoo records (additional 224 nights; Table 3-5)
- night roosting/breeding surveillance for black cockatoos at 19 sites over 11 evenings around the periphery of the study area to detect any movements into the WFA (additional 34.3 hours)
- breeding tree, foraging habitat quality and roosting habitat assessments for black cockatoos.

Table 3-5 Survey effort from Basic and Targeted fauna survey (Phoenix 2025a) relevant to birds and bats

Site name[4]	Phase	Sampling method			
		Avifauna census (min.)	Audio recording (nights)	Ultrasonic recording (nights)	BC roosting/ breeding surveillance (min.)
Mowl01	1		1[1]		
VER-16	2	60			
VER-17	2		3[2]	2	
VER-21	2	40			
VER-22	2	40			
VER-30	2	40			
VER-31	2	40			
VER-33	2		4[2]		
VER-35	2	40			
VER-36	2	40			
VER-37	2	40			
VER-39	2	40			
VER-40	2	50	4[2]		
VER-41	2		4[2]		
VER-42	2	40	4[2]		
VER-43	2			4	
VER-44	2			4	
VER-46	2	40		4	
VER-49	2	40			
BCRoosting01	3				240
BCRoosting02	3				60
BCRoosting03	3				120
BCRoosting04	3				210
BCRoosting05	3				65
BCRoosting06	3				150
BCRoosting07	3				90
BCRoosting09	3				65
BCRoosting10	3				105
BCRoosting11	3				80
BCRoosting12	3				60
BCRoosting13	3				60
BCRoosting14	3				60
BCRoosting15	3				70
BCRoosting16	3				70
BCRoosting17	3				90
Birding01	3				120
Birding02	3				130
Birding03	3				220
Opp20	3	20			
SM4-01	3		39[3]		
SM4-02	3		39[3]		
SM4-03	3		1[3]		
SM4-04	3		40[3]		
SM4-05	3		34[3]		

Site name[4]	Phase	Sampling method			
		Avifauna census (min.)	Audio recording (nights)	Ultrasonic recording (nights)	BC roosting/ breeding surveillance (min.)
SM4-06	3		13[3]		
SM4-07	3		38[3]		
Wetland01	3	20			
Wetland02	3	80			
Wetland03	3	40			
Total effort		**11.8 hrs**	**224 nights**	**14 nights**	**34.4 hrs**

1 - Opportunistic audio recording. 2 - Audio recording targeting Australian Bittern. 3 - Audio recording targeting black cockatoos. 4 - additional sites and species records collected through additional sampling techniques not relevant to this report.

3.3 LIKELIHOOD OF OCCURRENCE ASSESSMENT / POTENTIAL SPECIES OF CONCERN

The likelihood of occurrence for each conservation significant bird/bat species identified in the desktop review, and/or recorded in the field surveys, was assessed and assigned to one of 5 ratings:

- Recorded - species recorded within the study area by previous or current survey.
- Likely - study area within current known range of species, nearby (within 10 km) recent/relatively recent (within the last 10 years) records, suitable habitat within the study area.
- Possible - study area within current known range of species, suitable or potentially suitable habitat within the study area present, no nearby recent/relatively recent (within the last 10 years) desktop records or species has a wide home range and utilises a wide variety of habitats.
- 'Possible (rare)' - for Migratory listed species whose preferred/core foraging habitat is not present, but the study area contains marginal or rarely used habitat; species is rare in the region; occurs in very low numbers.
- Unlikely - study area outside current known range of species, no suitable habitat present in study area, very old desktop records only.

For Migratory shorebirds, the likelihood of occurrence assessment also considered the seasonal availability of suitable habitat as well as the timing of when they are likely to be present in the southwest.

Any conservation significant species that was recorded in the study area, or considered likely, or to possibly occur was classified as a potential species of concern. Species considered unlikely, or unlikely (rare), were not considered at-risk from the Project and therefore not considered further in the risk assessment. All pelagic species were discounted at the desktop review (regional overview) stage as it was determined that the study area is too far inland for any of these to occur. Likelihood of occurrence of all other species was assessed following the field surveys.

Other raptor and bat species recorded in the survey were also included as potential species of concern due to some species from these groups being known to be at-risk from turbine strike (see Section 2.3).

3.4 ANALYSIS OF SURVEY COMPLETENESS

Species accumulation curves were produced on an abundance basis using PRIMER V6 (Clarke & Gorley 2006) to obtain an estimate of survey completeness, i.e., whether the sample effort and methods used produced a dataset that can be considered representative of the bird and bat assemblage present in the study area. Three indices were calculated separately for birds (fixed-point count data) and bats (echolocation data) as the survey methods were different; Chao2, Jacknife2, Bootstrap. All samples per method were included and no data transformation was undertaken. The maximum permutations were set at 999. The resultant data for each indices was then plotted as a line graph within Primer6 and the data analysed with respect to the projected number of species each indices generated.

3.5 RISK ASSESSMENT

A risk assessment framework was developed to evaluate the potential risk of impact on potential species of concern from the Project. The approach assesses risk using a combination of likelihood and consequence of impact, in accordance with relevant Australian standards for risk management (Standards Australia 2018). While the framework is primarily based on collision risk, the risk assessment also considered other impacts of displacement/avoidance, and habitat loss.

Likelihood of direct impact from collision with turbines was classified into 5 categories, which considered desktop and survey records for each species with regard to likelihood of occurrence, utilisation of the study area, frequency of records, flock size, flight heights and available data on observed windfarm mortalities (Table 3-6). Mortality monitoring data for WA windfarms is not readily publicly available. Data on bird and bat windfarm mortalities was therefore obtained from 3 main sources that have collated post-construction mortality monitoring records from multiple windfarm sites in eastern Australia[1]:

- EcoLogical Australia (2025), memo provided for this Project, reviewed species of concern against ELA's database of available monitoring reports from windfarm operations in eastern Australia (includes monitoring reports from 16 windfarms as well as compilated studies)
- Moloney *et al.* (2019b), collated data from mortality surveys at 15 Victorian windfarms
- Stark and Muir (2020a), collated data from mortality surveys 10 windfarms in SE Australia.

For the 3 WA endemic black cockatoo species, *Zanda funerea* (Yellow-tailed Black Cockatoo) has been considered a suitable surrogate due to similarities in morphology, habitat and foraging and flight characteristics (EcoLogical Australia 2025). Consequence of impact was classified into 5 categories, from insignificant to severe based on estimated loss of individuals relative to local, regional, State or East Asian-Australasian Flyway (EAAF) population for Migratory species (Table 3-7). The consequence categories for Migratory shorebirds were established with consideration to the industry guidelines for assessment impacts to EPBC Act listed Migratory shorebirds (DoEE 2017). Collision risk modelling has not yet been completed and therefore is not considered in the risk assessment.

The risk matrix is provided in Table 3-8. Where the risk assessment for a species is determined to be low–negligible, no further action is required. Where the risk is perceived to be moderate–extreme, further studies, or mitigation actions, such as modifications to the wind farm design, should be considered to reduce the residual risk, or risk remaining after mitigation, to acceptable levels.

A risk assessment was conducted for all potential species of concern (see section 3.3) using the framework below and considering the species characterisation profile and field survey results.

[1] Note that there are overlaps between these literature sources.

Table 3-6 Likelihood of direct impact definitions

Likelihood	Birds	Bats
Almost certain	It is very probable that the risk event could happen in any year. • species recorded frequently (>5 times) and/or in large numbers (>30 individuals) within the RSA of the WFA; **AND** • has observed windfarm mortality.	It is very probable that the risk event could happen in any year. • species displays **high** activity levels[1] within the WFA; **AND** • suspected to fly at heights within the RSA of the WFA; **AND** • has observed windfarm mortality.
Likely	It is more probable that the risk event could happen in any year. • species recorded frequently (>5 times) and/or in large numbers (>30 individuals) within the RSA of the WFA; **AND** • has no observed windfarm mortality.	It is more probable that the risk event could happen in any year. • species displays **moderate** activity levels[1] within the WFA; **AND** • suspected to fly at heights within the RSA of the WFA; **AND** • has no observed windfarm mortality.
Potential	It is equally probable that the risk event could happen in any year. • species recorded infrequently within the WFA, or considered likely or to possibly occur (Section 3.3); **AND** • is known or suspected to fly within the RSA of the WFA and/or has observed windfarm mortality.	It is equally probable that the risk event could happen in any year. • species displays **low** activity levels[1] within the WFA, **OR** considered likely or to possibly occur (Section 3.3); **AND** • suspected to fly at heights within the RSA of the WFA or in open/uncluttered air spaces and/or has observed windfarm mortality.
Unlikely	It is less probable that the risk event could happen in any year. • species recorded within the WFA or considered likely or to possibly occur (Section 3.3); **AND** • is not known or suspected to fly within the RSA of the WFA and has no observed windfarm mortality. **OR** • species is considered to possibly occur within the WFA but only on rare occasions; **AND** • is known or suspected to fly within the RSA of the WFA and/or has observed windfarm mortality.	It is less probable that the risk event could happen in any year. • species has not been recorded but is considered likely or to possibly occur within the WFA (Section 3.3); **AND** • is not suspected to fly at heights within the RSA of the WFA or in open/uncluttered air spaces and has no observed windfarm mortality.
Rare	It is improbable that the risk event could happen in any year. • species has not been recorded but is considered to possibly occur within the WFA but only on rare occasions (Section 3.3); **AND**	It is improbable that the risk event could happen in any year. • species has been recorded, or considered likely or to possibly occur within the WFA (Section 3.3); **AND**

Likelihood	Birds	Bats
	• species is unlikely to fly within the RSA of the WFA and has no observed windfarm mortality.	• is unlikely to fly within the RSA of the WFA, given foraging and movement behaviour is restricted to cluttered air space, and has no observed windfarm mortality.

1 – see activity level thresholds in section 3.2.2.

Table 3-7 Consequence definitions

Consequence	Description	Group
Severe	Loss of greater than 1% of EAAF population over 10 years.	Migratory shorebirds
	Loss in numbers of individuals, leading to reduction in population viability for a period of at least 10 years.	All other birds + bats
Significant	Loss of at least 0.1% of EAAF population over 10 years.	Migratory shorebirds
	Loss in numbers of individuals, leading to reduction population viability for between 5 and 10 years.	All other birds + bats
Medium	Loss of at least 0.05% of EAAF population over 10 years.	Migratory shorebirds
	Loss in numbers of individuals, leading to minor reduction in population viability for between one and 5 years.	All other birds + bats
Minor	Undetectable (<0.05%) loss of EAAF population over 10 years.	Migratory shorebirds
	Occasional loss of small numbers of individuals but no reduction in population viability.	All other birds + bats
Insignificant	Undetectable loss (<0.005%) of EAAF population over 10 years.	Migratory shorebirds
	Rare loss of individuals but no reduction in population viability.	All other birds + bats

Table 3-8 Risk matrix based on likelihood and consequence

Likelihood	Consequence				
	Insignificant	Minor	Medium	Significant	Severe
Almost certain	Negligible	Low	High	Extreme	Extreme
Likely	Negligible	Low	Moderate	High	Extreme
Potential	Negligible	Low	Moderate	High	High
Unlikely	Negligible	Negligible	Low	Moderate	Moderate
Rare	Negligible	Negligible	Negligible	Low	Moderate

4 REGIONAL OVERVIEW

4.1 SITE CHARACTERISATION

4.1.1 Regional environment

The study area is located predominantly within the Warren IBRA bioregion (Warren subregion, WAR01), with a small portion in the Southern Jarrah Forest subregion (JAF02) of the Jarrah Forest bioregion (Figure 4-1). The Warren bioregion contains low Jarrah woodlands and paperbark/sedge swamps on leached sandy soils in depressions and plains, *Agonis flexuosa* and *Banksia* woodlands and heaths, on Holocene marine dunes, Jarrah-Marri forest on laterites and Karri forest on loamy soils (May & McKenzie 2003).

The wider BIA extends more fully into the Southern Jarrah Forest subregion, with large areas of intact forest present to the north and east of the study area (Figure 1-1; Figure 4-1). This subregion contains Jarrah-Marri forest on laterite gravels, Jarrah forest mosaics with a variety of species rich shrublands on Mesozoic sediments and *Agonis* shrublands on eluvial and alluvial deposits (May & McKenzie 2003). Regional vegetation complexes mapped for the southwest forests (DBCA 2018) delineated 12 vegetation complexes within the BIA that broadly include:

- *Eucalyptus marginata* subsp*. marginata-Corymbia calophylla* woodlands and open forests, sometimes with *Banksia grandis*, *Agonis flexuosa*, *Allocasuarina fraseriana*
- tall open *Eucalyptus diversicolor* forest, sometimes with *Corymbia calophylla*
- *Melaleuca rhaphiophylla* woodland
- low open *Banksia attenuata-Nuytsia floribunda* woodland
- open *Corymbia calophylla* woodland with *Eucalyptus patens*, *E. megacarpa*, with tall shrubland of *Agonis* species
- *Eucalyptus rudis-Melaleuca rhaphiophylla* woodland
- woodland of *Eucalyptus patens- Corymbia calophylla*.

Many of these vegetation complexes contain key black cockatoo foraging, nesting and/or roosting plant species, such as *Acacia saligna*, *Agonis flexuosa*, *Banksia attenuata*, *B. grandis*, *B. littoralis*, *C. calophylla*, *Eucalyptus marginata*, *E. patens* and *E. megacarpa*.

Topography of the study area is generally flat/undulating. There are no obvious topographic features that may cause updraft areas for birds or bats.

Numerous conservation reserves, national parks and state forests occur within the BIA (DBCA 2025b) (Figure 4-2). The large area of intact remnant vegetation to the north-east of the study area (Figure 1-1) is gazetted as several contiguous reserves: Blackwood River National Park, Milyeannup National Park, Wiltshire-Butler National Park, Unnamed National Park R46400, Chester Nature Reserve, Pagett Nature Reserve, South Blackwood State Forest, Milyeannup State Forest, Timber Reserve O12925 and Timber Reserve O20125. Scott National Park is located south-west of the study area, within the BIA, and Gingilup Swamps Nature Reserve is located south-east, also within the BIA (Figure 4-2).

Nature Reserve R42377 occurs within the boundaries of the study area but is excluded from the WFA. There is also a large vegetated remnant in the centre of, but excised from, the study area that is of interested to DBCA (DBCA 2025a) (Figure 4-2).

Most of the reserves (i.e. the national parks and nature reserves) are gazetted for the purpose of conservation of flora and fauna. These provide habitat for conservation significant birds and bats.

While state forests are not specifically reserved for the conservation of fauna, they also provide habitat for conservation significant birds and bats.

One Priority Ecological Community (PEC), Subtropical and Temperate Coastal Saltmarsh, located to the south-west of the study area on the Hardy Inlet (Figure 4-2), contains features of habitat value to Migratory shorebirds. The description for the PEC includes "occurs on the coastal margin, along estuaries and coastal embayments and on low wave energy coast in places with at least some tidal connection, including rarely inundated supratidal areas, intermittently opened or closed lagoons, and groundwater tidal influences. The community occurs on sandy or muddy substrate and may include coastal clay pans and similar habitats. It consists of dense to patchy areas of characteristic coastal saltmarsh plant species that include salt- tolerant herbs, succulent shrubs or grasses, and may also include bare sediment as part of the mosaic" (DBCA 2023b).

The gazetted ESA dataset (DWER 2023), which lists areas of high conservation value, shows 61 ESAs intersecting the study area, collectively covering most (99%) of the study area (Figure 4-3). These appear to be associated with Threatened flora, TECs and wetlands, the latter being potentially relevant to conservation significant birds. The mapped polygons encompass buffers for these values, typically 50 m for Threatened flora and between 500 m – 2,000 m for TEC, therefore the extent of actual ESAs in the study area is much lower than the mapped ESA polygons.

No RAMSAR sites are located in or near the BIA. The nearest RAMSAR wetland to the BIA is the Vasse-Wonnerup system, located ~48 km to the north. The 'Blackwood River (Lower Reaches) and Tributaries System' is listed as a nationally important wetland located ~4.5 km west of the study area at its closest point, within the BIA (Figure 4-4). This site comprises the lower reaches of the Blackwood River and associated minor tributaries (DCCEEW 2022). It contains riparian vegetation that includes fringing open-forest and open/closed-scrub which supports waterfowl in modest numbers, but the listing is not specifically associated with any conservation significant bird or bat species. The next closest nationally important wetland site is the Gingilup-Jasper Wetland System, located ~14 km ESE of the BIA (Figure 4-4). The Gingilup/ Quitchup/ Jasper wetlands provide habitat for Australasian Bittern (EN) and some habitat for Migratory species, though not in nationally significant numbers.

Australia is part of the EAAF, which is one of several broad global routes that waterbirds undertake annual migrations along. The EAAF extends from the Arctic (eastern Russia and Alaska), southwards through East Asia and South-east Asia, terminating in Australia and New Zealand. Many sites in Australia are internationally important as part of the network of wetlands that support migration along the EAAF. The closest site to the BIA listed in the Directory of Important Habitat for Migratory Shorebirds in Australia (Weller *et al.* 2020) is Gnarabup Beach, roughly 35 km north-west of the BIA, where Sanderling (Mig.) have been recorded in nationally significant numbers.

The Hardy Inlet to the SW of the BIA provides habitat for Migratory shorebirds (Figure 4-4). Several Migratory species have also been recorded from the artificial wetlands created at the old Beenup mine, ~1 km west of the study area within the BIA (Figure 4-4). Approximately 10 km of coastline is also present within the BIA, south of the study area which is also likely to be utilised by Migratory shorebirds.

Many wetlands are present within the BIA according to the Augusta to Walpole Geomorphic Wetlands dataset (DBCA-017) (WRC 2017) including estuary (i.e. Hardy Inlet), floodplains, sumplands and damplands (Figure 4-4). Most of the study area is classified as palusplain (seasonally waterlogged flat), with smaller areas of dampland (seasonally waterlogged basin), floodplain (seasonally inundated flat) and sumpland (seasonally inundated basin). It is evident from aerial imagery however, that the wetland boundaries are not accurate, and that much of the single polygon that identifies palusplain wetland intersects agricultural land.

The Blackwood River, a major watercourse, runs through the western and northern parts of the BIA, and is located ~4.5 km from the study area at its closest point. The Scott River, a minor watercourse, intersects the BIA, and runs directly to the south of the study area (Figure 4-4).

The study area is situated at the junction of 3 South West Regional Ecological Linkages (SWREL; Figure 4-2). The SWREL Project identified a network of regional-scale ecological linkages throughout the southwest of the State (Molloy *et al.* 2009b). Ecological linkages were defined as "a series of (both contiguous and non-contiguous) patches which, by virtue of their proximity to each other, act as stepping stones of habitat which facilitate the maintenance of ecological processes and the movement of organisms within, and across, a landscape". One east-west linkage intersects the northern end of the study area connecting Pagett Nature Reserve/South Blackwood State Forest with Scott National Park (Figure 4-2). Another east-west linkage is just outside the southern boundary of the study area following the Scott River between Gingilup Swamps Nature Reserve (and surrounding coastal remnant vegetation) and Scott National Park (Figure 4-2). The 3rd linkage runs north-south on the eastern boundary of the study area connecting Pagett Nature Reserve/South Blackwood State Forest to coastal remnants south of the study area (Figure 4-2). Small to moderate sized, mobile bush bird groups are most likely to depend on the linkages for movement, either foraging or dispersal.





SynergyRED
Scott River Wind Fam

Project No	1585
Date	18/06/2025
Drawn by	BK
Map author	BA

0 2 4
Kilometers

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Study area
Bird/Bat Investigation Area

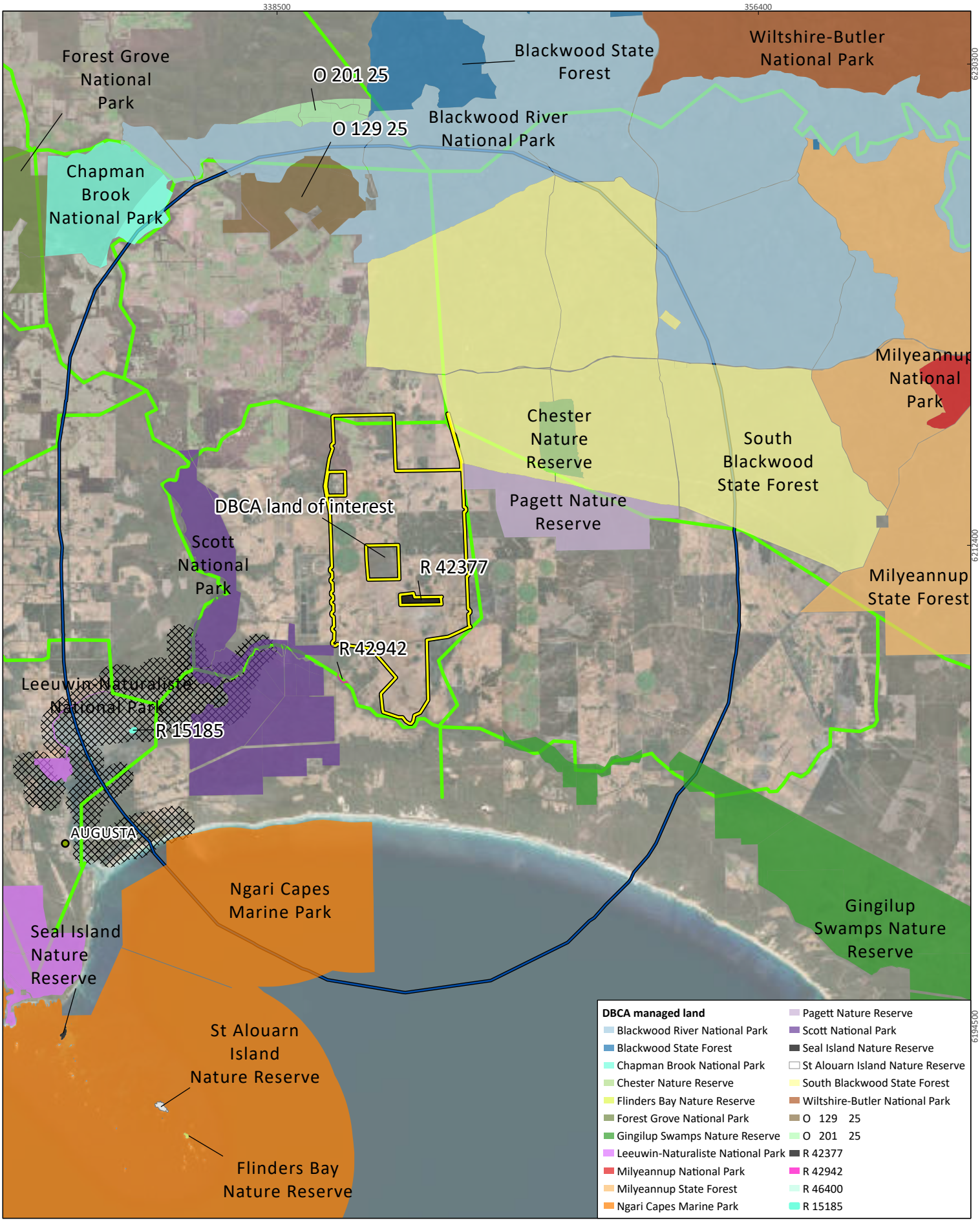
Region, subregion

Jarrah Forest, Southern Jarrah Forest
Warren, Warren

Figure 4-1

Study area in relation to IBRA regions and subregions

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Study area
Bird/Bat Investigation Area
South West Regional Ecological Linkages

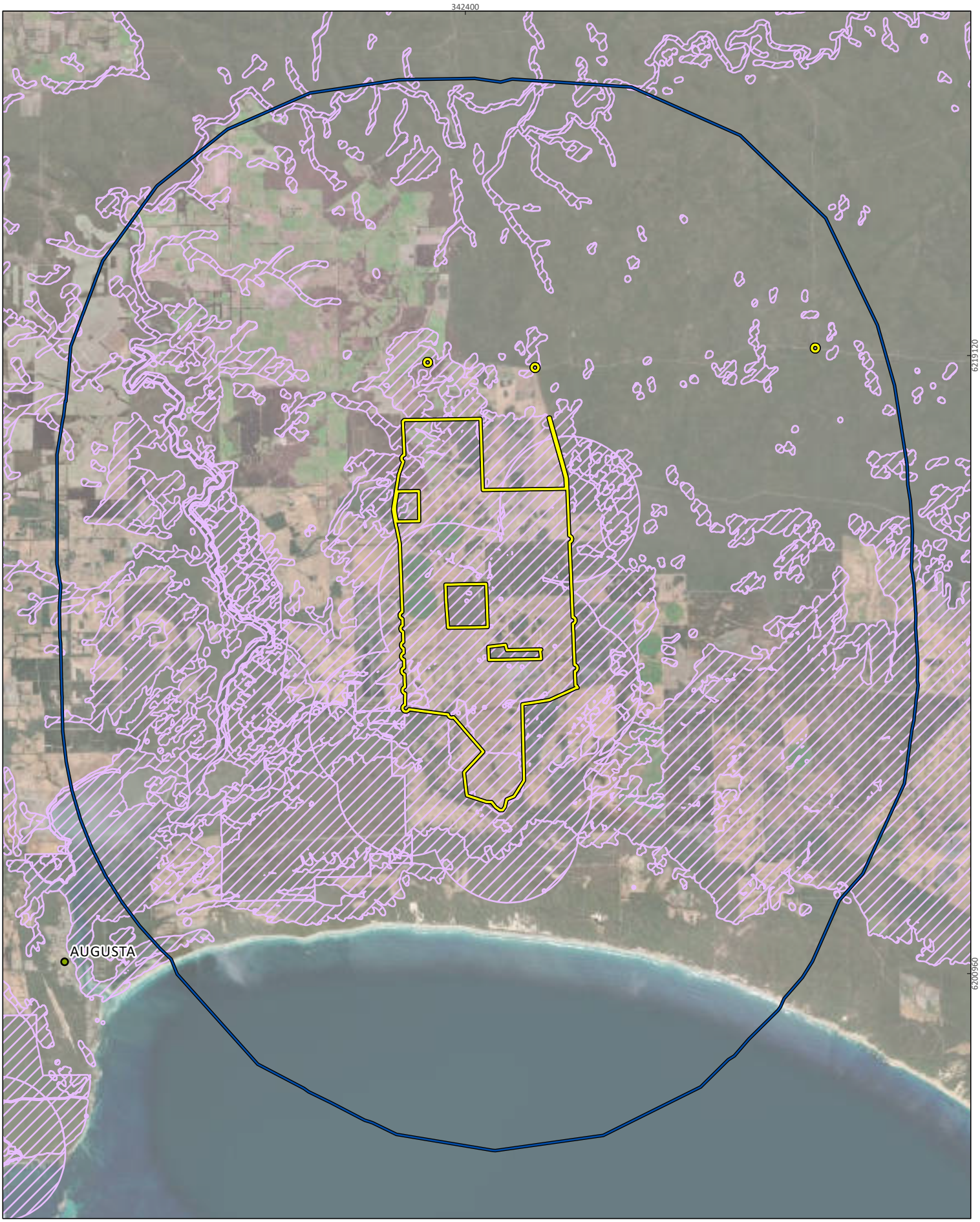
Priority ecological community

Subtropical and Temperate Coastal Saltmarsh

Figure 4-2

Conservation reserves, PEC and ecological linkages

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Proposed wind farm in Scott River

Project No	1583
Date	12/06/2025
Drawn by	BK
Map author	KC

0 2.5 5
Kilometers

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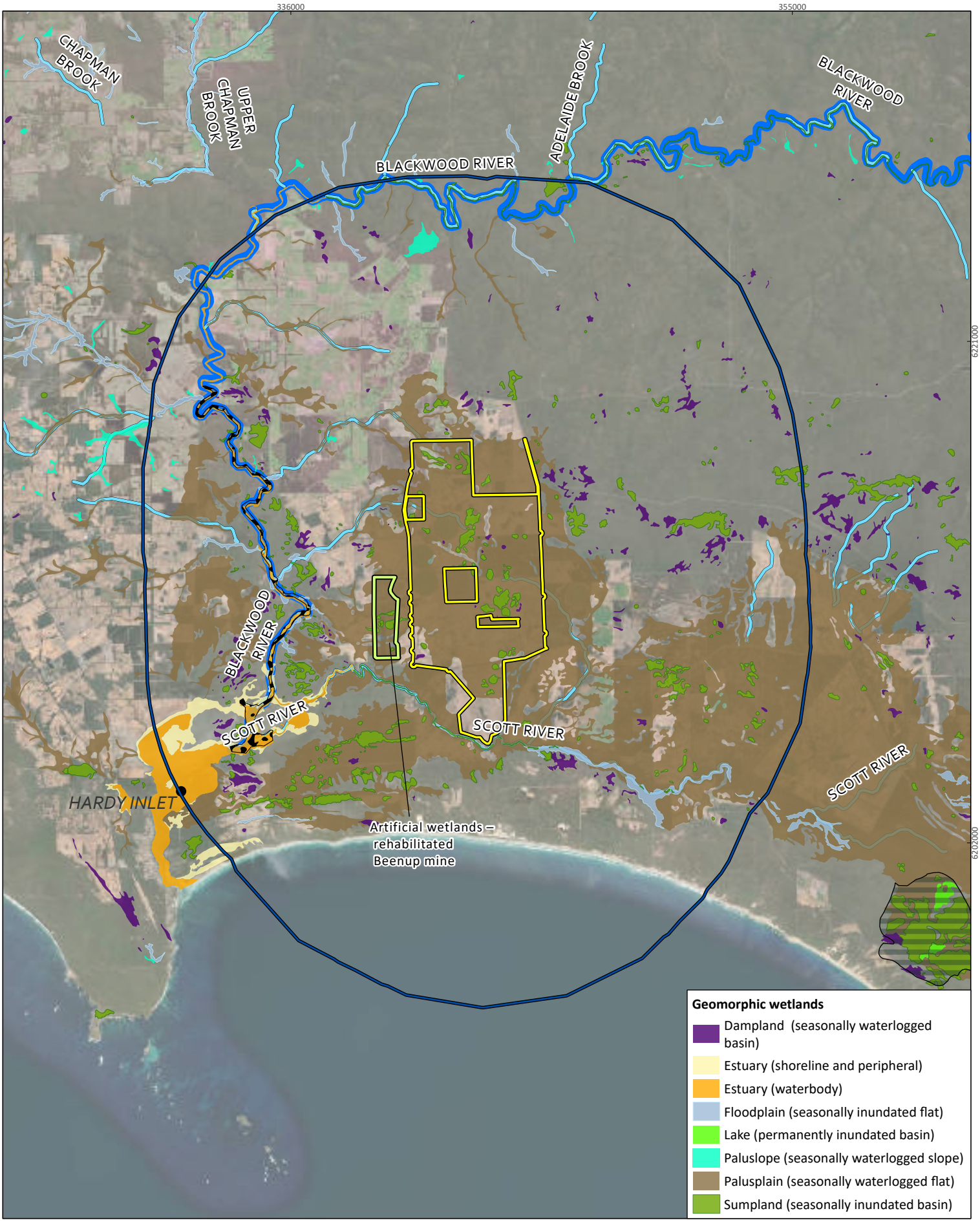
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- Study area
- Bird/Bat Investigation Area
- Environmentally Sensitive Areas

Figure 4-3

Environmentally Sensitive Areas

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Scott River Wind Fam

Project No	1585
Date	18/06/2025
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Map author	JC

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Study area
Bird/Bat Investigation Area
Major watercourses
Minor watercourses

Nationally important wetlands
Blackwood River (Lower Reaches) and Tributaries System
Gingilup-Jasper Wetland System

Artificial wetlands
Rehabilitated Beenup mine

Figure 4-4
Wetlands and waterways

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4.1.2 Climate and weather

The climate of the Warren (WAR01) subregion is described as moderate Mediterranean. The nearest Bureau of Meteorology (BoM) weather station with comprehensive data is Cape Leeuwin (no. 009518, Latitude: 34.37°S Longitude 115.14°E), located 17.8 km south-west of the study area. Cape Leeuwin records the highest mean maximum monthly temperature (23.4°C) in February and the lowest in July and August (16.5°C) (BoM 2025). The lowest mean minimum monthly temperature is in June (11.3°C) and highest in February (17.3°C; Figure 4-5). Mean annual rainfall is 947.5 mm, with July and June recording the highest mean monthly rainfall total (178.2 mm and 173.7 mm, respectively; Figure 4-5).

Daily mean maximum and minimum temperatures at Cape Leeuwin during the survey program (May 2023 to March 2025) were almost all higher than long-term averages, except June 2023 and April 2024 (Figure 4-5), in some cases substantially, e.g. monthly mean maximum temperature for October 2023 and May 2024 were 2°C and 3°C higher than the long-term averages, respectively. Across the complete survey period, monthly mean maximum and minimum temperatures were both on average 1.0°C above the long-term means, which are reflective of the warming trend occurring in south-west WA.

Monthly rainfall during the survey program did not correlate closely with long-term averages and was also variable between Year 1 and Year 2 of the survey program. Most months had below average, or close to average rainfall. Notable exclusions to this were April 2024, with 104.2 mm compared to the long-term average of 59.0 mm, and August 2024, with 228.4 mm compared to the long-term average of 135.1 mm (Figure 4-5). This is reflective of the drying trend occurring within south-west WA.

Based on long-term wind data from Cape Leeuwin weather station, prevailing winds are mainly from the NW–SW during May to September. In October, winds shift to the south, with prevailing winds coming mainly from the SE–SW during November to April. June to September is the windiest period.

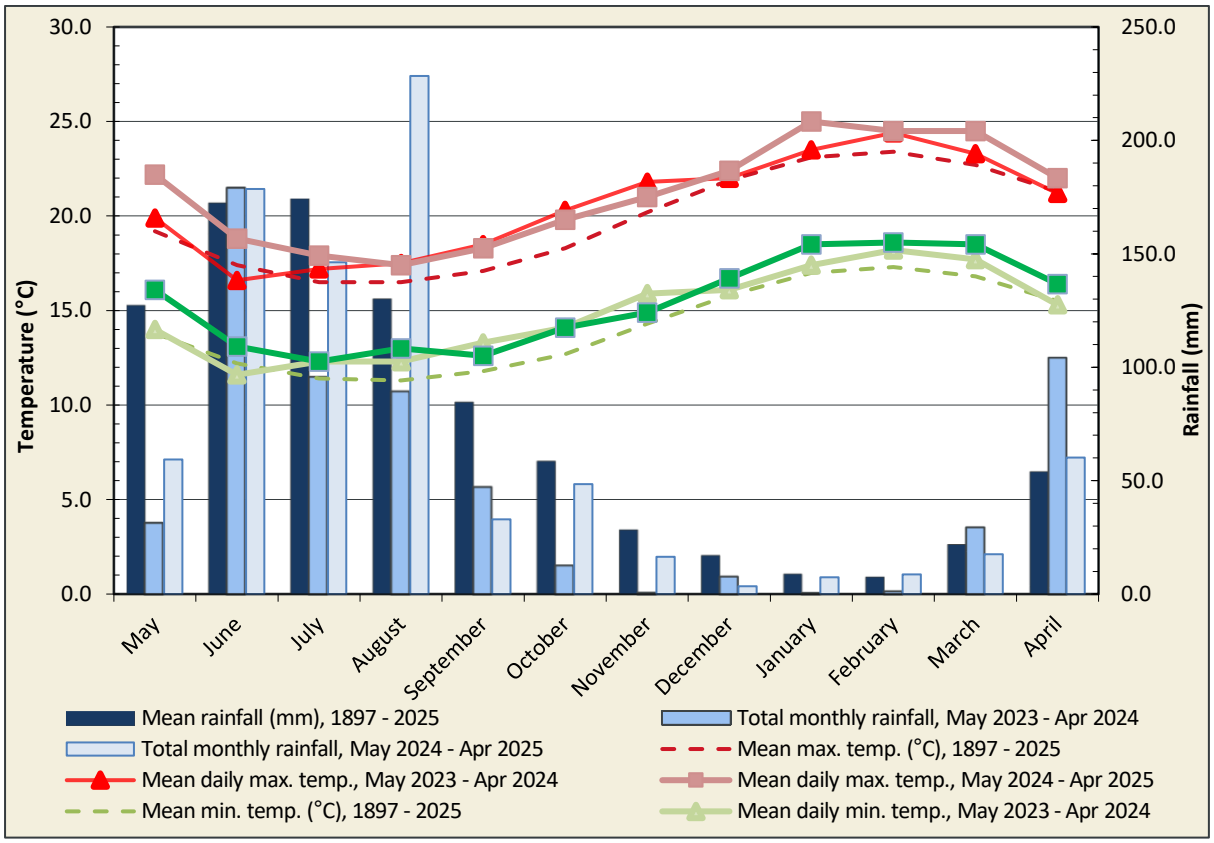


Figure 4-5 Climate data for Cape Leeuwin (no. 009518) – long-term data and for the survey period (BoM 2025)

4.1.3 Habitats in study area

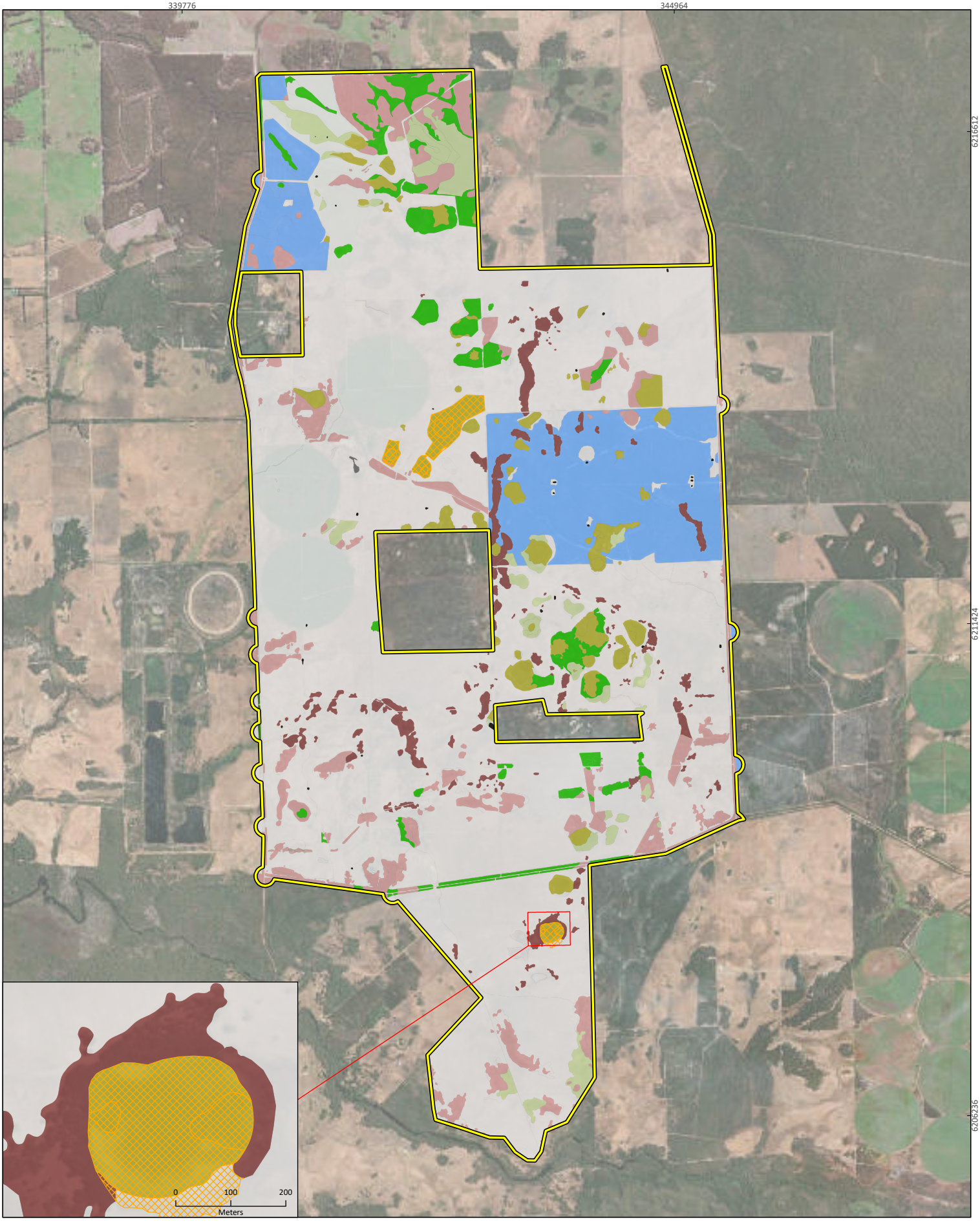
Habitat mapping from the Basic and Targeted fauna survey (Phoenix 2025a) identified 10 fauna habitat types in the study area, including 3 wetland habitats, 2 woodlands and 5 highly modified habitats (Figure 4-6; Table 4-1).

The wetlands are a mix of seasonally inundated paperbark woodlands, shrublands and sedgelands, collectively covering 377.7 ha (9.7%) of the study area, and are patchily distributed throughout (Figure 4-6). The condition of the wetlands was variable, with the paperbark woodlands and shrublands generally in better condition than the sedgelands, which tended to be heavily grazed. The majority of wetlands are seasonally inundated (i.e. ephemeral) and relatively shallow with water level typically less than 1 m, except for a large wetland south of Governor Broome Road and a wetland cluster in the northern part of the WFA that persisted into summer, suggesting that they have the potential to be permanently inundated (i.e. perennial); these are demarcated as 'potentially permanently inundated' in Figure 4-6.

Woodlands were in varying condition throughout the study area. These were categorised into Marri-Jarrah-Peppermint woodland and degraded Open woodland of Peppermint trees, together covering 416.6 ha (10.7%) of the study area. They occur within remnant vegetation patches and as roadside vegetation, sometimes adjacent to wetland habitats (Figure 4-6).

The highly modified habitats comprise cleared areas, dams and plantations. The study area is predominantly (68.7%) cleared areas, mainly comprising paddocks that contain little to no native vegetation but become inundated in winter for around 3 months of the year (June–August), essentially acting as floodplain grasslands. Two large Bluegum plantations are present, and a dense row of old pine trees occurs for 800 m along Scott River Road on the western boundary of the study area (Figure 4-6).

Most habitat in the study area is of low-quality with respect to the general flora assemblage (i.e. cleared areas, plantations, the degraded Open woodland of Peppermint trees, and dams) (Phoenix 2025b). There are however several small–moderate sized remnants of high-quality habitat remaining, some of which have been fenced off to prevent cattle access.





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Scott River Wind Fam

Project No	1585
Date	29/05/2025
Drawn by	BK
Map author	JC

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Kilometers

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Study area

Habitat

- Bluegum plantation
- Cleared
- Cleared - degraded sumpland
- Dam
- Marri-Jarrah-Peppermint woodland
- Open woodland of Peppermint trees (degraded)
- Pine plantation
- Seasonally inundated paperbark woodland (wetland)
- Seasonally inundated sedgeland (wetland)
- Seasonally inundated shrubland (wetland)
- Seasonally inundated paperbark woodland (wetland) - potentially permanently inundated

Figure 4-6

Fauna habitats in the study area

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Table 4-1 Extent and description of each fauna habitat in the study area

Habitat type	Description	Extent in study area ha (%)	Representative photograph
Wetland habitats			
Seasonally inundated paperbark woodland (wetland)	Seasonally inundated sumplands of paperbark woodlands, flora dominated by *Lemna disperma, Melaleuca rhaphiophylla, Taxandria juniperina, Taxandria inundata, Melaleuca preissiana, Callistachys lanceolata* and *Leptocarpus scariosus*. This wetland habitat is typically less floristically diverse (56 species recorded) than the shrublands, but far more diverse than the sedgelands. The tree canopy ranges from open to closed. Water is typically <50 cm deep and tannin stained, often with Duckweed at the surface and aquatic plants present. Large, old trees often present some with hollows being used by waterbirds. Habitat enhanced for fauna with log debris but can be plentiful or absent. Many examples fenced to prevent stock access. Four examples possibly perennially inundated (Figure 4-6).	144.99 ha (3.7%)	
Seasonally inundated sedgeland (wetland)	Seasonally inundated sumplands of open to dense mixed sedges, dominated by *Leptocarpus roycei*, *Machaerina juncea, Leptocarpus scariosus, Lepidosperma longitudinale* and *Melaleuca incana* subsp. *incana*. With or without occasional stands of paperbark (*Melaleuca rhaphiophylla*) typically at the periphery. Low floristic diversity. Often grazed at margins with associated weed encroachment. Can be relatively closed or with extensive open water areas. Bird presence generally limited to a handful of waterbirds that choose to nest in dense sedge stands that can form large homogenic stands.	106.7 ha (2.7%)	

Habitat type	Description	Extent in study area ha (%)	Representative photograph
Seasonally inundated shrubland (wetland)	Seasonally inundated sumplands with variable open to sparse shrublands. High floristic diversity (238 species in total). Dominated by *Taxandria inundata, Anarthria scabra, Loxocarya magna, Hypolaena caespitosa, Astartea scoparia, Leptocarpus scariosus*. Often grazed at margins with weed encroachment. Can be relatively closed or with extensive open water areas. Bird diversity generally greater compared with the 2 other wetland types (sedgelands or woodlands) due to higher diversity of flowering shrubs present offering a greater diversity of feeding and nesting opportunities. Waterbirds also present in low numbers.	126.1 ha (3.2%)	
Woodland habitats			
Marri-Jarrah-Peppermint woodland	Low to mid open woodlands dominated by *Corymbia calophylla, Eucalyptus marginata* subsp. *marginata, Allocasuarina fraseriana, Agonis flexuosa* var. *flexuosa*, *Machaerina juncea, Taxandria juniperina, Cyathochaeta equitans, Anarthria scabra, Lepidosperma leptostachyum, Platychorda applanata, Gastrolobium formosum* and *Astartea scoparia*. Habitat condition varies greatly depending on grazing history and can have excellent condition understorey through to completely degraded. Structural complexity also varies substantially with some remnants retaining many logs and debris on the floor and others with very little. The best examples are high quality habitat for the 3 black cockatoo species.	317.7 ha (8.2%)	

Habitat type	Description	Extent in study area ha (%)	Representative photograph
Open woodland of Peppermint trees (degraded)	Highly modified habitat dominated by a single native species, *Agonis flexuosa* var. *flexuosa*, and a variety of introduced weeds, such as **Rumex acetosella, *Hordeum leporinum and *Lolium rigidum, *Ehrharta longiflora* and **Bromus diandrus*. This habitat represents limited value to most native fauna due to the completely degraded nature of the understorey, and the fact *Agonis flexuosa* var. *flexuosa* rarely forms hollows.	98.9 ha (2.5%)	
Highly modified habitats			
Cleared	Cleared areas absent or near absent of native vegetation; agricultural paddocks and roads. May contain isolated paddock trees, generally of Peppermint (*Agonis flexuosa* var. *flexuosa*). Limited value to native fauna. Typically used by birds that tolerate and sometimes thrive in modified environments. Carnaby's Cockatoo observed on 2 occasions feeding on paddock weeds in seed.	2,667.8 (68.7%)	

Habitat type	Description	Extent in study area ha (%)	Representative photograph
Cleared–degraded sumpland	Seasonally inundated sumpland wetland that has been cleared (i.e., now paddock) and is almost completely devoid of native vegetation, excepting occasional isolated sedge plants. This habitat is essentially a highly degraded form of seasonally inundated sedgeland (wetland) habitat. As such it supports a limited number of native fauna species, including more degradation tolerant bird species. White-faced heron were regularly seen foraging in this habitat while it was inundated.	0.7 ha (<0.1%)	
Dam	Artificial pond or dam with standing water. Typically provides habitat for a handful of waterbirds only, and generally only in the largest examples. One example on Dennis Road was constructed with a sizeable rim and some rocky features affording protection and visibility limited predation and which attracted more birds than elsewhere.	1.7 ha (<0.1%)	
Bluegum plantation	Planted mid woodland of Bluegum (*_Eucalyptus globulus_ subsp. _globulus_). Monoculture which provides limited habitat value for native fauna. Carnaby's Cockatoo are known to use this habitat type on occasion but was not observed in the Bluegum plantation in the study area.	415.4 ha (10.7%)	

Habitat type	Description	Extent in study area ha (%)	Representative photograph
Pine plantation	Planted open woodland of pine (*_Pinus_ sp.) plantation. Monoculture which provides limited habitat value for native fauna. Carnaby's Cockatoo are known to feed on _Pinus_ sp. but were not observed doing so in the study area. Ninox (2012) observed a flock of Baudin's Cockatoo land in the stand of Pines on Scott River Road (in the study area) in 2006.	1.6 ha (<0.1%)	
Total		**3,881.5 ha**	

4.2 SPECIES CHARACTERISATION

The desktop review identified records of 199[2] species of bird and 7 species of bat within the desktop search extent (Appendix 3). This included a total of 58 conservation significant birds and one conservation significant bat, of which 45 are listed as Migratory under the EPBC Act and/or BC Act, 34 are listed as Threatened, Conservation Dependent or OS under the EPBC Act and/or BC Act, and 5 are Priority species listed by DBCA (many species have dual listings, e.g. as Threatened and Migratory).

Eighteen of the conservation significant species are pelagic seabirds, represented by albatrosses, petrels, shearwaters and Pomarine Jaeger (shaded grey in Appendix 3). These were considered unlikely to occur in the study area due to the distance of the study area from the coast and therefore have not been considered further. Species summary profiles for the remaining 41 conservation significant species are provided in Table 4-2.

Of these 41 conservation significant species, 3 have previously been recorded within the study area (Figure 4-7):

- Baudin's Cockatoo (EN) (Birdlife Australia 2023)
- Carnaby's Cockatoo (EN) (Birdlife Australia 2023; DBCA 2023c)
- Forest Red-tailed Black Cockatoo (VU) (DBCA 2023c).

Based on the desktop assessment, no known black cockatoo nesting or roosting sites are present in the study area. No known breeding sites were identified within the wider desktop search area but according to the DBCA Threatened and Priority Fauna database (DBCA 2024) a known roost site (from 2019, count of 19 white-tails) is located roughly 4.5 km north of the WFA. Another is located roughly 11.5 km NW of the WFA but has no bird count data.

[2] Count excludes indet. black cockatoo rows in Appendix 3 (i.e. *Calyptorhynchus* sp., *Calyptorhynchus*/*Zanda* sp. and *Zanda* sp.) as these records will belong to one of the 3 black cockatoo species listed in the appendix. Other indet. taxa detected in the desktop review have been excluded from Appendix 3 as they can be attributed to other species already listed.

Table 4-2 Desktop conservation significant species summary profiles

Family	Species	Conservation status	Nearest desktop record	Habitat preferences	Behaviour	Flight behaviour	Population estimates[1]
Accipitridae	*Pandion haliaetus* (Osprey)	Mig. (EPBC & BC Acts)	1.2 km W	Coastal habitats, saline and freshwater wetlands.	Feeds on fish, other vertebrates, marine invertebrates. Resident or sedentary.	Mostly diurnal, mid-flying, nocturnal hunter on occasion, mostly solitary	Australian pop. size unclear Global pop. ~100,000–1.2 mil.
Anatidae	*Oxyura australis* (Blue-billed Duck)	P4 (DBCA list)	1.0 km W	Shallow freshwater sources with reedbeds and vegetation, rarely saline water.	Feeds on plants, invertebrates. Concentrates in favourable areas.	Mostly diurnal, flocking, dispersive	Australian pop. ~ 11,000–19,000
Apodidae	*Apus pacificus* (Fork-tailed Swift)	Mig. (EPBC & BC Acts)	>20 km	Occurs over a variety of habitats, is almost exclusively aerial.	Overwinters in Australia. Forages for insects in the air. Migratory - present in Australia between September–April.	High flying, diurnal, flocking, transitory	Global pop. unclear, though common in breeding range. Australian pop. Estimated in the 10,000s
Ardeidae	*Botaurus poiciloptilus* (Australasian Bittern)	EN (EPBC & BC Acts)	12 km SW	Freshwater wetlands with dense vegetation.	Forages nocturnally on tadpoles, frogs, fish, dragonfly larvae. Usually occurs singly or in pairs.	Solitary/pairs, nocturnal, dispersive	Global pop. <2,000
Cacatuidae	*Calyptorhynchus banksii naso* (Forest Red-tailed Black Cockatoo)	VU (EPBC & BC Acts)	Within study area	Jarrah, Karri and Marri forest or woodland with >600 mm average annual rainfall.	Moves between roosts and foraging habitat at dawn and dusk.	Flocking, mid-flying diurnal	Total pop. ~17,000
Cacatuidae	*Zanda baudinii* (Baudin's Cockatoo)	EN (EPBC & BC Acts)	Within study area	High rainfall areas of Jarrah, Marri and Karri forest or woodland.	Moves between roosts and foraging habitat at dawn and dusk. Occurs in different parts of its range according to season.	Mid-flying, flocking, diurnal	Total pop. ~5,000–8,000
Cacatuidae	*Zanda latirostris* (Carnaby's Cockatoo)	EN (EPBC & BC Acts)	Within study area	Jarrah, Marri and Karri forest or woodland.	Moves between roosts and foraging habitat at dawn and dusk. Occurs in different parts of its range according to season.	Mid-flying, flocking, diurnal	Total pop. ~35,000

Family	Species	Conservation status	Nearest desktop record	Habitat preferences	Behaviour	Flight behaviour	Population estimates[1]
Charadriidae	*Anarhynchus bicinctus* (Double-banded Plover)	Mig. (EPBC & BC Acts)	1.9 km W	Coastal and freshwater wetlands, seldom far inland.	Feeds on invertebrates and plant matter mixing with other small shorebirds. Migratory - present in Australia between October–April.	High flying, diurnal/nocturnal, flocking	EAAF pop. ~19,000.
Charadriidae	*Anarhynchus leschenaultii* (Greater Sand Plover)	VU/Mig. (EPBC Act); VU (BC Act)	1.9 km W	Coastal habitats, e.g. sheltered beaches, intertidal mudflats, estuaries.	Mixes with other shorebirds in large flocks. Feeds on marine invertebrates. Migratory - present in Australia between late July–April.	Flocking, high flying, diurnal/nocturnal	EAAF pop. ~200,000–300,000
Charadriidae	*Anarhynchus mongolus* (Siberian Sand Plover)	EN/Mig. (EPBC Act); EN (BC Act)	1.9 km W	Coastal habitats, e.g. sandflats, mudflats, beaches, brackish swamps.	Mixes with other shorebirds in large flocks. Feeds on marine invertebrates. Migratory - present in Australia between August–April.	Flocking, high flying, diurnal/nocturnal	EAAF pop. ~325,000
Charadriidae	*Charadrius cucullatus* (Hooded Plover/Dotterel)	P4 (DBCA list)	3.3 km S	Ocean coastal beaches, saline and freshwater lakes, inland salt lakes.	Feeds on invertebrates, day and night. Some local movements between coast and salt lakes. Locally migratory.	Flocking, diurnal/nocturnal	WA pop. ~2,250.
Charadriidae	*Pluvialis fulva* (Pacific Golden Plover)	Mig. (EPBC & BC Acts)	1.9 km W	Mainly coastal habitats, but also recorded from inland wetlands, paddocks.	Feeds on invertebrates, often occurring in large flocks as well as mixed flocks. Migratory - present in Australia between September–May.	Flocking, high flying, diurnal/nocturnal	EAAF pop. ~ 120,000. Aust. numbers vary greatly annually
Charadriidae	*Pluvialis squatarola* (Grey Plover)	VU/Mig. (EPBC Act); Mig. (BC Acts)	11.0 km WSW	Coastal habitats, e.g. beaches, sandflats, intertidal mudflats, saltmarshes.	Feeds on invertebrates. Often occurs in large flocks, and mixed flocks. Migratory - present in Australia between August–April.	Flocking, high flying, diurnal	EAAF pop. ~80,000 Australian pop. ~11,300
Falconidae	*Falco peregrinus* (Peregrine Falcon)	OS (BC Act)	0.9 km S	Variety of habitats incl. cliff lines, woodland, shrubland, grassland	Undertakes high-speed pursuit of prey, diving from high altitudes. Observed alone or in pairs.	Transitory, soaring, high flying, diurnal	Australian pop. ~ 6,000– 10,000

Family	Species	Conservation status	Nearest desktop record	Habitat preferences	Behaviour	Flight behaviour	Population estimates[1]
Laridae	*Anous tenuirostris melanops* (Australian Lesser Noddy)	VU (EPBC Act); EN (BC Act)	Proj. dist.	Mangroves, lagoons, beaches on oceanic coral-limestone islands.	Feeds on small surface-dwelling fish, invertebrates and coral fragments.	Sedentary, hovering, most flight over water	Australian pop. ~100,000 breeding birds
Laridae	*Hydroprogne caspia* (Caspian Tern)	Mig. (EPBC & BC Acts)	1.0 km W	Coastal habitat, near-coastal saline and freshwater wetlands.	Forages for fish in open wetland margins and coastal shorelines. Circles slowly and dives for prey. Sedentary or locally migratory in Australia between nesting and non-nesting sites.	Mid-flying, diurnal	Australian pop. unknown, est. many 1000s
Laridae	*Onychoprion anaethetus* (Bridled Tern)	Mig. (EPBC & BC Acts)	11.3 km W	Offshore tropical and subtropical seas and islands.	Occurs almost entirely offshore, nesting on islands. Feeds on aquatic vertebrates and invertebrates. Migratory - present in Australia between September–April.	Flocking, mid-flying, diurnal	Global pop. ~ 610,000–1.5 mil
Laridae	*Sternula nereis nereis* (Fairy Tern)	VU (EPBC & BC Acts)	7.0 km WSW	Offshore, estuarine or lacustrine (lake) islands, wetlands, beaches and spits.	Feeds on aquatic animals and plants. Two subpopulations in WA, one migratory and one sedentary.	Flocking, mid-flying, diurnal	Australian pop. ~7,450
Laridae	*Thalasseus bergii* (Greater Crested Tern)	Mig. (EPBC & BC Acts)	1.9 km W	Coastal habitats, e.g. estuaries, brackish rivers.	Feeds on aquatic animals, mainly fish, by dive-bombing and fully submerging. Does not migrate in Australia. Breeds between September–April and remains close to breeding sites outside the breeding season.	Flocking, mid-flying, diurnal	Global pop. ~150,000–1.1 mil Australian pop. Unknown
Megapodiidae	*Leipoa ocellata* (Malleefowl)	VU (EPBC & BC Acts)	1.2 km SSW	Semi-arid shrublands and low woodlands.	Feeds on various plant material. Forms large mounds for breeding.	Rarely flies	Total pop. ~20,000–30,000
Motacillidae	*Motacilla cinerea* (Grey Wagtail)	Mig. (EPBC & BC Acts)	Proj. dist.	Riparian woodland, farmland, wetlands.	Vagrant to Australia. Feeds on insects on/low over the ground. Wades in shallow water for	Low flying, diurnal	Global pop. ~7–20 mil.

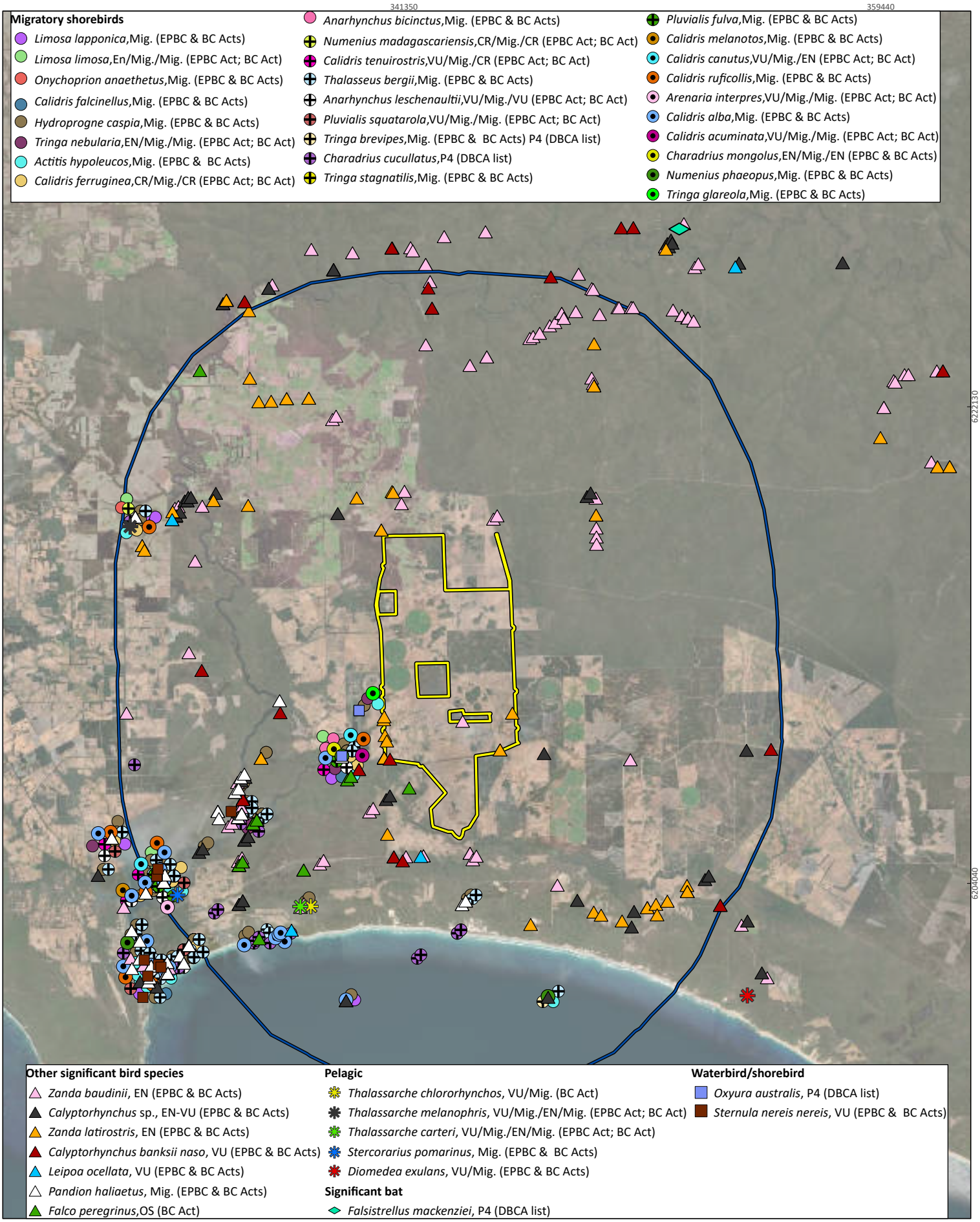
Family	Species	Conservation status	Nearest desktop record	Habitat preferences	Behaviour	Flight behaviour	Population estimates[1]
					aquatic invertebrates. Migratory - present in Australia between October–April.		No reliable Australian pop. est.
Scolopacidae	*Actitis hypoleucos* (Common Sandpiper)	Mig. (EPBC & BC Acts)	0.5 km W	Coastal and inland saline and freshwater wetlands.	Forages in shallow water and mud. Often found alone or in pairs. Migratory - present in Australia between July–April.	Mid-flying, diurnal/nocturnal	Global pop. 4.9-7.5 mil. EAAF pop. ~190,000
Scolopacidae	*Arenaria interpres* (Ruddy Turnstone)	VU/Mig. (EPBC Act); Mig. (BC Act)	11.0 km SSE	Variety of coastal habitats, such as mudflats and sewerage ponds	Found singly or in pairs. Feeds nocturnally and diurnally on invertebrates. Migratory - present in Australia between August–April.	High flying, diurnal/nocturnal, flocking	EAAF pop. ~30,000 Australian pop. ~19,000
Scolopacidae	*Calidris acuminata* (Sharp-tailed Sandpiper)	VU/Mig. (EPBC Act); Mig. (BC Act)	1.2 km W	Fresh, brackish and saline wetlands, lagoons, lakes and inundated paddocks.	Preys on invertebrates and plant matter from mud. Forms large mixed flocks. Migratory - present in Australia between August–April.	Mid-flying, diurnal/nocturnal, flocking	EAAF pop. / Australian pop. ~73,000
Scolopacidae	*Calidris alba* (Sanderling)	Mig. (EPBC & BC Acts)	1.9 km W	Open coastal habitats, e.g. exposed beaches.	Active forager in tight flocks, feeding on plants, seeds, and invertebrates. Migratory - present in Australia between September–May.	High flying, diurnal/nocturnal, flocking	EAAF pop. ~30,000
Scolopacidae	*Calidris canutus* (Red Knot)	VU/Mig. (EPBC Act); EN (BC Act)	1.9 km W	Coastal habitats, e.g. estuaries, mudflats.	Feeds on invertebrates in large mixed shorebird flocks. Less common in SW than other coastal areas. Migratory - present in Australia between August–April.	Migratory, high flying, diurnal/nocturnal, flocking	Global pop. ~1.1 mil Australian pop. ~135,000
Scolopacidae	*Calidris falcinellus* (Broad-billed Sandpiper)	Mig. (EPBC & BC Acts)	1.9 km W	Coastal habitats, e.g. estuarine mudflats, reefs and marshes.	Feeds on invertebrates and plant matter in mud. Rare, with often only one in large mixed flocks. Migratory - present in Australia between August–April.	High flying, diurnal/nocturnal, flocking	EAAF pop. ~30,000

Family	Species	Conservation status	Nearest desktop record	Habitat preferences	Behaviour	Flight behaviour	Population estimates[1]
Scolopacidae	*Calidris ferruginea* (Curlew Sandpiper)	CR/Mig. (EPBC Act); CR (BC Act)	1.9 km W	Mainly inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets	Feeds on invertebrates and plant matter in mud. Forms large mixed flocks. Migratory - present in Australia between August–April.	High flying, diurnal/nocturnal, flocking	EAAF pop. ~90,000 Australian pop. ~40,000
Scolopacidae	*Calidris melanotos* (Pectoral Sandpiper)	Mig. (EPBC & BC Acts)	12.7 SWS	Fresh, brackish and saline wetlands, lagoons, lakes and inundated grasslands.	Feeds on invertebrates and plant matter in mud. Rare species, joins large mixed flocks. Migratory present in Australia between September–June.	High flying, diurnal/nocturnal, flocking	Global pop. ~25,000–100,000
Scolopacidae	*Calidris ruficollis* (Red-necked Stint)	Mig. (EPBC & BC Acts)	1.9 km W	Aquatic habitats such as mudflats, beaches and wetlands, and sometimes in inundated paddocks.	Feeds on invertebrates and plant matter in mud and water. Feeds and roosts in large mixed flocks. Migratory - present in Australia between August–April.	High flying, diurnal/nocturnal, flocking	EAAF pop. ~475,000 Australian pop. ~350,000
Scolopacidae	*Calidris tenuirostris* (Great Knot)	VU/Mig. (EPBC Act); CR (BC Act)	1.9 km W	Coastal habitats, e.g. estuaries, mudflats.	Feeds on invertebrates in large mixed shorebird flocks. Mainly found in northern Australia. Migratory - present in Australia between August–April.	High flying, diurnal/nocturnal, flocking	EAAF pop. ~425,000 Australian pop. ~386,900
Scolopacidae	*Limosa lapponica* (Bar-tailed Godwit)	Mig. (EPBC & BC Acts)	1.9 km W	Coastal habitats, e.g. bays, estuaries, mudflats, sandflats.	Forages for invertebrates on wide intertidal mudflats or sandflats. Observed in large mixed flocks in some locations. Migratory - present in Australia between August–April.	High flying, diurnal/nocturnal, flocking	EAAF pop. ~325,000
Scolopacidae	*Limosa limosa* (Black-tailed Godwit)	EN/Mig. (EPBC Act); Mig. (BC Act)	1.9 km W	Coastal habitats, e.g. bays, estuaries, mudflats, sandflats.	Forages for invertebrates on wide intertidal mudflats or sandflats. Observed in large mixed flocks in some locations. Migratory - present in Australia between August–April.	High flying, diurnal/nocturnal, flocking	AAF pop. ~160,000 Australian pop. ~43,000

Family	Species	Conservation status	Nearest desktop record	Habitat preferences	Behaviour	Flight behaviour	Population estimates[1]
Scolopacidae	*Numenius madagascariensis* (Eastern Curlew)	CR/Mig. (EPBC Act); CR (BC Act)	11.5 km W	Coastal habitats, e.g. mudflats, sandflats, especially those with seagrass.	Feeds on crustaceans in estuaries, mangroves, saltmarshes and intertidal flats. Migratory - present in Australia between August–April.	Mid-flying, diurnal/nocturnal, flocking	EAAF pop. ~35,000 Australian pop. ~22,500
Scolopacidae	*Numenius phaeopus* (Whimbrel)	Mig. (EPBC & BC Acts)	1.9 km W	Coastal habitats, e.g. mudflats, sandflats, mangroves.	Forages on beaches/rocks, alone or with other shorebirds. Migratory - present in Australia between August–April.	Flocking, high flying	EAAF pop. ~65,000
Scolopacidae	*Tringa brevipes* (Grey-tailed Tattler)	Mig. (EPBC and BC Acts); P4 DBCA list	6.9 km SSE	Coastal habitat, e.g. reefs, rock platforms, mudflats.	Forages for invertebrates in shallow water, usually during the day. Migratory - present in Australia between August–April.	Mid-flying, diurnal, flocking	EAAF pop. ~70,000
Scolopacidae	*Tringa glareola* (Wood Sandpiper)	Mig. (EPBC & BC Acts)	0.5 km W	Well vegetated freshwater wetlands and water sources, as well as inundated grasslands.	Forages for invertebrates in shallow water. Often found alone, in pairs or in small flocks with other shorebirds. Migratory - present in Australia between August–April.	High flying, diurnal/nocturnal, flocking	EAAF pop. ~130,000
Scolopacidae	*Tringa nebularia* (Common Greenshank)	EN/Mig. (EPBC Act); Mig. (BC Act)	0.5 km W	Saline and freshwater wetlands, mudflats and inundated paddocks.	Forages for invertebrates in shallow water, often along shorelines. Observed in mixed flocks. Migratory - present in Australia between August–May.	High flying, diurnal/nocturnal, flocking	EAAF pop. ~110,000 Australian pop. ~23,700
Scolopacidae	*Tringa stagnatilis* (Marsh Sandpiper)	Mig. (EPBC & BC Acts)	12.5 km SW	Saline and freshwater wetlands, including inundated floodplains.	Forages on invertebrates in shallow water at the edge of wetlands singly or in groups. Migratory - present in Australia between September–April.	High flying, diurnal/nocturnal, flocking	EAAF pop. ~130,000
Tytonidae	*Tyto novaehollandiae novaehollandiae*	P3 (DBCA list)	1.0 km S	Tall open forests with large trees	Territorial, usually seen singly. Roosts in large trees. Feeds on a wide variety of prey. Perch and	Nocturnal, mid-flying	Population size unknown Anecdotally, there is a healthy population

Family	Species	Conservation status	Nearest desktop record	Habitat preferences	Behaviour	Flight behaviour	Population estimates[1]
	(Masked Owl (southwest))				drop predator that hunts on forest edges.		in the Augusta-Margaret River region[2]
Vespertilionidae	*Falsistrellus mackenziei* (Western False Pipistrelle)	P4 (DBCA list)	1.2 km W	Tall woodlands and wet or dry sclerophyll forest	Feeds on insects. Forms colonies up to 30 bats. Roosts in hollows.	High flying, nocturnal	Unknown population size. Estimated in 2014 that remaining habitat sufficient to support >10,000

1 - Refer to Appendix 4 for sources of population estimates. 2 - Pers. comm Dr Boyd Wykes.





SynergyRED
Scott River Wind Fam

Project No	1585
Date	19/06/2025
Drawn by	BK
Map author	BA

0 2.5 5
Kilometers

1:185,500 (at A4) GDA 1994 MGA Zone 50

All information within this map is current as of 19/06/2025. This product is subject to COPYRIGHT and is property of Phoenix Environmental Sciences (Phoenix). While Phoenix has taken care to ensure the accuracy of this product, Phoenix make no representations or warranties about its accuracy, completeness or suitability for any particular purpose.

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Study area
Bird/Bat Investigation Area

Figure 4-7

Desktop records of significant birds and bats

PHOENIX ENVIRONMENTAL SCIENCES

5 FIELD SURVEY RESULTS

5.1 BIRDS

5.1.1 General summary

Results presented in section 5.1.1 are based on the BBRAS survey data from the fixed-point count sites only. Records from the Basic and Targeted fauna survey are omitted, unless otherwise stated.

A total of 310 samples taken from 28 sites resulted in a total bird species richness of 96 and total abundance of 13,471 (Table 5-1). Species richness was 60 at Impact sites, 74 at Reference sites and 31 at the Regional reference sites. Reference sites were therefore the most speciose and abundant overall. Regional reference sites comprised just 2.5% of the samples and 3.9% of species records but contributed 16% of the overall abundance and recorded a species richness that was >50% that of Impact sites, strongly distinguishing the Regional reference sites as species rich and abundant, compared with sites within the WFA and BIA.

Table 5-1 Data summary of records for fixed-point count samples between the 3 site types

Site type	No. sites	No. sample events	Species richness	No. records	Total abundance
Impact	9	125	60	988	4,750
Reference	14	177	74	1,542	6,568
Regional reference	5	8	31	104	2,153
Total	**28**	**310**	**96**	**2,634**	**13,471**

Species richness, abundance and number of records aggregated across sites in the BIA is shown for Year 1 and Year 2 in Figure 5-1, and per season in Figure 5-2. Almost twice as many samples were completed in Year 2 (202) compared with Year 1 (108). Accordingly, the number of records was much higher in Year 2 (1,599 records) compared with Year 1 (1,075 records) as was the total abundance, being 8,315 in Year 2 compared with 5,156 in Year 1. Despite the significant increase in sample effort in Year 2, species richness was only marginally higher (78 species), compared with Year 1 (72 species). The analysis of survey completeness is provided in section 5.4.

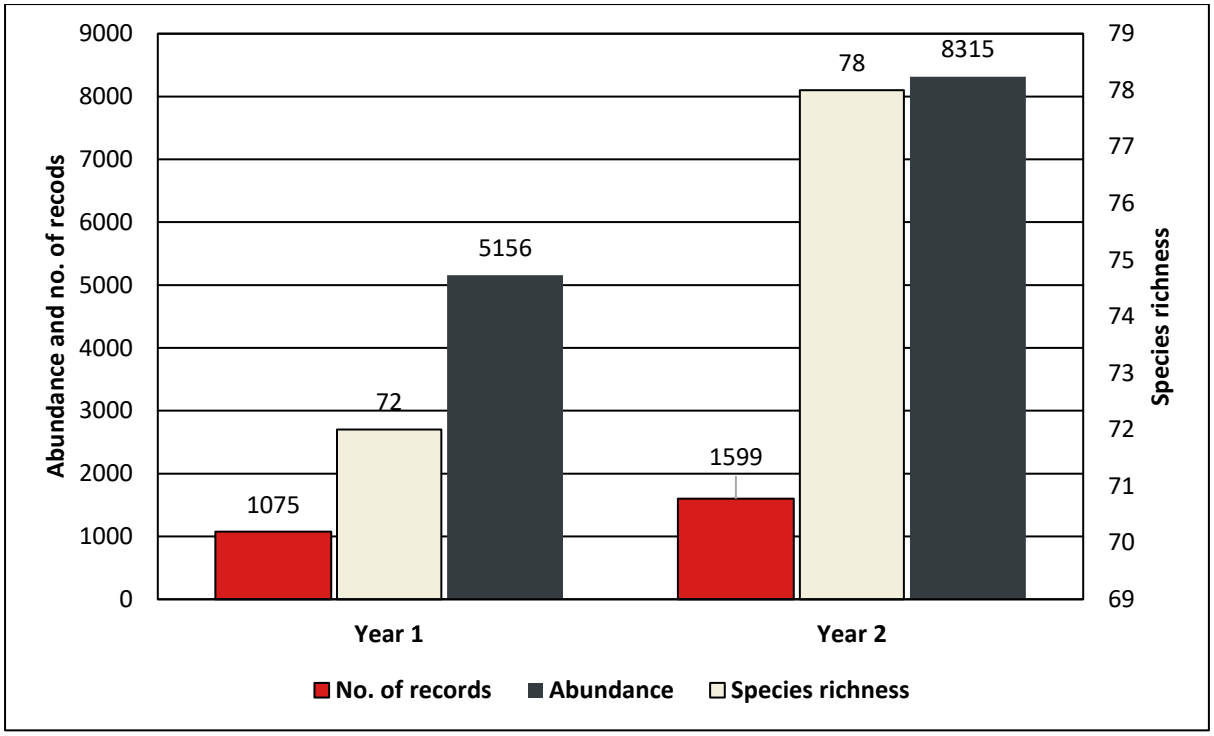


Figure 5-1 **Species richness, number of records and abundance of birds at fixed-point count sites per year**

Figure 5-2 demonstrates the effect on abundance of the additional sample effort in Year 2, which was almost twice that of Year 1 and thus at first appears a much more abundant year, by displaying the mean abundance and mean species richness per sample, per season in each year. With the data summarised per sample and the mean values calculated, the large difference in abundance between years is no longer apparent, i.e. mean abundance for all seasons in Year 2 is far more similar to that of Year 1. Autumn of Year 1 was therefore the period where mean abundance was greatest, followed by summer in Year 2.

Mean species richness per sample was highest in winter and spring of Year 1 (9.2 species). In fact, mean species richness in every season of Year 1 was higher than that of Year 2, conversely however, summer and spring of Year 2 were the most speciose periods over the 2 years, recording 68 and 66 species, respectively; and the autumn of Year 2 was the least speciose period.

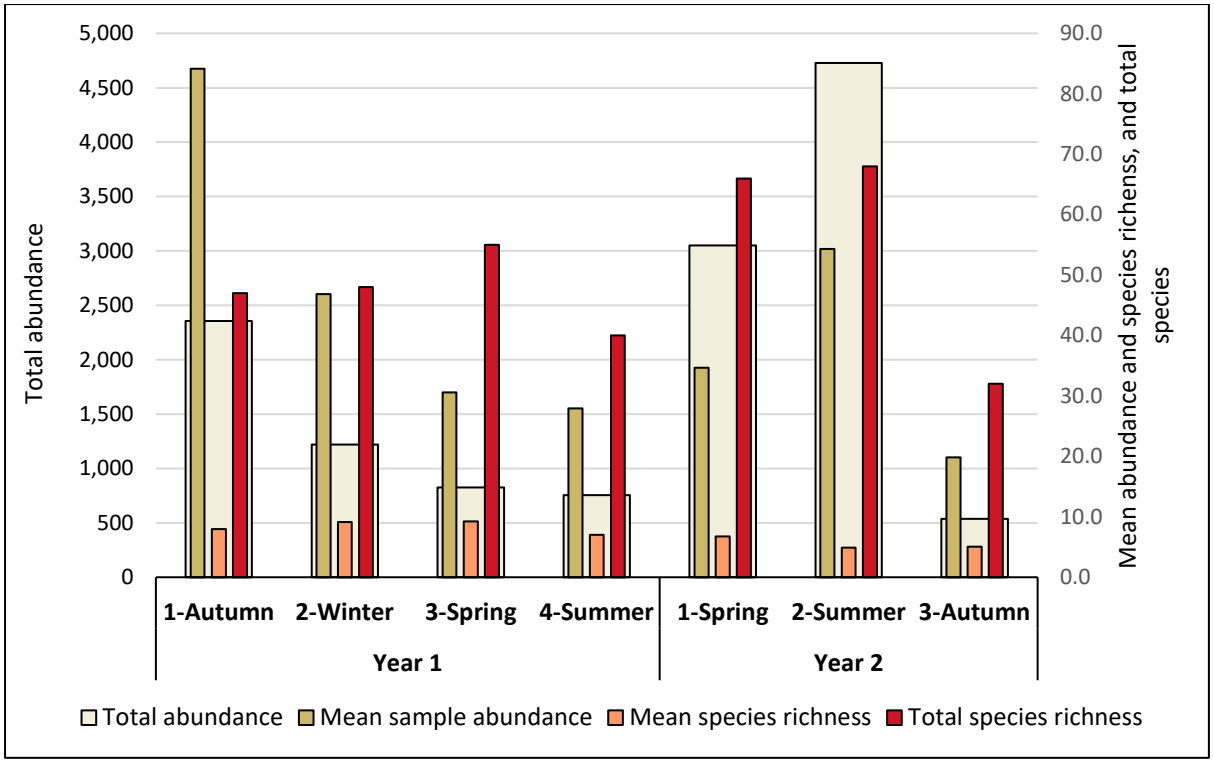


Figure 5-2 Seasonal mean species richness and mean abundance per year, based on samples

At the site level, 9 sites in the 30-minute point counts, including 4 Impact sites, recorded a species richness of just one (Table 5-2). Maximum species richness varied considerably, but sites BUS020 (Impact), BUS015 (Reference) and BUS031 (Regional reference) were the most speciose (15, 19 and 16 species, respectively) in each area. However, sites BUS006 (Impact), BUS009 (Reference) and BUS031 (Regional reference) were consistently the most speciose in each area, recording mean species richness values of 9.0, 12.0 and 14.0, respectively.

When the Impact, Reference and Regional reference sites are compared in aggregate, there is little difference between Impact and Reference sites - numerous metrics for these 2 groups were remarkably similar, for instance mean abundance was 39.2 and 38.6, respectively. The mean median abundance was 25.8 and 23.3, respectively and the standard deviation of the mean abundance was 45.7 and 48.5, respectively. Reference sites were, however, slightly more species rich than Impact sites, recording mean richness values of 8.0 and 5.9 species, respectively.

In contrast, the Regional reference sites were far more abundant (mean = 222.5) and more species rich (10.5) on average compared with Impact and Reference sites in or near the WFA. Further sampling of these sites through other periods of the year, especially when Migratory species are absent, would have undoubtedly lowered both values.

Mean abundance per sample and mean species richness per sample for each site are also displayed graphically in Figure 5-3 and spatially in Figure 5-4[3]. In both figures the much higher mean abundance per sample at Regional reference sites compared with Impact and Reference sites is very clear, particularly for 2 sites, BUS030 and BUS031. It can also be seen in Figure 5-4 that the southwest corner of the WFA supports a more abundant bird population on average. With respect to mean species richness however, both Figure 5-3 and Figure 5-4 indicate that the differences between the 3 groups are far less pronounced.

[3] In order to give visual effect to Figure 5-4, mean abundance was multiplied by 10 and mean species richness was multiplied by 50.

Table 5-2 Site-sample summary for fixed-point count sites

Area	sitename	#samples	Total sp. rich.	Total abundance	Min		Max		Range		Mean		Total		Median		Std.dev.	
					Abnd.	Sp. rich.	Abnd.	Sp. rich.	Abnd.	Sp. rich.	Abnd.	Sp. rich.	Abnd.	Sp. rich.	Abnd.	Sp. rich.	Abnd.	Sp. rich.
Impact sites	BUS004	21	33	468	5	4	48	11	43	7	22.3	7.3	468	33	19.0	7.0	12.5	2.1
	BUS006	8	35	383	10	4	149	13	139	9	47.9	9.0	383	35	38.5	9.5	41.9	2.9
	BUS016	14	30	736	6	3	235	13	229	10	52.6	5.6	736	30	21.0	5.0	67.4	2.8
	BUS018	13	22	459	5	3	99	9	94	6	35.3	5.1	459	22	29.0	5.0	25.1	1.7
	BUS019	14	22	253	2	1	35	9	33	8	18.1	4.6	253	22	18.0	4.5	9.6	1.8
	BUS020	14	30	1,557	6	1	792	15	786	14	111.2	7.1	1,557	30	56.5	7.0	191.7	4.2
	BUS025	14	29	334	8	1	51	11	43	10	23.9	6.3	334	29	22.0	6.5	12.6	3.3
	BUS026	13	16	228	1	1	102	6	101	5	17.5	2.6	228	16	11.0	2.0	25.6	1.5
	BUS027	14	21	332	2	2	92	9	90	7	23.7	5.1	332	21	17.0	5.0	24.8	1.9
	Sub-total	**125**	**60**	**4,750**	**1**	**1**	**792**	**15**	**786**	**14**	**39.2**	**5.9**	**4,750**	**60**	**25.8**	**5.7**	**45.7**	**2.5**
Ref. sites	BUS001	22	49	942	16	2	189	17	173	15	42.8	9.2	942	49	34.5	9.0	34.4	3.6
	BUS002	22	31	737	1	1	397	11	396	10	33.5	5.4	737	31	13.5	5.5	80.3	2.9
	BUS003	8	35	1,107	19	8	859	13	840	5	138.4	10.5	1,107	35	36.5	11.0	272.6	1.7
	BUS005	21	37	605	3	3	169	13	166	10	28.8	6.4	605	37	18.0	6.0	33.4	2.8
	BUS007	8	20	349	3	1	123	12	120	11	43.6	6.1	349	20	31.0	6.5	41.0	2.9
	BUS008	19	25	399	1	1	167	7	166	6	21.0	4.0	399	25	11.0	4.0	36.4	1.6
	BUS009	6	30	230	14	7	64	15	50	8	38.3	12.0	230	30	41.5	13.5	18.4	2.9
	BUS010	22	30	632	1	1	82	10	81	9	28.7	5.6	632	30	19.5	5.5	21.5	2.2
	BUS011	21	32	773	1	1	191	12	190	11	36.8	6.8	773	32	20.0	6.0	47.4	2.9
	BUS012	2	14	29	10	6	19	11	9	5	14.5	8.5	29	14	14.5	8.5	4.5	2.5
	BUS013	8	23	242	8	5	125	11	117	6	30.3	7.5	242	23	14.5	7.0	36.6	2.2
	BUS014	8	29	162	6	2	33	11	27	9	20.3	7.6	162	29	20.5	9.5	10.8	3.4
	BUS015	8	28	314	5	3	128	19	123	16	39.3	10.5	314	28	27.0	10.5	36.5	4.2
	BUS035	2	15	47	18	9	29	14	11	5	23.5	11.5	47	**15.0**	23.5	11.5	5.5	2.5

Area	sitename	#samples	Total sp. rich.	Total abundance	Min		Max		Range		Mean		Total		Median		Std.dev.	
					Abnd.	Sp. rich.	Abnd.	Sp. rich.	Abnd.	Sp. rich.	Abnd.	Sp. rich.	Abnd.	Sp. rich.	Abnd.	Sp. rich.	Abnd.	Sp. rich.
Sub-total		**177**	**74**	**6,568**	1	**1**	**859**	**19**	**840**	**16**	**38.6**	**8.0**	**6,568**	**74**	**23.3**	**8.1**	**48.5**	**2.7**
Reg. ref. sites	BUS030	2	19	769	12	9	757	13	745	4	384.5	11.0	769	19	384.5	11.0	372.5	2.0
	BUS031	2	19	1,112	435	12	677	16	242	4	556.0	14.0	1,112	19	556.0	14.0	121.0	2.0
	BUS032	1	8	45	45	8	45	8	0	0	45.0	8.0	45	8	45.0	8.0	0.0	0.0
	BUS033	1	12	57	57	12	57	12	0	0	57.0	12.0	57	12	57.0	12.0	0.0	0.0
	BUS034	2	13	170	26	6	144	9	118	3	85.0	7.5	170	13	85.0	7.5	59.0	1.5
Sub-total		**8**	**31**	**2,153**	**12**	**6**	**757**	**16**	**745**	**4**	**225.5**	**10.5**	**2,153**	**33**	**225.5**	**10.5**	**110.5**	**1.1**
Total		**310**	**96**	**13,471**	**96**	**1**	**859**	**19**	**840**	**16**	**72.1**	**7.7**	**13,471**	**96**	**60.2**	**7.8**	**58.7**	**2.4**

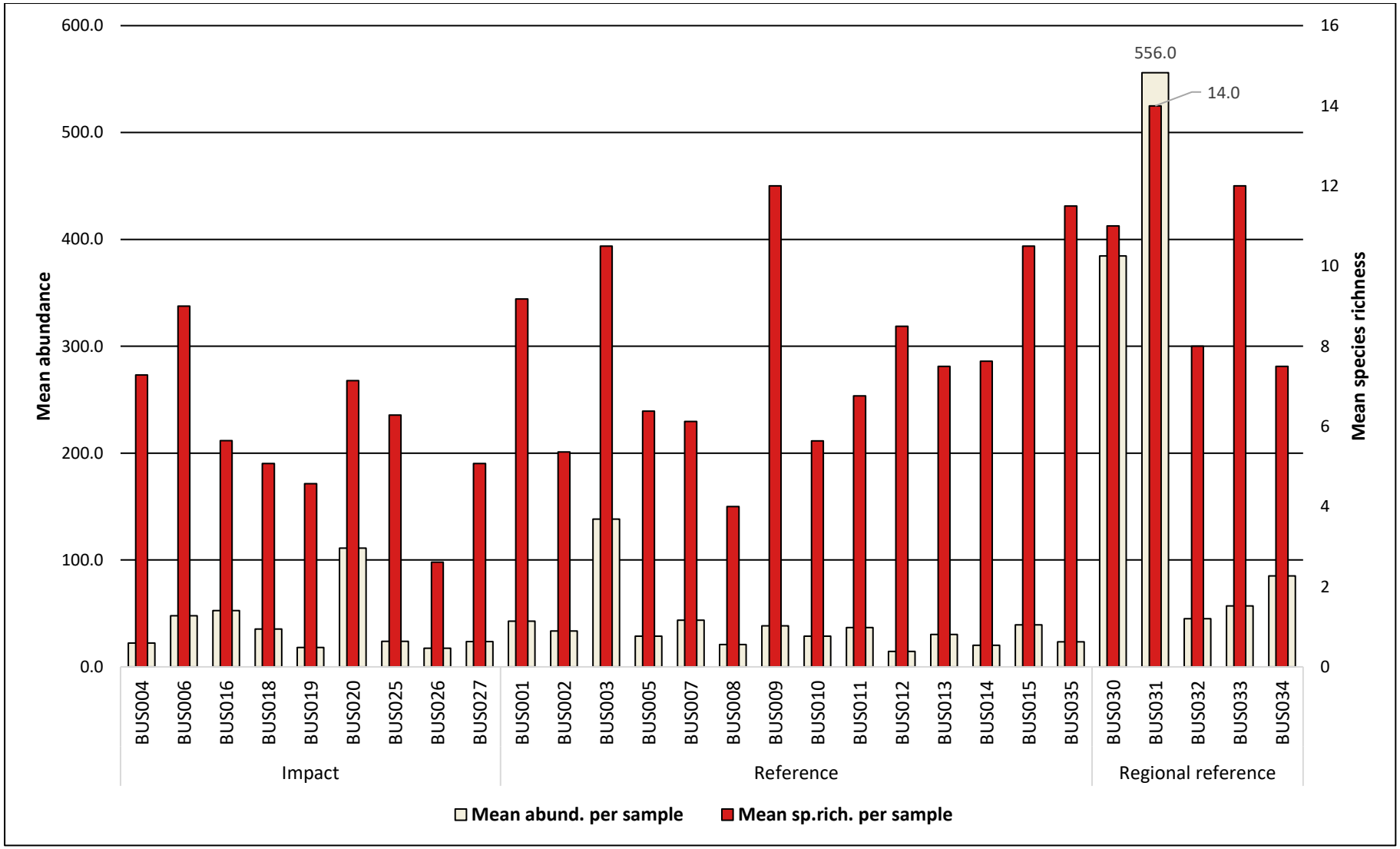
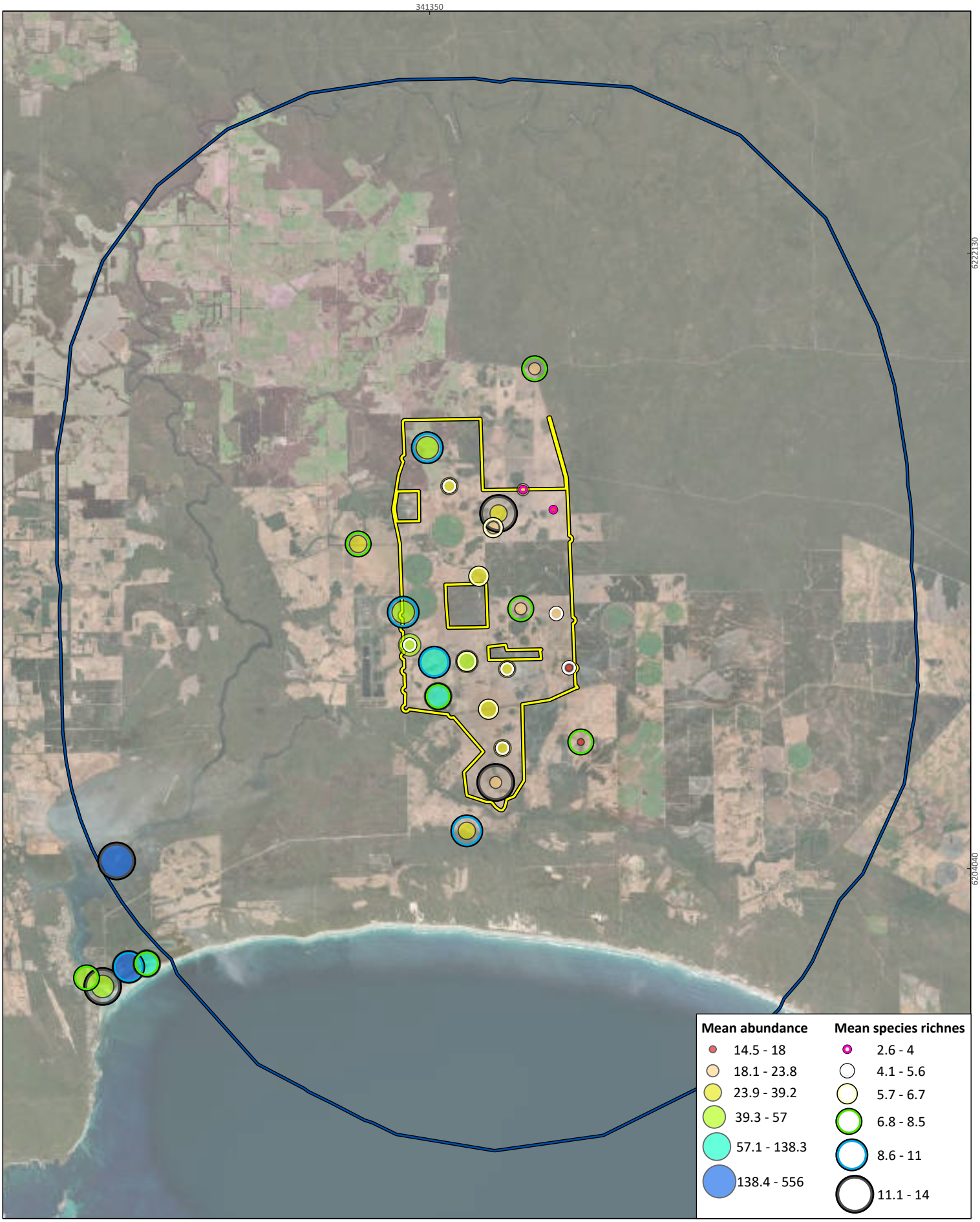


Figure 5-3 **Bar graph displaying mean species richness and abundance per sample, per site**





SynergyRED
Scott River Wind Fam

Project No	1585
Date	18/06/2025
Drawn by	BK
Map author	BA

0 2.5 5
Kilometers

1:143,615 (at A4) GDA 1994 MGA Zone 50

All information within this map is current as of 18/06/2025. This product is subject to COPYRIGHT and is property of Phoenix Environmental Sciences (Phoenix). While Phoenix has taken care to ensure the accuracy of this product, Phoenix make no representations or warranties about its accuracy, completeness or suitability for any particular purpose.

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Study area
Bird/Bat Investigation Area

Figure 5-4

Mean bird abundance and mean richness per sample, per site

PHOENIX ENVIRONMENTAL SCIENCES

5.1.2 Assemblage summary for impact and reference sites

The data presented in Section 5.1.2 relates only to fixed point counts from impact and reference sites (i.e. excludes regional reference sites). A summary of the data relating to the top 10 most abundant and dominant birds is presented in Table 5-3. The top 3, 10 and 20 most abundant species collectively represented just under 50%, 73.6% and 86.2%, respectively of the overall abundance of birds; the individual contribution and cumulative proportion is provided in Table 5-3.

The most abundant bird species recorded was Straw-necked Ibis (n = 3,519) which in relative terms contributed 31.1% of all birds and was recorded in 28.9% of all sample events. It was observed 88 times over the 2-year program, including 11 instances where the flock size was >100 individuals. Typically, it occurred in larger flocks and rarely as individuals or pairs. Abundance was relatively even between years, with Year 2 being 10% lower than Year 1 (Table 5-3).

Australian Raven was the second most abundant species (n = 1,136). It contributed 10.0% of the total abundance and was recorded in 121.6% of samples (i.e. multiple records were made in each sample event). It was far more abundant in Year 2 however, being up by 245.5% compared with Year 1. It was typically recorded in groups of 2 and 3.

Tree Martin was the third most abundant species (n = 912), contributing 8.1% of the overall abundance and being recorded in 42.3% of sample events. This species was usually recorded in small groups of 6–8 individuals and was 230.2% more abundant in Year 2, compared with Year 1.

Australian Shelduck (n = 816) contributed 7.2% of the overall abundance and was detected in 39.7% of sample events. Its abundance was relatively even between years, being just 7.1% higher in Year 2, compared with Year 1.

Australian White Ibis (Table 5-3) was also relatively abundant (n = 619), far more so in Year 2 (+343%). In fact, it was quite rare in Year 1 only being recorded 3 times, whereas in Year 2 it was recorded 50 times at an average of 10.1 individuals, and overall it contributed 5.5% of the total bird abundance for the 2 years of sampling.

Other notable species included While Willie Wagtail, which contributed just 2.2% of the total abundance, but was ubiquitous, being recorded in 56.1% of all sample events. Yellow-rumped Thornbill and White-fronted Chat declined 69.1% and 30.1%, respectively, in Year 2. While not shown in Table 5-3 as it was the 15th most abundant species, it is also noted that Emu abundance was up 235.3% in Year 2.

Three of the top 5 most abundant species were waterbirds, and of the top 20, almost all are considered either cosmopolitan or species that are advantaged by modified landscapes (e.g. Australian Raven, Tree Martin, Australian Ringneck, Yellow-rumped Thornbill, Willie Wagtail, Australian Magpie, White-fronted Chat, Grey Butcherbird, Red Wattlebird, Welcome Swallow, Magpie-lark and Splendid Fairy-wren) or favour grassland and floodplain habitats that dominate the WFA (Straw-necked Ibis, Australian Shelduck, Australian White Ibis, White-faced Heron, Emu and Inland Thornbill).

Table 5-3 Top 10 species by abundance at all fixed-point count sites

Scientific name	Vernacular	Year 1				Year 2				Pct change Year 1-2	Total abund.	Total relat. abund. (%)	Cum. abund. (%)	Total detected (%)
		Abund.	Mean abund.	No. of records	Detected (%)	Abund.	Mean abund.	No. of records	Detected (%)					
Threskiornis spinicollis	Straw-necked Ibis	1,855	74.2	25	8.2	1,664	26.4	63	20.7	-10.3%	3,519	31.1	31.1	28.9
Corvus coronoides	Australian Raven	255	2.7	93	30.5	881	3.2	278	91.1	245.5%	1,136	10.0	41.1	121.6
Petrochelidon nigricans	Tree Martin	212	6.1	35	11.5	700	7.4	94	30.8	230.2%	912	8.1	49.2	42.3
Tadorna tadornoides	Australian Shelduck	394	6.2	64	21	422	7.4	57	18.7	7.1%	816	7.2	56.4	39.7
Threskiornis molucca	Australian White Ibis	114	38	3	1	505	10.1	50	16.4	343.0%	619	5.5	61.9	17.4
Barnardius zonarius	Australian Ringneck	179	3.2	56	18.4	163	2.8	58	19	-8.9%	342	3.0	64.9	37.4
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	236	7.4	32	10.5	73	4.9	15	4.9	-69.1%	309	2.7	67.6	15.4
Rhipidura leucophrys	Willie Wagtail	127	1.6	78	25.6	126	1.4	93	30.5	-0.8%	253	2.2	69.9	56.1
Gymnorhina tibicen	Australian Magpie	126	2.3	54	17.7	110	1.8	61	20	-12.7%	236	2.1	71.9	37.7
Epthianura albifrons	White-fronted Chat	113	6.3	18	5.9	79	4.4	18	5.9	-30.1%	192	1.7	73.6	11.8
Total abundance top 10 species		**3,611**	**14.8**	**NA**	**NA**	**4,723**	**6.7**	**NA**	**NA**	**69.4%**	**8,334**	**73.6%**	**73.6**	**NA**
Total abundance top 11–20 species[1]		**4,377**	**9.3**	**NA**	**NA**	**5,376**	**5.1**	**NA**	**NA**	**35.2%**	**9,753**	**86.2%**		**NA**
Grand total abundance		**5,156**	**4.0**	**NA**	**NA**	**6,162**	**2.3**	**NA**	**NA**	**NA**	**11,318**	**NA**		**NA**

[1]Species not listed in table but summary data shown here for context.

The assemblage has been considered in terms of 'functional groups', which are essentially the Order each species belongs to (Figure 5-5). Eleven functional groups were recorded, with perching and singing birds (passerines) being the most abundant and species rich group overall and including 7 of the top 10 most abundant species (Table 5-4). Parrots and birds of prey were also relatively species rich, but birds of prey were not abundant by comparison, and were generally recorded as singletons or pairs hunting widely across the different habitats of the WFA. Parrots included the 6th most abundant species (Australian Ringneck) as well as Carnaby's Cockatoo (EN), Baudin's Cockatoo (EN) and Forest Red-tailed Black Cockatoo (VU). Most parrot records were of individuals, pairs or small groups moving between bushland remnants rather than actively using the cleared habitats that most sites were located in; although parrots were observed on occasion foraging on the ground when grasses were in seed, including Carnaby's Cockatoo.

The 3 'waterbird' groups collectively represented the 2nd most abundant group, with diversity approaching that of parrots, birds of prey and to a lesser extent perching and singing birds. Except for Banded Lapwing, shorebirds (including 'Migratory' species) were not observed during the fixed-point count sites in the WFA, and were instead restricted to the Regional reference sites. A single record of 3 Wood Sandpiper (Mig.) within the WFA was made during the Basic and Targeted fauna survey (Phoenix 2025a).

Waterbirds include all the ducks and cormorants. The 4 families represented were moderately speciose, and abundant, as would be expected for a study site that includes many ephemeral wetlands as well as large expanses of flooded grassland during the wet portion of the year. Australian Shelduck and Pacific and Black Duck were the 4th and 11th most abundant species overall, respectively (Figure 5-5; Table 5-3). These 2 species were observed foraging and breeding in wetlands and flooded grasslands. Cormorants were often observed loafing on tree branches at the periphery of wetlands.

Wading birds comprise the long-legged wetland birds, such as Straw-necked Ibis (the most abundant species), Australian White Ibis (5th most abundant) and White-faced Heron (14th most abundant) (Figure 5-5; Table 5-3). These species typically forage in flooded grasslands and in and around moderately shallow wetlands. Rarer waders included Little Egret, Royal Spoonbill and Yellow-billed Spoonbill.

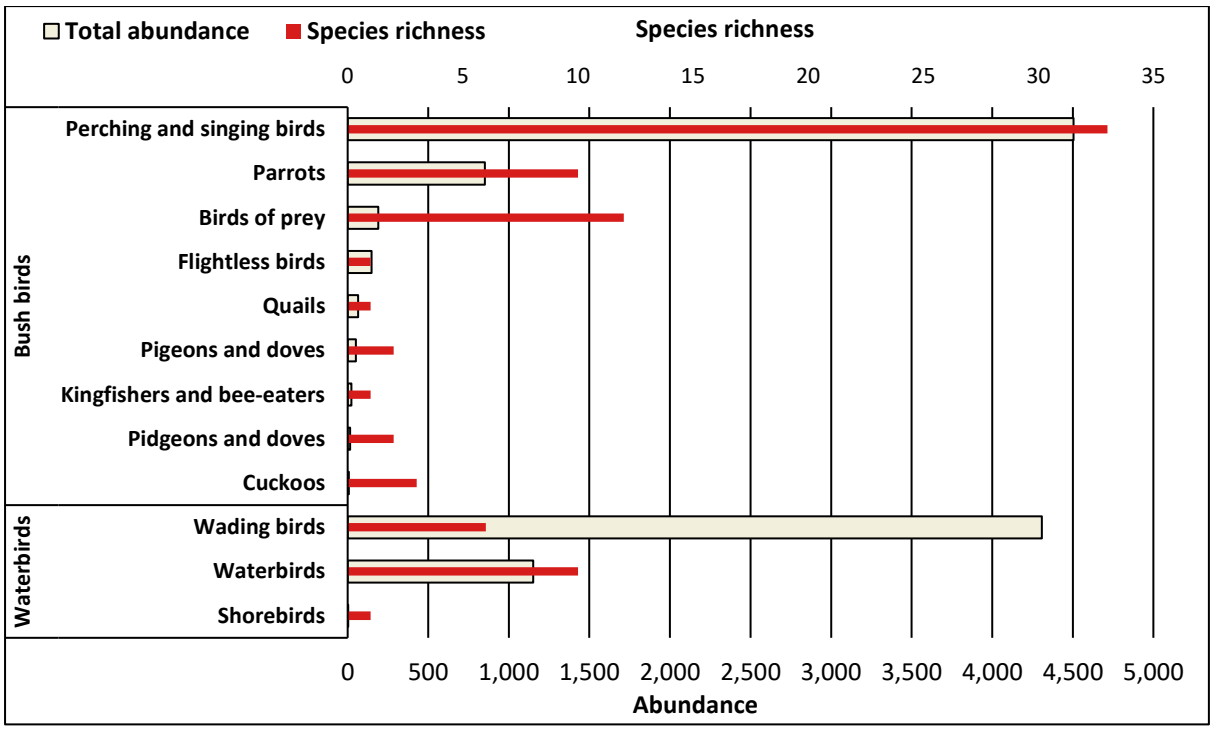


Figure 5-5 Summary by functional/taxonomic group

Table 5-4 further explores each family, providing a brief summary of each. The assemblage derived from the 305 fixed-point count samples from impact and reference sites, included members from 28 families, with some families represented by only a single species, while other families recorded several species (Table 5-4). The most speciose families were Accipitridae and Falconidae (birds of prey; 8 and 4 species each), Anatidae (ducks; 6 species), Psittacidae and Cacatuidae (parrots; 5 species each) and Meliphagidae (honeyeaters and chats; 5 species).

Threskiornithidae was the most abundant family, with records of 4,147 individuals, overwhelmingly of Straw-necked Ibis and to a lesser extent Australian White Ibis. The ducks (Anatidae) were also very abundant (1,133 individuals). Australian Raven, the only Corvidae was the second most recorded species with 1,136 individuals recorded from 371 observations (Table 5-4) and being recorded at least once in in every sample event.

There were few clear trends evident at the family level, except within the 'waterbirds'. Members of the orders Anseriformes (ducks etc) and Ciconiiformes (spoonbills and Ibis), and the family Phalacrocoracidae (cormorants) were largely or entirely restricted to the BBIA, whereas the members of Charadriiformes (families Charadriidae, Haematopodidae, Laridae and Scolopacidae) were restricted to the Regional reference sites and are not included in Table 5-3. This clear split is related to the nature of the available aquatic habitats, e.g. salinity, depth and inundation duration, and the associated food sources within WFA wetlands, compared with the tidal (marine) habitats of the Hardy Inlet.

The Order Passeriformes (perching and singing birds) included 15 families and 33 species in total. This was the most diverse group of birds recorded. However, many common 'bush birds' were not well represented in the fixed-point count data principally because the sites were typically located in open paddocks.

Table 5-4 Bird assemblage by family at fixed-point count impact and reference sites

Family name	Common names	Data summary	Summary of records
Birds of prey (Accipitriformes and Falconiformes) (13 ssp.)			
Accipitridae	Black-shouldered Kite, Brown Goshawk, Collared Sparrowhawk, Little Eagle, Swamp Harrier, Wedge-tailed Eagle, Whistling Kite, White-bellied Sea-eagle	Abundance: 114 No. records: 95 Species richness: 8	Records throughout WFA from cleared and MJP woodland habitats. Also recorded outside WFA in wider BIA and at Regional reference sites. Recorded mostly as singles and pairs. Also represented in Basic and Targeted fauna survey records.
Falconidae	Australian Hobby, Australian Kestrel, Brown Falcon, Peregrine Falcon	Abundance: 76 No. records: 61 Species richness: 4	Records throughout WFA from cleared and Marri-Jarrah-Peppermint woodland habitats. Also recorded outside WFA in wider BIA and at Regional reference sites. Recorded exclusively as singles and pairs. Also represented in Basic and Targeted fauna survey records.
Cuckoos (Cuculiformes) (3 ssp.)			
Cuculidae	Fan-tailed Cuckoo, Horsfield's Bronze Cuckoo, Shining Bronze Cuckoo	Abundance: 8 No. records: 8 Species richness: 3	Sparse records throughout WFA within cleared and MJP woodland habitat. Recorded exclusively as singletons, mainly in spring. Also represented in Basic and Targeted fauna survey records.
Flightless birds (Struthioniformes) (1 sp.)			
Dromaiidae	Emu	Abundance: 148 No. records: 26 Species richness: 1	Regular, scattered records in WFA, in cleared and MJP woodland habitats. Mostly recorded as 2 or more individuals and up to 17 recorded. Recorded in summer, autumn and spring. Also represented in Basic and Targeted fauna survey records.
Kingfishers and bee-eaters (Coraciiformes) (1 sp.)			
Halcyonidae	Laughing Kookaburra	Abundance: 23 No. records: 18 Species richness: 1	Naturalised exotic. Regular, scattered records in WFA, in cleared and MJP woodland habitats. Recorded exclusively as singletons and pairs, in all seasons. Also represented in Basic and Targeted fauna survey records, including additional member.

Family name	Common names	Data summary	Summary of records
Parrots (Psittaciformes) (11 ssp.)			
Cacatuidae	Baudin's Cockatoo, Carnaby's Cockatoo, Forest Red-tailed Black Cockatoo,	Abundance: 254 No. records: 36 Species richness: 3	Recorded throughout WFA, in cleared and MJP woodland habitat. Also recorded outside WFA in wider BIA and at Regional reference sites. Recorded mostly as singles and pairs, but some larger flocks from 12-53 individuals. Recorded in all seasons. Also represented in Basic and Targeted fauna survey records.
Psittaculidae	Australian Ringneck, Elegant Parrot, Purple-crowned Lorikeet, Red-capped Parrot, Western Rosella	Abundance: 597 No. records: 169 Species richness: 5	Recorded throughout WFA, in cleared and MJP woodland habitat. Also recorded outside WFA in wider BIA and at Regional reference sites. Recorded predominantly as 2 or more individuals. Recorded in all seasons. Also represented in Basic and Targeted fauna survey records.
Perching and singing bids (Passeriformes) (33 ssp.)			
Acanthizidae	Inland Thornbill, Spotted Scrubwren, Western Gerygone, Yellow-rumped Thornbill	Abundance: 450 No. records: 126 Species richness: 4	Recorded throughout WFA, in cleared and MJP woodland habitat. Also recorded outside WFA in wider BIA and at Regional reference sites. Recorded predominantly as 2 or more individuals. Most recorded in summer, spring and autumn. Also represented in Basic and Targeted fauna survey records, including additional member.
Artamidae	Australian Magpie, Black-faced Woodswallow, Dusky Woodswallow, Grey Butcherbird	Abundance: 550 No. records: 285 Species richness: 4	Recorded throughout WFA, in cleared and MJP woodland habitat. Also recorded outside WFA in wider BIA. Predominantly recorded as singletons and pairs (70%), but a few small flocks of <20 observed. Recorded in all seasons. Also represented in Basic and Targeted fauna survey records.
Campephagidae	Black-faced Cuckoo-shrike, White-winged Triller	Abundance: 94 No. records: 46 Species richness: 2	Regular, scattered records throughout the WFA, in cleared and MJP woodland habitat. Recorded almost exclusively as singletons and pairs, in all seasons. Also represented in Basic and Targeted fauna survey records.
Corvidae	Australian Raven	Abundance: 1,136 No. records: 371 Species richness: 1	The second most abundant species observed. Common throughout WFA, within cleared and MJP woodland habitats. Also recorded outside WFA in wider BIA and at Regional reference sites. Recorded mainly singletons and pairs (75%), but as many as 100 observed at a time. Present throughout the year. Also represented in Basic and Targeted fauna survey records.

Family name	Common names	Data summary	Summary of records
Dicruridae	Grey Fantail, Magpie-lark, Willie Wagtail	Abundance: 446 No. records: 296 Species richness: 3	Common throughout WFA, recorded from cleared and MJP woodland habitats, present throughout the year. Also recorded outside WFA in wider BIA. More than 2 individuals rarely recorded at any one time. Also represented in Basic and Targeted fauna survey records.
Hirundinidae	Tree Martin, Welcome Swallow	Abundance: 1,047 No. records: 173 Species richness: 2	Recorded throughout WFA, in cleared and MJP woodland habitats. Also recorded outside WFA in wider BIA and at a Regional reference site. Tree Martin was 3rd most abundant species recorded, often seen in groups of 3 or more and up to 26. Recorded in all seasons. Also represented in Basic and Targeted fauna survey records.
Locustellidae	Brown Songlark, Rufous Songlark	Abundance: 23 No. records: 18 Species richness: 2	Not common, but present throughout WFA, predominantly in the south in cleared habitat. Also represented in Basic and Targeted fauna survey records.
Maluridae	Red-winged Fairy-wren, Southern Emu-wren, Splendid Fairy-wren	Abundance: 139 No. records: 59 Species richness: 3	Commonly recorded, throughout the WFA from cleared and MJP woodland habitat. Also recorded outside WFA in wider BIA. Likely more prevalent in remnants, particularly with dense shrubs layers. Present in all seasons. Also represented in Basic and Targeted fauna survey records.
Meliphagidae	Brown Honeyeater, New Holland Honeyeater, Red Wattlebird, Western Spinebill, White-fronted Chat	Abundance: 423 No. records: 160 Species richness: 5	Common throughout the WFA in both cleared and MJP woodland habitat. Also recorded outside WFA in wider BIA. Recorded mostly as singletons/pairs, but often in group of 3 or more, and up to 30. Recorded throughout year. Also represented in Basic and Targeted fauna survey records, including additional members.
Motacillidae	Australian Pipit	Abundance: 77 No. records: 54 Species richness: 1	Mon-specific. Recorded throughout the WFA all in cleared areas but primarily in the southern half. Nesting pairs recorded breeding in paddocks and distinctive swooping-diving breeding behaviour observed on several occasions. Recorded mostly as singletons in spring and summer. Also represented in Basic and Targeted fauna survey records.
Pachycephalidae	Grey Shrike-thrush, Western Whistler	Abundance: 16 No. records: 15 Species richness: 2	Rarely recorded in WFA during fixed-point counts, in cleared and MJP habitat. Also recorded outside WFA in wider BIA. Scattered records in throughout the study area. Recorded almost exclusively as singletons. Likely more common in native remnants. Also represented in Basic and Targeted fauna survey records, including additional member.

Family name	Common names	Data summary	Summary of records
Pardalotidae	Striated Pardalote	Abundance: 1 No. records: 1 Species richness: 1	A single record west of the WFA from a roadside remnant, in spring. Also represented in Basic and Targeted fauna survey records in the WFA, including additional member.
Petroicidae	Jacky Winter, Scarlet Robin	Abundance: 3 No. records: 3 Species richness: 2	Single records of each species, in the north and south of the WFA. Recorded from cleared and MJP woodland habitat. One additional member represented in the Basic and Targeted fauna survey.
Zosteropidae	Silvereye	Abundance: 99 No. records: 25 Species richness: 1	Mono-specific. Commonly recorded throughout WFA, in cleared and MJP woodland habitats. Also recorded outside WFA in wider BIA. Typically recorded as 2 or more individuals. Not recorded in winter. Also represented in Basic and Targeted fauna survey records.
Pigeons and doves (Columbiformes) (3 ssp.)			
Columbidae	Common Bronzewing, Crested Pigeon	Abundance: 66 No. records: 46 Species richness: 2	Commonly recorded throughout WFA but more commonly in the southern half, in cleared habitat. Also recorded outside WFA in wider BIA. Recorded as singletons and pairs almost predominantly. Recorded in all seasons. Also represented in Basic and Targeted fauna survey records in the WFA.
Phasianidae	Stubble Quail	Abundance: 65 No. records: 38 Species richness: 1	Commonly recorded throughout study area, in cleared habitat. Also recorded outside WFA in wider BIA. Recorded almost exclusively as singletons and pairs. Recorded in all seasons, except winter. Also represented in Basic and Targeted fauna survey records.
Waterbirds (Anseriformes, Charadriiformes and Ciconiiformes) (30 ssp.)			
Anatidae	Australian Shelduck, Australian Wood Duck, Black Swan, Grey Teal, Musk Duck, Pacific Black Duck	Abundance: 1,133 No. records: 188 Species richness: 6	Records spread throughout WFA, in cleared and MJP woodland habitats. Also recorded outside WFA in wider BIA. Around 75% of records as singleton and pairs, but also several flocks up to >30 individuals recorded (Australian Shelduck, Black Swan, Pacific Black Duck) and up to 650. The majority of records in winter months, but members of the family present throughout the year. Also represented in Basic and Targeted fauna survey records, notably in wetland habitats.

Family name	Common names	Data summary	Summary of records
Charadriidae	Banded Lapwing	Abundance: 4 No. records: 3 Species richness: 1	Limited records in WFA, only Banded Lapwing, which was restricted to sites in the south of the WFA in Cleared habitat, absent in summer months. Red-capped plover also, but restricted to Regional reference sites. Also represented in Basic and Targeted fauna survey, including additional member and additional Banded Lapwing record, notably in wetland habitats.
Ardeidae	White-faced Heron, White-necked Heron	Abundance: 161 No. records: 50 Species richness: 2	Records throughout the WFA, from cleared areas and MJP woodland habitats. Recorded mostly as singletons and pairs, but with a few flocks also recorded, and up to 55 individuals. Most observations were of White-faced Heron. Also recorded outside WFA in wider BIA and at Regional reference sites (but much rarer). Mainly recorded in summer, some spring records. Also represented in Basic and Targeted fauna survey, including additional member.
Threskiornithidae	Australian White Ibis, Royal Spoonbill, Straw-necked Ibis, Yellow-billed Spoonbill	Abundance: 4,147 No. records: 146 Species richness: 4	Records dominated by Straw-necked Ibis and Australian White Ibis which are both in the top 10 most abundant species for the survey; the other 2 species were rare. The 2 dominant species were recorded throughout WFA, and flocks of Straw-necked Ibis >100 individuals regularly recorded. Recorded from cleared and MJP woodland habitat in the WFA. Also recorded outside WFA in wider BIA and at Regional reference sites (Australian White Ibis only). Rare in winter, mainly recorded in summer. Also represented in Basic and Targeted fauna survey.
Phalacrocoracidae	Great Cormorant, Little Black Cormorant, Little Pied Cormorant, Pied Cormorant	Abundance: 18 No. records: 14 Species richness: 4	Records throughout the WFA, from cleared areas and MJP woodland habitats. Also recorded from Regional reference sites. Little Pied Cormorant and Pied Cormorant commonly recorded. Predominantly recorded as singletons and largely restricted to spring and summer months. Also represented in Basic and Targeted fauna survey.

5.1.3 Flight heights and movements

Table 5-5 summarises flight height and movement recorded in this survey and Phoenix (2025a) for all species where flight data was recorded, including the Regional reference sites (see full dataset in Appendix 6). Figure 5-6 presents the same data with respect to the direction of observed flights. Further information with respect to conservation significant species and other species of potential concern is provided below (section 5.1.4.2).

The data in Table 5-5 shows that far fewer birds were recorded within the RSA range (25.3%) than below (74.7%) or above (0.01%). In total 71.7% of birds were stationary below the minimum RSA height. The number of records (n = 71) and abundance of 'moving' birds (4.3%) in Table 5-5 indicates that relatively few, larger flocks were observed making distinct movements within the RSA.

Table 5-5 Summary of bird height records in relation to RSA height categories for all point-count sites

Bird movement	RSA Location	Height cat.	No. of species	No. consig. species	Abund.	No. of records	Relat. abund.	Pct. rcords
Moving	Below	0-24	35	2	448	136	2.9%	5.0%
	Within	25-50	18	2	365	59	2.4%	2.2%
		51-75	5	0	123	10	0.8%	0.4%
		76-150	1	0	180	2	1.2%	0.1%
		151-250	0	0	0	0	0.0%	0.0%
	RSA	>250	0	0	0	0	0.0%	0.0%
Sub-total			**40**	**3**	**1,116**	**207**	**7.2%**	**7.6%**
Stationary	Below	0-25	91	11	11,706	2,227	75.8%	82.0%
	Within	26-50	43	5	1,757	205	11.4%	7.5%
		51-75	14	1	172	26	1.1%	1.0%
		76-150	13	0	650	41	4.2%	1.5%
		151-250	0	0	0	0	0.0%	0.0%
	RSA	>250	3	0	36	10	0.2%	0.4%
Sub-total			**120**	**5**	**14,321**	**2,509**	**92.8%**	**92.4%**
Grand total – within RSA			**52**	**8**	**3,911**	**414**	**25.3%**	**15.2%**
Grand total – outside RSA			**91**	**11**	**11,526**	**2,302**	**74.7%**	**84.8%**
Grant total			**100**	**12**	**15,437**	**2,716**	**100.0%**	**100.0%**

The following conservation significant species were recorded within the RSA (25–250 m) in the WFA:

- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) (VU)
- Baudin's Cockatoo (*Zanda baudinii*) (EN)
- Carnaby's Cockatoo (*Zanda latirostris*) (EN)
- Peregrine Falcon (*Falco peregrinus*) (OS)
- Osprey (*Pandion haliaetus*) (Mig.).

The following conservation significant species were recorded within the RSA (25–250 m) at the Regional reference sites:

- Sharp-tailed Sandpiper (*Calidris acuminata*) (VU/Mig.)

- Sanderling (*Calidris alba*) (Mig.)
- Red-necked Stint (*Calidris ruficollis*) (Mig.)
- Caspian Tern (*Hydroprogne caspia*) (Mig.)
- Bar-tailed Godwit (*Limosa lapponica*) (Mig.)
- Fairy Tern (*Sternula nereis nereis*) (VU)
- Greater Crested Tern (*Thalasseus bergii*) (Mig.).

Figure 5-6 shows the direction of bird movements across the landscape, using abundance and number of records. The majority of distinct movements were toward the west (38.9%). This was closely followed by birds moving north, from the south (44.4%). However, a fair proportion were also moving in the opposite direction, south to north, and less so west to east. When movements are considered in either direction (east/west or north/south) the data is well balanced (abundance = 434 vs 496, respectively). Overall, the data therefore does not suggest any strong movement direction trends.

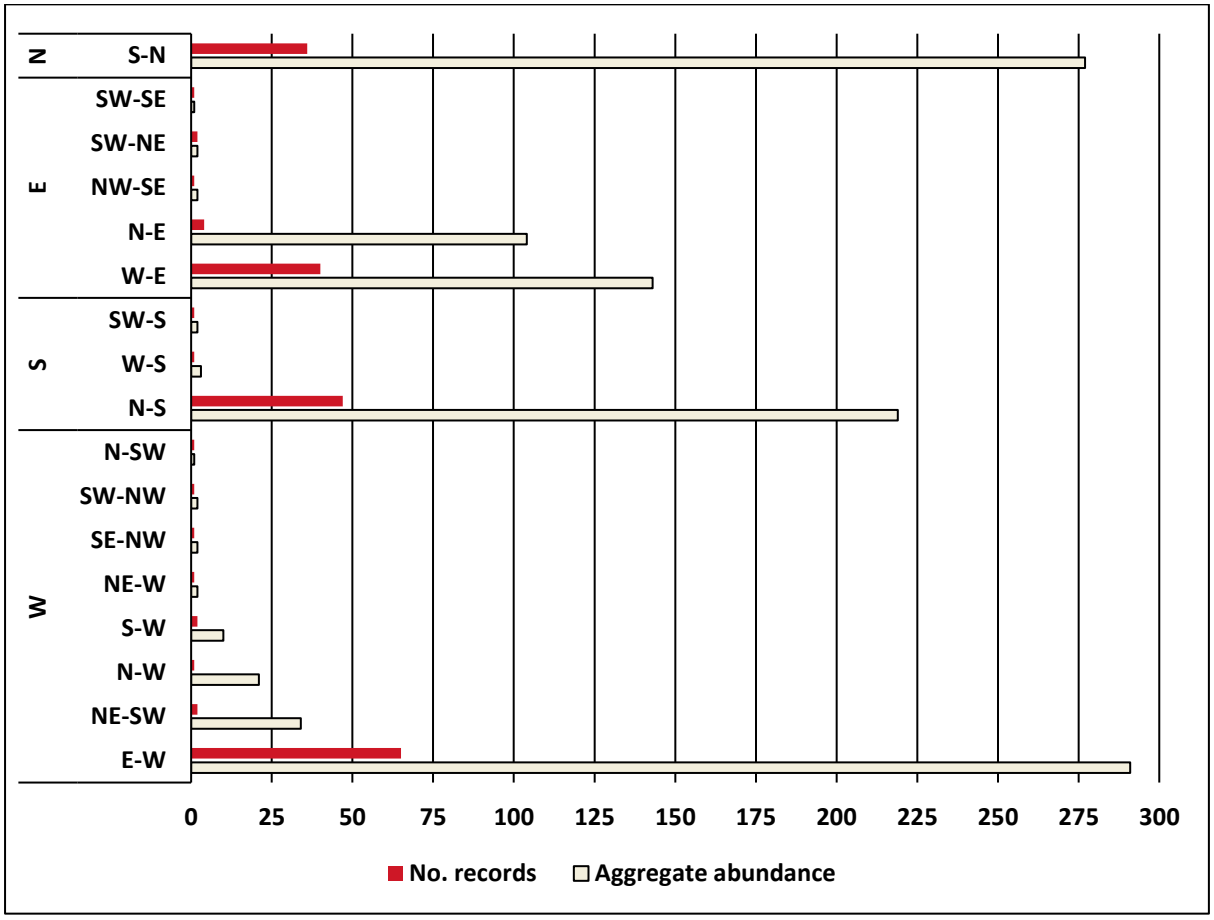


Figure 5-6 **Summary of flight direction: abundance and number of records for all point-count sites**

5.1.4 Conservation significant birds and other birds potentially of concern recorded

5.1.4.1 Species records

Fourteen bird species of conservation significance were recorded across the BBRAS survey and the Basic and Targeted fauna survey, one of which was only recorded from the latter (Wood sandpiper; Table 5-6; Figure 5-7). Seven of these species were recorded in the WFA and/or wider BIA:

- Baudin's Cockatoo (*Zanda baudinii*; EN) – recorded during both surveys, in the WFA and wider BIA
- Carnaby's Cockatoo (*Zanda latirostris*; EN) – recorded during both surveys, in the WFA and wider BIA
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*; VU) – recorded during both surveys, in the WFA and wider BIA
- Wood Sandpiper (*Tringa glareola*; Mig.) – recorded during the Basic and Targeted survey, in the WFA only
- Osprey (*Pandion haliaetus*; Mig.) – recorded during both surveys, in the WFA and at Regional reference sites
- Peregrine Falcon (*Falco peregrinus*; OS) – recorded during the BBRAS, in the WFA only
- Masked Owl (southwest) (*Tyto novaehollandiae novaehollandiae*; P3) – recorded during the BBRAS, outside the WFA in the wider BIA.

The remaining 7 conservation significant species, all Migratory shorebirds, were recorded only at Regional reference sites, during Year 2 of the BBRAS:

- Caspian Tern (*Hydroprogne caspia*; Mig.) – recorded at Hardy Inlet, unlikely to occur in WFA
- Fairy Tern (*Sternula nereis nereis*) – recorded at Hardy Inlet, unlikely to occur in WFA
- Greater Crested Tern (*Thalasseus bergii*; Mig.) – recorded at Hardy Inlet, unlikely to occur in WFA
- Sharp-tailed Sandpiper (*Calidris acuminata*; VU; Mig.) – recorded at Hardy Inlet, may possibly occur in WFA on occasion
- Sanderling (*Calidris alba*; Mig.) – recorded at Hardy Inlet, unlikely to occur in WFA
- Red-necked Stint (*Calidris ruficollis*; Mig.) – recorded at Hardy Inlet, may possibly occur in WFA on occasion
- Bar-tailed Godwit (*Limosa lapponica*; Mig.) – recorded at Hardy Inlet, unlikely to occur in WFA.

All conservation significant species recorded in the WFA or wider BIA are considered potential species of concern to the Project per Brett Lane and Associates (2005) and DCCEEW (2024). Sharp-tailed Sandpiper and Red-necked Stint are also considered potential species of concern as they may possibly occur in the WFA on occasion. Caspian Tern, Greater Crested Tern, Sanderling and Bar-tailed Godwit are not considered of concern as they are unlikely to occur in the WFA as no suitable habitat is present.

In addition to the recorded conservation significant species, non-conservation significant raptors recorded were also identified as potential species of concern as they are particularly vulnerable to collision risk due to their morphology and/or flight behaviour, though susceptibility varies between species. Eleven non-conservation significant raptors were recorded across the BBRAS survey and the Basic and Targeted fauna survey (Table 5-6; Figure 5-7).

Table 5-6 Summary of conservation significant bird records and other recorded birds potentially of concern

Species	Cons. status	Rec. area[1]	Sites[2]	Evidence	Pot. use WFA	No. rec (ab.)		Habitats[3,4]									Rel. ab.	Rec. flight height cat. (# records), Flight direction/s
						BBRAS sites	B/T sites[2]	SIPW	SISE	SISH	MJP	OWP	Cleared	Clrd – DS	Dam	Bluegum	Pine	
Conservation significant bird species recorded																		
Pandion haliaetus (Osprey)	Mig. (EPBC & BC Acts)	WFA, Reg.	BBRAS sites – BUS030, BUS032, BUS033, BUS034 B/T sites – Osprey	Direct sighting at 'Osprey' site in WFA; opportunistic record during heritage survey, flying over a paddock. All other records from Regional sites at Hardy Inlet. Known to utilise a variety of near-coastal habitats. Study area considered minor/supplemental foraging habitat within the home range of Hardy Inlet individuals. Suitable foraging habitat is abundant outside the WFA. Unlikely to nest within the study area.	None, transitory only	6 (6)	1 (1)	S	S	S			R					0.05%	0-24 m (2) 25-50 m (3) 51-75 m (1)
Calyptorhynchus banksii naso (Forest Red-tailed Black Cockatoo)	VU (EPBC & BC Acts)	WFA, BIA	BBRAS sites – BUS008, BUS013 B/T sites – AQU-01, AQU-02, AQU-03, AQU-25, AQU-40, AQU-55, BC2024_01, BCForaging, BCRoosting05, BCRoosting09, FRTBC-01, FRTBC-02, FRTBC-03, FRTBC-04, FRTBC-05, FRTBC-06, Opp12, Opp13,	Audio recording, direct sighting and foraging evidence in the WFA. Records from the WFA and wider BIA. Most records of individuals and pairs, with only 9 records of >2 birds. The largest flock (53 individuals) recorded 1.5 km west of study area during the BBRAS (site BUS013). It was directly observed foraging at one site (VER-Opp04) while foraging evidence (chewed Marri nuts predominantly) was obtained from 7 sites. 15 audio detections it total, but only once from the BBRAS recorders (open paddocks). The Phase 3 audio recordings identified 12 detections, of which 6 were flyovers and 6 were foraging detections where the birds spent >1 minute at that site presumably foraging, or prospecting. All other records were of the birds moving	Roosting, foraging. Study area contains PNTs but none with hollows currently suitable for breeding	3 (55)	45 (104)	R, S	R, S	R, S	R, S	S	R		R			0.83%	0-24 m (3) 25-50 m (2) N-S

Species	Cons. status	Rec. area[1]	Sites[2]	Evidence	Pot. use WFA	No. rec (ab.)		Habitats[3,4]										Rel. ab.	Rec. flight height cat. (# records), Flight direction/s
						BBRAS sites	B/T sites[2]	SIPW	SISE	SISH	MJP	OWP	Cleared	Clrd – DS	Dam	Bluegum	Pine		
			Opp15, Opp19, SM4-01, SM4-02, SM4-06, SM4-07, VER-22, VER-32, VER-33, VER-40, VER-45, VER-47, VER-Opp04, VER-Opp07, VER-Opp08	through/over this habitat. No breeding or night roosting behaviour was observed. Suitable habitat within and surrounding the WFA.															
Zanda baudinii (Baudin's Cockatoo)	EN (EPBC & BC Acts)	WFA, BIA	BBRAS sites – BUS014, BUS015, BUS019 B/T sites – Opp11, VER-41, VER-42, VER-Opp01	Calls, direct sightings in the WFA. Records from the WFA and wider BIA. Largest flocks – 26, 10, 9 and 8 individuals. Observed foraging just once in the WFA (site VER-Opp01). All other observations were of birds moving through the landscape. No breeding or night roosting behaviour was observed. In addition to the records of Baudin's, *Zanda* sp. (either Baudin's or Carnaby's) was detected during Phase 3 audio recordings at all sites (92 individual detections) for a total occupation time of 9.5 hours over ~2 months of recording, with 37 (45%) of these being birds flying over the site. *Zanda* sp. was also recorded directly 5 times, twice foraging and 3 times moving through the landscape. It is likely that most of these records were Carnaby's Cockatoo given the much higher detection rate of this species over Baudin's (~4:1) during the surveys. Suitable habitat within and surrounding the WFA.	Roosting, foraging. Study area contains PNTs but none with hollows currently suitable for breeding	3 (11)	4 (46)	S	S	S	R, S	S	R	S		S		0.30%	0-24 m (3)

Species	Cons. status	Rec. area[1]	Sites[2]	Evidence	Pot. use WFA	No. rec (ab.)		Habitats[3,4]										Rel. ab.	Rec. flight height cat. (# records), Flight direction/s
						BBRAS sites	B/T sites[2]	SIPW	SISE	SISH	MJP	OWP	Cleared	Clrd – DS	Dam	Bluegum	Pine		
Zanda latirostris (Carnaby's Cockatoo)	EN (EPBC & BC Acts)	WFA, BIA	BBRAS sites – BUS001, BUS004, BUS005, BUS010, BUS014, BUS016, BUS019, BUS020, BUS026, BUS027 B/T sites – AQU-28, AQU-39, AQU-51, AQU-53, AQU-55, BCRoosting05, BCRoosting09, CarnabysCockies 02, VER-31, VER-33, VER-39, VER-41, VER-42	Calls, direct sightings in the WFA. Records from the WFA and wider BIA. Evidence of occupation via calls and direct sightings at 23 sites (36 total records), with repeated detections at a number of those sites. Predominantly recorded as singles, with only 9 records of more than one individual and flocks >10 birds observed on 3 occasions. Observed foraging in MJP woodland once outside the WFA. Two observations of foraging on the ground in the WFA eating paddock seeds. All other records were of birds moving through the landscape. In addition to the records of Carnaby's, *Zanda* sp. (either Baudin's or Carnaby's) was detected during Phase 3 audio recordings at all sites (92 individual detections) for a total occupation time of 9.5 hours over ~2 months of recording, with 37 (45%) of these being birds flying over the site. *Zanda* sp. was also recorded directly 5 times, twice foraging and 3 times moving through the landscape. It is likely that most of these records were Carnaby's Cockatoo given the much higher detection rate of this species over Baudin's (~4:1) during the surveys. Suitable habitat within and surrounding the WFA.	Roosting, foraging. Study area contains PNTs but none with hollows currently suitable for breeding	22 (95)	14 (55)	R, S	R, S	R, S	R, S					S	S	0.79%	0-24 m (20) 25-50 m (4)

Species	Cons. status	Rec. area[1]	Sites[2]	Evidence	Pot. use WFA	No. rec (ab.)		Habitats[3,4]										Rel. ab.	Rec. flight height cat. (# records), Flight direction/s
						BBRAS sites	B/T sites[2]	SIPW	SISE	SISH	MJP	OWP	Cleared	Clrd – DS	Dam	Bluegum	Pine		
Falco peregrinus (Peregrine Falcon)	OS (BC Act)	WFA	BBRAS sites – BUS011 B/T sites – none	Direct sighting of one individual observed hunting near Governor Broome Rd in the southern part of the WFA. Much of the WFA is suitable hunting habitat. May be a resident close to the WFA, using the available habitats for hunting. Unlikely to nest in WFA.	Foraging	1 (1)	0 (0)	S	S	S	S	S	R, S	S	S	S	S	0.01%	25-50 m (1) N-S
Hydroprogne caspia (Caspian Tern)	Mig. (EPBC & BC Acts)	Reg.	BUS031, BUS032, BUS033, BUS034	Recorded at Hardy Inlet only, in flocks.	None	6 (62)	0 (0)											0.33%	0-24 m (2) 25-50 m (2)
Sternula nereis nereis (Fairy Tern)	VU (EPBC & BC Acts)	Reg.	BUS031, BUS033, BUS034	Recorded at Hardy Inlet only, as singles.	None	1 (3)	0 (0)											0.35%	0-24 m (2) 25-50 m (1)
Thalasseus bergii (Greater Crested Tern)	Mig. (EPBC & BC Acts)	Reg.	BUS030, BUS031, BUS032, BUS033, BUS034	Recorded at Hardy Inlet only, in flocks.	None	10 (46)	0 (0)											0.24%	0-24 m (4) 25-50 m (2)
Calidris acuminata (Sharp-tailed Sandpiper)	VU/ Mig. (EPBC Act); Mig. (BC Act)	Reg.	BUS031	Single record of flock of 40 from Hardy Inlet only.	Foraging	1 (40)	0 (0)	S	S	S			S					0.21%	0-24 m (1)
Calidris alba (Sanderling)	Mig. (EPBC & BC Acts)	Reg.	BUS031	Single record of 4 from Hardy Inlet only.	None	1 (4)	0 (0)											0.02%	0-24 m (1)
Calidris ruficollis (Red-necked Stint)	Mig. (EPBC & BC Acts)	Reg.	BUS031, BUS034	Recorded at Hardy Inlet only, in flocks.	Foraging	2 (72)	0 (0)	S	S	S			S					0.38%	0-24 m (1)

Species	Cons. status	Rec. area[1]	Sites[2]	Evidence	Pot. use WFA	No. rec (ab.)		Habitats[3,4]										Rel. ab.	Rec. flight height cat. (# records), Flight direction/s
						BBRAS sites	B/T sites[2]	SIPW	SISE	SISH	MJP	OWP	Cleared	Clrd – DS	Dam	Bluegum	Pine		
Limosa lapponica (Bar-tailed Godwit)	Mig. (EPBC & BC Acts)	Reg.	BUS031	Single individual recorded at Hardy Inlet.	None	1 (1)												0.01%	0-24 m (1)
Tringa glareola (Wood Sandpiper)	Mig. (EPBC & BC Acts)	WFA	BBRAS sites – none B/T sites – VER-36	Direct sighting of 3 individuals in a SIPW wetland in the WFA. No records during BBRAS. Likely to utilise wetland habitats in WFA. Suitable habitat within and outside WFA.	Foraging	0 (0)	1 (3)	R, S	S	S								0.02%	0-24 m (1)
Tyto novaehollandiae novaehollandiae (Masked Owl (southwest))	P3 (DBCA list)	BIA	BBRAS sites – BUS014 B/T sites – Mowl01	Two audio recordings located ~2.5 km north of the WFA and ~1 km south of the WFA along the Scott River. No records in the WFA. Recorded in May and November 2023 in the BBRAS. May be resident within woodland habitats generally of the WFA, but more likely to roost and nest in such habitat along the Scott River and in nature reserve to the north where habitat is extensive.	Roosting, foraging, breeding	1 (1)	1 (1)				R, S	S	R			S		0.01%	NR, detected via audio recording only
Other potential bird species of concern recorded																			
Aquila audax (Wedge-tailed Eagle)	Not listed	WFA, BIA	BBRAS sites – BUS001, BUS004, BUS005, BUS006, BUS008, BUS009, BUS010, BUS011, BUS015, BUS016, BUS018, BUS019, BUS025 B/T sites – AQU-25, VER-21, WedgeyOpp	Regular direct sightings in WFA. Also recorded in wider BIA. Mostly singles, 3 records of a pair. All records were of birds in flight. Observed soaring and likely foraging in WFA, as well as flying over.	Foraging, roosting, breeding	34 (46)	3 (4)	S	S	R, S	R, S	S	R, S	S				0.26%	0-24 m (2) 25-50 m (12) 51-75 m (3) 76-150 m (11) 151-200 m (5) >200 m(2) E-W

Species	Cons. status	Rec. area[1]	Sites[2]	Evidence	Pot. use WFA	No. rec (ab.)		Habitats[3,4]										Rel. ab.	Rec. flight height cat. (# records), Flight direction/s
						BBRAS sites	B/T sites[2]	SIPW	SISE	SISH	MJP	OWP	Cleared	Clrd – DS	Dam	Bluegum	Pine		
Circus approximans (Swamp Harrier)	Not listed	WFA, BIA	BBRAS sites – BUS001, BUS002, BUS003, BUS004, BUS006, BUS008, BUS010, BUS011, BUS015, BUS016, BUS018, BUS019, BUS020, BUS025, BUS026, BUS027 B/T sites – AQU-01, AQU-15, AQU-18, AQU-25, AQU-30, AQU-45, AQU-51, AQU-57, Opp07, Opp20, VER-33, VER-38	Regular direct sightings in WFA. Also recorded in wider BIA. Mostly singles, 4 records of a pair. All records were of birds in flight. Observed soaring and likely foraging in WFA, as well as flying over.	Foraging, roosting, breeding	46 (52)	11 (14)	S	S	S			S	S	S			0.35%	0-24 m (33) 25-50 m (12) 51-75 m (3) 76-150 m (3) N-S, S-N, E-W, SW-NE, W-E
Elanus axillaris (Black-shouldered Kite)	Not listed	WFA	BBRAS sites – BUS001, BUS016 B/T sites – AQU-Opp04, Opp17	Direct sightings in the WFA. All singles. All records were of birds in flight. Observed soaring in WFA.	Foraging, roosting, breeding	2 (2)	2 (2)	S	S	S	S	S	S	S	S			0.02%	0-24 m (1) 25-50 m (1)
Haliaeetus leucogaster (White-bellied Sea-Eagle)	Not listed	WFA, Reg.	BBRAS sites – BUS018, BUS032 B/T sites – none	One direct sighting in the WFA and one at a Regional site at the Hardy Inlet. Both singles. WFA record was of the bird flying over the site. Soaring at Regional site.	Foraging	2 (2)	0 (0)	S	S	S								0.01%	76-150 m (2)
Haliastur sphenurus (Whistling Kite)	Not listed	WFA, Reg.	BBRAS sites – BUS001, BUS002, BUS016, BUS020, BUS030 B/T sites – Opp06, Opp07	Direct sightings in the WFA and at a Regional site at the Hardy Inlet. All singles except one pair. All records were of birds in flight.	Foraging, roosting, breeding	6 (6)	2 (3)	S	S	S	S	S	S	S	S			0.05%	25-50 m (3) 51-75 m (1) 76-150 m (2) W-E

Species	Cons. status	Rec. area[1]	Sites[2]	Evidence	Pot. use WFA	No. rec (ab.)		Habitats[3,4]										Rel. ab.	Rec. flight height cat. (# records), Flight direction/s
						BBRAS sites	B/T sites[2]	SIPW	SISE	SISH	MJP	OWP	Cleared	Clrd – DS	Dam	Bluegum	Pine		
Hieraaetus morphnoides (Little Eagle)	Not listed	WFA, BIA, Reg.	BBRAS sites – BUS005, BUS030 B/T sites – VER-30	Direct sighting in the WFA, wider BIA and at a Regional site at the Hardy Inlet. All singles. All records were of birds in flight. Observed soaring in WFA.	Foraging, roosting, breeding	2 (2)	1 (1)	S	S	S	S	S	S	S	S			0.02%	76-150 m (2)
Tachyspiza cirrocephala (Collared Sparrowhawk)	Not listed	WFA	BBRAS sites – BUS005, BUS011, BUS020 B/T sites – none	Direct sightings in the WFA. All singles. All records were of birds in flight. Observed soaring in the WFA and flying over.	Foraging, roosting, breeding	4 (4)	0 (0)	S	S	S	S	S	S	S	S			0.03%	0-24 m (2) 25-50 m (1) 76-150 m (1) W-E
Tachyspiza fasciata (Brown Goshawk)	Not listed	WFA	BBRAS sites – BUS001, BUS005 B/T sites – AQU-25, VER-Opp02, VER-Opp03	Direct sightings in the WFA. Singles, one pair. All records were of birds in flight.	Foraging, roosting, breeding	3 (4)	3 (3)	S	S	S	S	S	S	S	S			0.04%	0-24 m (1) 51-75 m (1) 76-150 m (2) E-W
Falco berigora (Brown Falcon)	Not listed	WFA, BIA	BBRAS sites – BUS002, BUS003, BUS008, BUS011, BUS018, BUS025 B/T sites – Bfalcon, VER-09, VER-40	Direct sightings in the WFA and BIA. Mostly singles. All records were of birds in flight. Observed soaring in the WFA and flying over.	Foraging, roosting, breeding	14 (17)	3 (4)	S	S	S	S	S	S	S	S			0.11%	0-24 m (8) 25-50 m (4) 51-75 m (1) 76-150 m (3) W-E, E-W

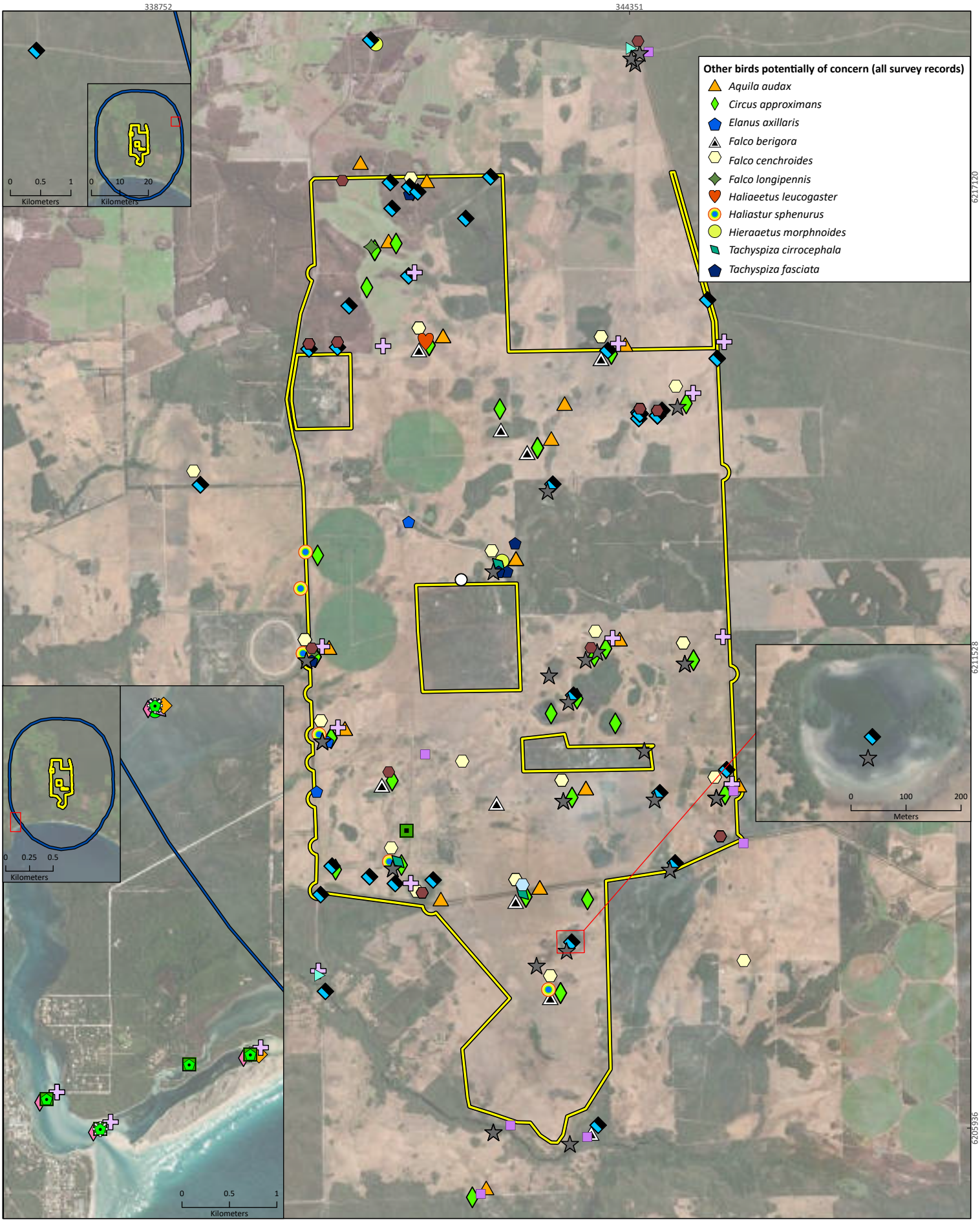
Species	Cons. status	Rec. area[1]	Sites[2]	Evidence	Pot. use WFA	No. rec (ab.)		Habitats[3,4]										Rel. ab.	Rec. flight height cat. (# records), Flight direction/s
						BBRAS sites	B/T sites[2]	SIPW	SISE	SISH	MJP	OWP	Cleared	Clrd – DS	Dam	Bluegum	Pine		
Falco cenchroides (Australian Kestrel)	Not listed	WFA, BIA, Reg.	BBRAS sites – BUS001, BUS002, BUS004, BUS005, BUS007, BUS008, BUS010, BUS011, BUS012, BUS013, BUS016, BUS018, BUS019, BUS020, BUS026, BUS027, BUS030, BUS034 B/T sites – VER-21, VER-45	Direct sightings in the WFA, BIA and Regional reference sites. Singles, pairs. All records were of birds in flight. Observed soaring and foraging in the WFA and flying over.	Foraging, roosting, breeding	45 (56)	2 (2)	S	S	S	S	S	S	S	S			0.30%	0-24 m (34) 25-50 m (8) 76-150 m (3) S-N
Falco longipennis (Australian Hobby)	Not listed	WFA	BBRAS sites – BUS001, BUS006 B/T sites – none	Direct sightings in the WFA. Singles, one pair. All records were of birds in flight.	Foraging, roosting, breeding	3 (4)	0 (0)	S	S	S	S	S	S	S	S			0.02%	0-24 m (2) 51-75 m (1) N-S

1 – BIA in this column refers to the BIA extent that is outside the WFA. Reg. = Regional sites.

2 – B/T sites = Basic and Targeted fauna survey sites.

3 – SIPW – seasonally inundated paperbark woodland (wetland); SISE – seasonally inundated sedgeland (wetland); SISH – seasonally inundated shrubland; MJP – Marri-Jarrah-Peppermint woodland; OWP – Open woodland of Peppermint trees (degraded); Clrd DS – Cleared–degraded sumpland; Bluegum – Bluegum plantation; Pine – Pine plantation.

4 – 'R' = Recorded from habitat. 'S' = Suitable habitat for species.



Western Australia

PERTH

SynergyRED
Scott River Wind Fam

Project No	1585
Date	19/06/2025
Drawn by	BK
Map author	JC

0 1 2
Kilometers

1:58,100 (at A4) GDA 1994 MGA Zone 50

Study area
Bird/Bat Investigation Area

Significant birds (all survey records)

- *Calidris acuminata*,VU/ Mig. (EPBC Act); Mig. (BC Act)
- *Calidris alba*,Mig. (EPBC & BC Acts)
- *Calidris ruficollis*,Mig. (EPBC & BC Acts)
- *Calyptorhynchus banksii naso*,VU (EPBC & BC Acts)
- *Calyptorhynchus/Zanda* sp.,EN-VU (EPBC & BC Acts)
- *Falco peregrinus*,OS (BC Act)
- *Hydroprogne caspia*,Mig. (EPBC & BC Acts)
- *Limosa lapponica*,Mig. (EPBC & BC Acts)
- *Pandion haliaetus*,Mig. (EPBC & BC Acts)
- *Sternula nereis nereis*,VU (EPBC & BC Acts)
- *Thalasseus bergii*,Mig. (EPBC & BC Acts)
- *Tringa glareola*,Mig. (EPBC & BC Acts)
- *Tyto novaehollandiae novaehollandiae*,P3 (DBCA list)
- *Zanda baudinii*,EN (EPBC & BC Acts)
- *Zanda latirostris*,EN (EPBC & BC Acts)
- *Zanda* sp.,EN (EPBC & BC Acts)

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Figure 5-7

Recorded conservation significant birds and other birds potentially of concern

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5.1.4.2 Flight heights and movements

The flight data presented below (Table 5-7) includes records from the current survey and the Basic and Targeted fauna survey (Phoenix 2025a). Not all records for conservation significant species included flight details due to the sample method (e.g. audio recordings), or other factors, and therefore the numbers below do not necessarily match those presented in Table 5-6 above.

Seven conservation significant species were recorded flying at heights within the RSA (Table 5-7), although most records were of birds flying below the RSA (i.e., 0-24m):

- Caspian Tern (0-50 m) – Regional reference sites only
- Fairy Tern (0-50 m) – Regional reference sites only
- Greater Crested Tern (25-50 m) – Regional reference sites only
- Osprey (0-75 m) – Regional reference sites, plus recorded in the WFA but no height recorded
- Peregrine Falcon (25-50 m) – WFA
- Forest Red-tailed Black Cockatoo (0-50 m) – WFA and BIA
- Carnaby's Cockatoo (0-50 m) – WFA and BIA.

Flight direction for most observations was determined to be 'stationary', as the birds were either hovering or showing no distinct direction of movement. However, where they were recorded as moving in a distinct direction they were typically moving N-S/S-N and there is no difference in movement between conservation significant species and the broader assemblage, as presented in section 5.1.3 (Figure 5-6; Table 5-5).

Wood Sandpiper and Peregrine Falcon were recorded from only a single observation each, therefore no substantive comments can be made concerning observed behaviour, site utilisation etc for these species. Masked Owl was only recorded indirectly via nocturnal audio recording therefore no flight heights were recorded.

Table 5-7 Flight directions per record for conservation significant birds (grey rows denote RSA heights)

Family (Order)	Species	Conservation status	Site	# indiv.	Height range	Flight direction
Charadriiformes						
Laridae	*Hydroprogne caspia* (Caspian Tern)	Mig. (EPBC & BC Acts)	BUS031	27	0-24	Stat.
			BUS031	22	0-24	Stat.
			BUS032	1	25-50	Stat.
			BUS032	2	25-50	Stat.
			BUS033	9	0-24	Stat.
			BUS034	1	0-24	Stat.
	Sternula nereis nereis (Fairy Tern)	VU (EPBC & BC Acts)	BUS031	40	0-24	Stat.
			BUS033	4	0-24	Stat.
			BUS034	4	25-50	Stat.
	Thalasseus bergii (Greater Crested Tern)	Mig. (EPBC & BC Acts)	BUS030	1	0-24	Stat.
			BUS031	9	0-24	Stat.
			BUS032	1	0-24	Stat.
			BUS032	6	25-50	Stat.
			BUS032	6	0-24	Stat.
			BUS032	1	25-50	Stat.

Family (Order)	Species	Conservation status	Site	# indiv.	Height range	Flight direction
			BUS033	20	0-24	Stat.
			BUS034	1	0-24	Stat.
			BUS034	1	0-24	Stat.
Scolopacidae	*Calidris acuminata* (Sharp-tailed Sandpiper)	VU/Mig./Mig. (EPBC Act; BC Act)	BUS031	40	0-24	Stat.
	Calidris alba (Sanderling)	Mig. (EPBC & BC Acts)	BUS031	4	0-24	Stat.
	Calidris ruficollis (Red-necked Stint)	Mig. (EPBC & BC Acts)	BUS031	12	0-24	Stat.
			BUS034	60	0-24	Stat.
	Limosa lapponica (Bar-tailed Godwit)	Mig. (EPBC & BC Acts)	BUS031	1	0-24	Stat.
Falconiformes						
Accipitridae	*Pandion haliaetus* (Osprey)	Mig. (EPBC & BC Acts)	BUS030	1	0-24	Stat.
			BUS030	1	25-50	Stat.
			BUS032	4	25-50	Stat.
			BUS033	1	51-75	Stat.
			BUS033	1	25-50	Stat.
			BUS034	1	0-24	Stat.
Falconidae	*Falco peregrinus* (Peregrine Falcon)	OS (BC Act)	BUS011	1	25-50	N-S
Psittaciformes						
Cacatuidae	*Calyptorhynchus banksii naso* (Forest Red-tailed Black Cockatoo/Karrak)	VU (EPBC & BC Acts)	AQU-01	10	25-50	N-S
			BCForaging	1	0-24	Stat.
			BCRoosting09	2	0-24	Stat.
			BUS013	1	25-50	N-S
			BUS013	53	0-24	S-N
	Calyptorhynchus/ Zanda sp. (black cockatoo species)	EN-VU (EPBC & BC Acts)	BCRoosting01	4	0-24	Stat.
			BCRoosting06	2	0-24	Stat.
			BCRoosting16	6	0-24	Stat.
			BUS001	1	25-50	Stat.
			BUS004	38	0-24	Stat.
			BUS008	6	0-24	Stat.
			BUS016	2	0-24	Stat.
			BUS019	2	0-24	Stat.
			BUS019	6	0-24	Stat.
			BUS026	10	0-24	Stat.
			BUS032	4	25-50	Stat.
			BUS032	2	25-50	Stat.
			BUS032	2	0-24	Stat.
			BUS033	7	0-24	Stat.
			BUS034	4	0-24	Stat.
			BUS014	8	0-24	NE-SW

Family (Order)	Species	Conservation status	Site	# indiv.	Height range	Flight direction
	Zanda baudinii (Baudin's Cockatoo)	EN (EPBC & BC Acts)	BUS015	1	0-24	N-SW
			BUS019	2	0-24	Stat.
	Zanda latirostris (Carnaby's Cockatoo)	EN (EPBC & BC Acts)	BCRoosting05	2	25-50	Stat.
			BCRoosting09	2	0-24	Stat.
			BUS001	3	0-24	Stat.
			BUS001	1	25-50	Stat.
			BUS004	2	0-24	Stat.
			BUS005	1	25-50	Stat.
			BUS010	6	0-24	Stat.
			BUS010	4	0-24	Stat.
			BUS014	5	0-24	Stat.
			BUS016	20	0-24	Stat.
			BUS016	2	0-24	Stat.
			BUS016	2	0-24	Stat.
			BUS016	4	0-24	Stat.
			BUS019	12	0-24	Stat.
			BUS019	6	0-24	Stat.
			BUS019	2	0-24	Stat.
			BUS019	9	0-24	Stat.
			BUS019	2	0-24	Stat.
			BUS020	2	0-24	Stat.
			BUS020	2	25-50	Stat.
			BUS026	2	0-24	Stat.
			BUS027	1	0-24	Stat.
			BUS027	6	0-24	Stat.
			BUS027	1	0-24	Stat.
	Zanda sp. (white-tailed black cockatoo species)	EN (EPBC & BC Acts)	BUS001	3	0-24	E-W
			BUS003	26	0-24	SW-X?

5.2 BATS

5.2.1 General summary

A summary of the data for the 16 sites where ultrasonic recorders were deployed in Year 1 is presented in Table 5-8. The site level data presents a compelling and consistent theme of relatively high bat diversity, but generally low levels of activity, across the WFA. A total of 55 samples were recorded over 71 nights and bats were detected in 43 of those nights, which means over 20% of samples detected no bats at all. Further, 50% of sites (8 of 16) detected no bats at least once. Those samples where no bats were detected occurred in all seasons (seasonal trends are presented in more detail below).

Where bats were detected, all metrics presented in Table 5-8 demonstrate low bat activity, with a few exceptions. For example, a total of 1,233 detections were found from an approximate 852 hours of recording, meaning bats were detected at a rate of 1.5 per hour, or one detection every 40 minutes, on average across the Impact and Reference sites. Similarly for the number of calls, a total of 9,803 were obtained (from 852 hours of recording), resulting in just 11.5 calls per hour on average being recorded. Further, the average number of calls per detection was just 5.5 overall, with 11 sites (69% of sites) recording an average number of calls per detection of <5. These results suggest either very low numbers of individuals typically are being detected when bats are present, and/or bats are not actively hunting in the cleared areas at or near ground-level but are instead passing through on their way to more productive remnant patches; It is considered likely a combination of both scenarios.

The highest activity levels were at sites BUS002 and BUS013 (25.7 and 15.6 average number of calls per detection respectively; Table 5-8). These sites were located on a roadside remnant in the BIA west of the WFA and in a cleared area in the southern half of the WFA, respectively. Sites BUS001, BUS014 and BUS035 also recorded relatively high activity levels, based on average number of calls per detection (6–8). BUS012 was the least active site which although only sampled once before access to this area was removed, recorded a single species, from a single detection and call.

While the number of calls detected vary considerably between sites and species (Table 5-11), a rather homogenous bat assemblage was recorded for the most part across the WFA and immediate surrounds. For example, Impact sites recorded 7 species and Reference sites 8 species; both Impact and Reference sites recorded 2 families. The mean total number of calls per site was 476 at Impact sites and 632.2 at Reference sites, whereas the average number of calls per detection was 4.1 at Impact sites, 8.9 at Reference sites and 8.0 overall, suggesting almost 50% lower activity at Impact sites and low activity generally in both.

Table 5-8 Sites summary for bats

Location	Site	No. samples	No. nights	Approx. hrs recording	No. samples bats detected	Species richness	Families	Total no. of calls	No. of detects	Mean. no. of calls per detect.	No detects / hr	No. calls / hr
Impact	BUS004	3	3	36	2	7	2	111	37	3.0	1.0	3.1
	BUS006	4	8	96	3	6	2	841	197	4.3	2.1	8.8
Sub-total		**7**	**11**	**132**	**5**	**7**	**2**	**952**	**234**	**4.1**	**1.5**	**5.9**
Ref.	BUS001	4	6	72	4	7	2	1,008	131	7.7	1.8	14.0
	BUS002	4	6	72	4	6	2	1,981	77	25.7	1.1	27.5
	BUS003	4	4	48	1	2	1	6	5	1.2	0.1	0.1
	BUS005	3	3	36	3	6	2	100	40	2.5	1.1	2.8
	BUS007	4	4	48	3	3	2	22	13	1.7	0.3	0.5
	BUS008	4	4	48	3	6	2	116	63	1.8	1.3	2.4
	BUS009	3	3	36	3	6	2	48	29	1.7	0.8	1.3
	BUS010	4	4	48	1	4	2	17	13	1.3	0.3	0.4
	BUS011	4	6	72	3	6	2	135	55	2.5	0.8	1.9
	BUS012	1	1	12	1	1	1	1	1	1.0	0.1	0.1
	BUS013	4	6	72	4	7	2	2,952	189	15.6	2.6	41.0
	BUS014	4	6	72	4	8	2	1,887	236	8.0	3.3	26.2
	BUS015	4	6	72	3	8	2	410	119	3.4	1.7	5.7
	BUS035	1	1	12	1	6	2	168	28	6.0	2.3	14.0
Sub-total		**48**	**60**	**720**	**38**	**8**	**2**	**8,851**	**999**	**5.7**	**1.3**	**9.8**
Total abund.		**55**	**71**	**852**	**43**	**8**	**2**	**9,803**	**1,233**	**8.0**	**1.4**	**11.5**

When the bat data is considered spatially, a clear picture emerges, that is that bat activity at sites outside the WFA or at its borders (i.e. in proximity to native vegetation) is much higher than in the central areas (Figure 5-8). The data therefore suggests that while there may be as many species being detected over time inside the WFA, the bat activity at those sites, located in the cleared landscape of the WFA is much lower than at sites outside the WFA. Indeed, the number of calls and detections are so low at many sites (68.75% of them), the data suggests that the individuals detected were moving through the area only, and not actively foraging, which is important when considering risk to bats in general and to individual species.

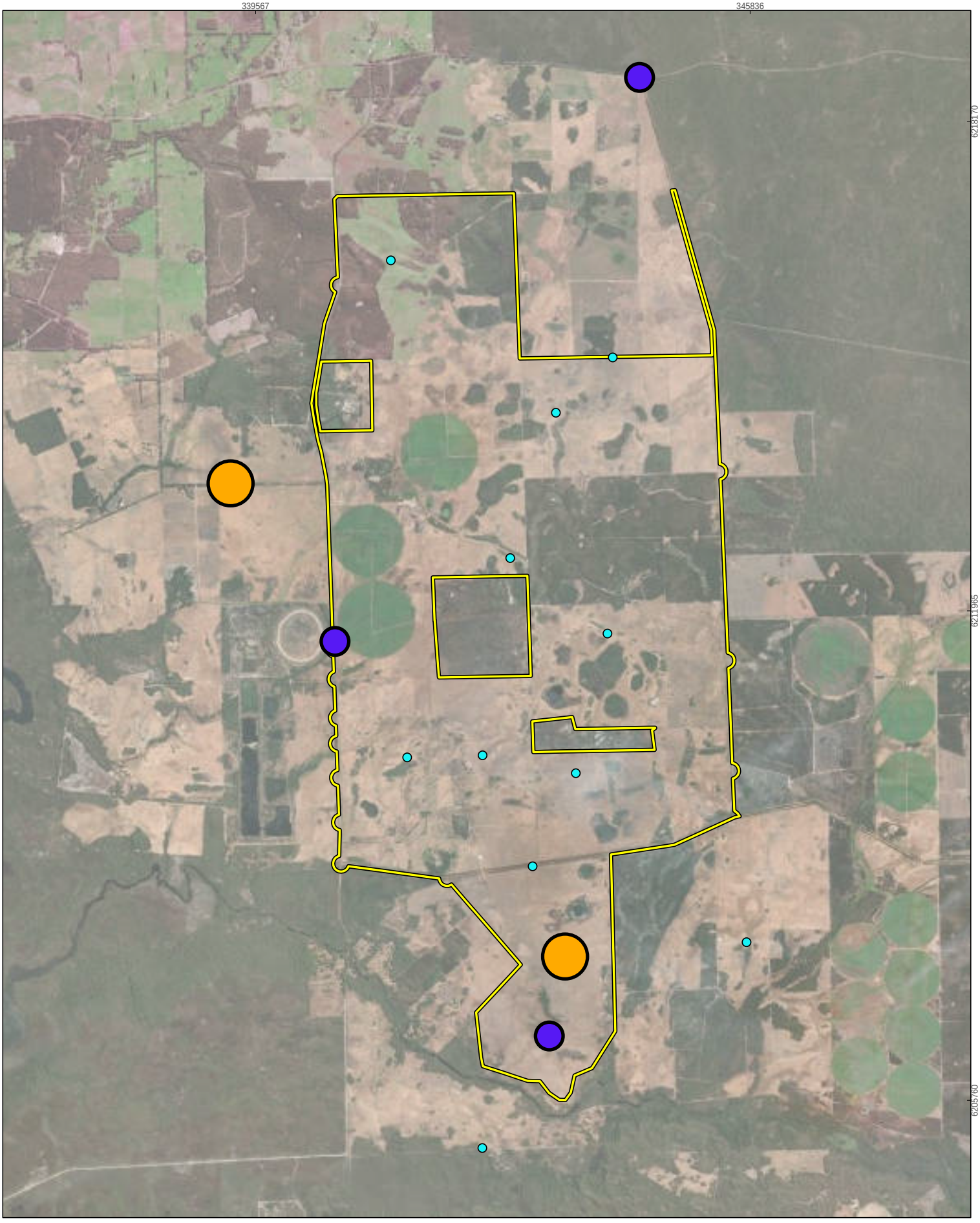
The bat data is summarised with respect to season in Table 5-9 and shown visually in Figure 5-9. While species richness stayed relatively constant over the 4 seasons (6-8 species), bat detection changed markedly, peaking in summer (634), then declining through the rest of the year, so that summer detections were 4 times that of winter (155), 3 times that of autumn (201) and over twice that of spring (283).

The 2 species not detected in winter were *Falsistrellus mackenziei* (Western False Pipistrelle; P4) and *Nyctophilus holtorum* (Holt's Long-eared Bat). While no data is available concerning the hibernation or torpor of *F. mackenziei* and *N. holtorum* specifically, seasonal fluctuation in species diversity and detection is well documented for bats in temperate climates. Bats may be homeothermic like other mammals but their high energy requirements and large surface area to volume ratio mean they expend a lot of energy and get cold easily, hence many undertake a form of hibernation or torpor each winter, and/or will dramatically reduce their activity in response to daily temperature variations. For example, Chocolate Wattled Bat is typically one of the last species to emerge from winter hibernation (Churchill 2008).

Other members of the family Vespertilionidae (such as *F. mackenziei*) as well as *Nyctophilus* species such as, *N. gouldi* and *N. geoffroyi* are also known to go into extended periods of torpor of up to 15 days (Genoud & Christe 2011; Turbill & Geiser 2008). Therefore, the declines in activity per the number detections are a response to seasonal conditions and not due to migration out of the study area to warmer climes.

Table 5-9 Summary of bat data per season

Season	No. of samples	Species richness	Family richness	No. of detections	No. of calls	Mean detections
Autumn	12	8	2	201	2,733	13.6
Winter	8	6	2	115	1,041	9.1
Spring	13	7	2	283	1,181	4.2
Summer	11	8	2	634	4,848	7.6
Total	**44**	**8**	**2**	**1,233**	**9,803**	**8.0**



Western Australia

PERTH

SynergyRED
Scott River Wind Farm

Project No	1585
Date	12/08/2025
Drawn by	BK
Map author	JC

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Kilometers

1:61,965 (at A4) GDA 1994 MGA Zone 50

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Study area

Mean. no. of calls per detection

- 1 - 4.3
- 4.31 - 8
- 8.01 - 25.7

Figure 5-8

Mean number of calls per detection at each BBRAS site

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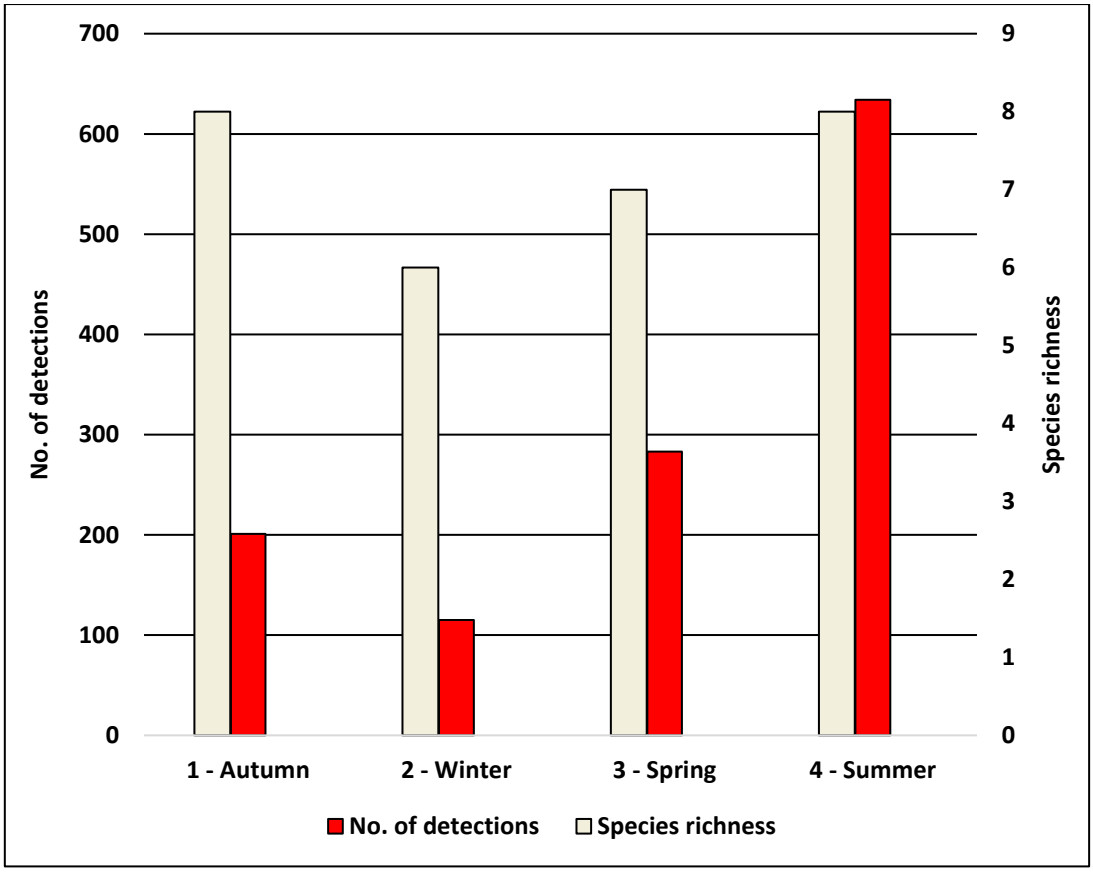


Figure 5-9 Number of bat species and detections per season at BBRAS sites

5.2.2 Assemblage summary

All bats herein are treated as species of concern. A total of 8 bat species were recorded in the current BBRAS survey and 7 in the Basic and Targeted survey (Table 5-10; Appendix 3; Appendix 5). The data presented here relates only to the current survey, unless otherwise stated. *Nyctophilus major* was not recorded by Phoenix (2025a).

Three of the recorded bat species were not identified in the desktop assessment for the species characterisation (Section 4.2), which reflects changes in Chiropteran taxonomy rather than historic or current survey efforts. The assemblage represented 2 families, Vespertilionidae (7 species) and Molossidae (one species; Table 5-10).

Table 5-10 Recorded bat assemblage, by family

Family	Species recorded	Summary of records
Molossidae	White-striped Free-tailed Bat *Austronomus australis*	Recorded at 15 of the 16 sites, mainly in cleared areas between remnants but also 2 Marri Jarrah Peppermint woodland BBRAS sites. However, the species is believed to generally be strongly tied to dense, often old-growth, forest (Churchill 2008). Second most detected species (2,939). Far more active in summer, almost absent in winter.
Vespertilionidae	Gould's Wattled Bat *Chalinolobus gouldii* Chocolate Wattled Bat *Chalinolobus morio* Western False Pipistrelle *Falsistrellus mackenziei* Lesser Long-eared Bat *Nyctophilus geoffroyi* Holt's Long-eared Bat *Nyctophilus holtorum* Greater Long-eared Bat *Nyctophilus major* Southern Forest Bat *Vespadelus regulus*	Activity of the members of this family varied greatly across 15 of the 16 sites (this family was not detected at BUS012). For example, *Falsistrellus mackenziei* (P4) was detected rarely (9 detections from 1 impact site and 5 reference sites), whereas *Vespadelus regulus* was the most detected species (5,478 detections from 14 sites). All species were recorded from both cleared and Marri Jarrah Peppermint woodland[1] BBRAS sites. Representatives were also recorded from Seasonally inundated sedgeland (wetland), Seasonally inundated shrubland (wetland), Open woodland of Peppermint trees (degraded) habitats in the Basic and Targeted fauna survey. As above, members of this family were most active in summer and least active in winter.

The aggregated bat data per species is presented as a species-site matrix in Table 5-11. Bats were recorded at all 16 sites, with just one species detected at site BUS012 (White-striped Free-tailed Bat) and all 8 species detected at sites BUS014 and BUS015, both located outside the study area. The species richness of Impact and Reference sites was similar, with only *Nyctophilus major* being absent from Impact sites.

The activity levels were high for White-striped Free-tailed Bat (overall mean = 12.9) and Southern Forest Bat (overall mean = 11.4) (Table 5-11; Figure 5-10) despite being absent from one and 2 sites, respectively. Activity levels of Southern Forest Bat were however moderate within the WFA but high outside this in the wider BIA.

The activity levels of all other species were low, recording mean call numbers of between 1.0 and 3.5, over all records. Holt's Long-eared Bat and Western False Pipistrelle were the rarest species, being present from 4 and 6 sites and having mean call numbers of 1.1 and 1, respectively. The results suggest that other than for White-striped Free-tailed Bat and Southern Forest Bat, the other 6 species infrequently foraged within the detection circumference of the recorders, and were mostly passing by as either individuals, pairs or small groups.

Table 5-11 Number of bat calls per BBRAS site (C – Calls, D – Detections, M – Mean)

Location	Site	Chocolate Wattled Bat			Gould's Wattled Bat			Greater Long-eared Bat			Holt's Long-eared Bat			Lesser Long-eared Bat			Southern Forest Bat			Western False Pipistrelle			White-striped Free-tailed Bat		
		C	D	M	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M
Impact	BUS004	3	2	1.5	12	7	1.7	4	3	1.3				2	2	1.0	79	18	4.4	1	1	1.0	10	4	2.5
	BUS006	80	41	2.0	48	30	1.6	15	7	2.1				45	19	2.4	333	75	4.4				320	25	12.8
Sub-total per species		**83**	**43**	**1.9**	**60**	**37**	**1.6**	**19**	**10**	**1.9**	**0**	**0**		**47**	**21**	**2.2**	**412**	**93**	**4.4**	**1**	**1**	**1.0**	**330**	**29**	**11.4**
Impact activity level		**Low**			**Low**			**Low**			**Low**			**Low**			**Moderate**			**Low**			**High**		
Ref.	BUS001	51	26	2.0	5	3	1.7	1	1	1.0				12	9	1.3	828	68	12.2	1	1	1.0	110	23	4.8
	BUS002	1	1	1.0	5	4	1.3	2	2	1.0				9	6	1.5	75	19	3.9				1,889	45	42.0
	BUS003				5	4	1.3										1	1	1.0						
	BUS005	16	10	1.6	2	2	1.0	2	2	1.0				4	3	1.3	67	17	3.9				9	6	1.5
	BUS007	5	4	1.3	9	6	1.5																8	3	2.7
	BUS008	9	8	1.1	24	15	1.6	4	4	1.0				4	4	1.0	44	18	2.4				31	14	2.2
	BUS009	10	7	1.4	16	8	2.0				2	2	1.0	3	1	3.0	9	6	1.5				8	5	1.6
	BUS010	5	3	1.7	8	6	1.3										2	2	1.0				2	2	1.0
	BUS011	2	2	1.0	12	6	2.0							5	3	1.7	81	31	2.6	1	1	1.0	34	12	2.8
	BUS012																						1	1	1.0
	BUS013	283	38	7.4	38	21	1.8				1	1	1.0	186	29	6.4	2,297	72	31.9	1	1	1.0	146	27	5.4
	BUS014	152	29	5.2	134	42	3.2	2	2	1.0	6	5	1.2	44	27	1.6	1,365	97	14.1	3	3	1.0	181	31	5.8
	BUS015	40	18	2.2	12	10	1.2	10	8	1.3	1	1	1.0	14	12	1.2	284	52	5.5	2	2	1.0	47	16	2.9
	BUS035	2	2	1.0	6	4	1.5	2	1	2.0				2	2	1.0	13	6	2.2				143	13	11.0
Sub-total activity		**576**	**148**	**3.9**	**276**	**131**	**2.1**	**23**	**20**	**1.2**	**10**	**9**	**1.1**	**283**	**96**	**2.9**	**5,066**	**389**	**13.0**	**8**	**8**	**1.0**	**2,609**	**198**	**13.2**
Ref. activity level		**Low**			**Low**			**Low**			**`Low**			**Low**			**High**			**Low**			**High**		
Grand total activity		**659**	**191**	**3.5**	**336**	**168**	**2.0**	**42**	**30**	**1.4**	**10**	**9**	**1.1**	**330**	**117**	**2.8**	**5,478**	**482**	**11.4**	**9**	**9**	**1.0**	**2,939**	**227**	**12.9**
No. sites detected		**14**	**14**	**14**	**15**	**15**	**15**	**9**	**9**	**9**	**4**	**4**	**4**	**12**	**12**	**12**	**14**	**14**	**14**	**6**	**6**	**6**	**15**	**15**	**15**
Overall activity level		**Low**			**Low**			**Low**			**Low**			**Low**			**High**			**Low**			**High**		

Bat activity was also analysed by 30-minute intervals to investigate whether there were any periods of particularly high activity as bats typically show strong site fidelity and consistent nightly movement patterns. As can be seen in Figure 5-10 all bats were present throughout the night, although generally less active in the first and last 1–2 hours each night. And, with the exceptions of White-striped Free-tailed Bat and Southern Forest Bat, activity was typically low throughout the night.

Calls of Southern Forest Bat typically peaked between 7–730pm each night, then showed a steady decline throughout the night (Table 5-10; Appendix 7). White striped Free-tailed Bat was generally not active until 8–830pm, after which activity steadily increased until 1130–12pm, then steadily declined toward dawn each night. Chocolate Wattled Bat was the 3rd most active species. It was active from 830pm–4am, being most active at around 2am.

The delayed arrivals and early departures of most species suggest, as would be excepted, that bats are not roosting in the open paddock habitats in which the recorders were located and the proposed impact would take place, but are instead roosting elsewhere in native remnant habitats and moving into the cleared paddocks after foraging near their roost sites. This is certainly the case for the only significant bat recorded, Western False Pipistrelle, which was only detected a handful of times from 1–2 calls per detection (also see section 5.2.3; Table 5-12).

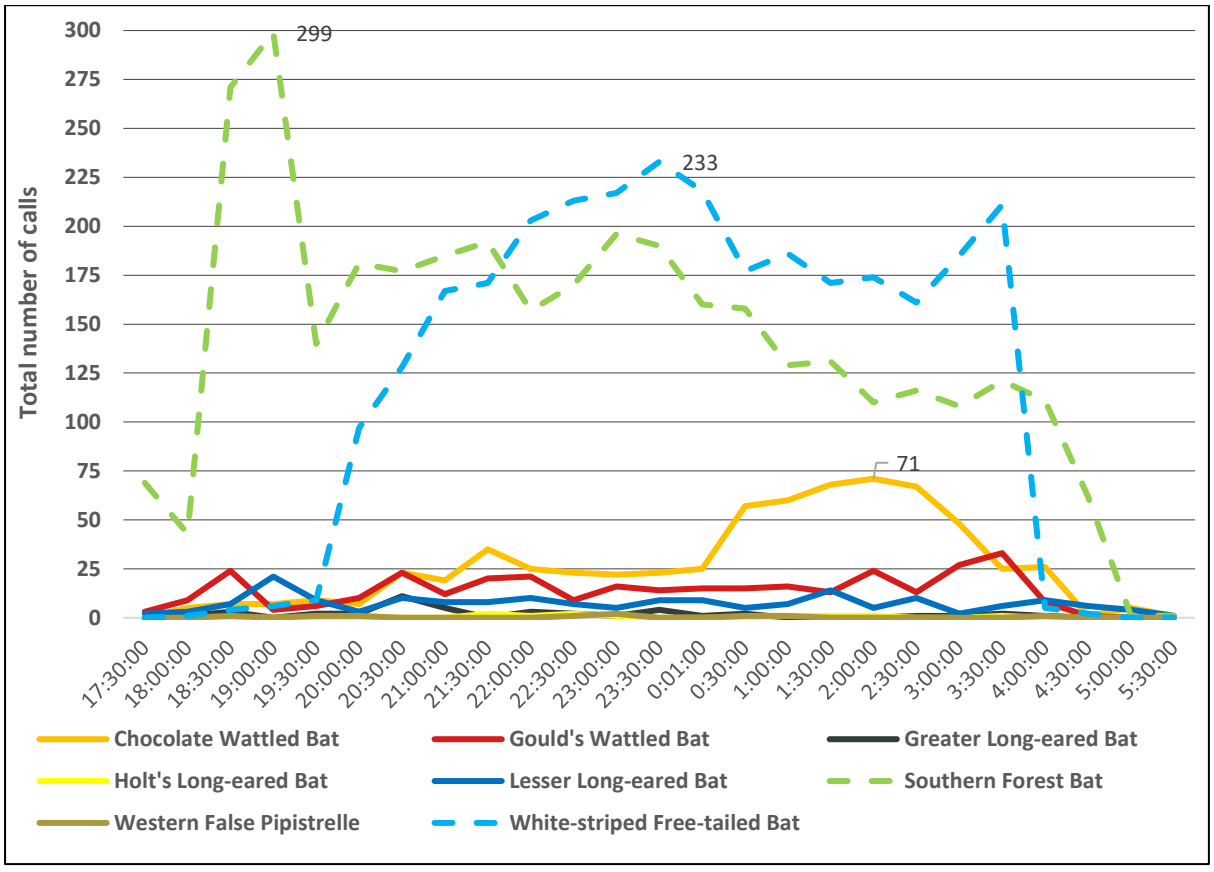


Figure 5-10 Total number of calls per 30-minute time interval

5.2.3 Conservation significant bats

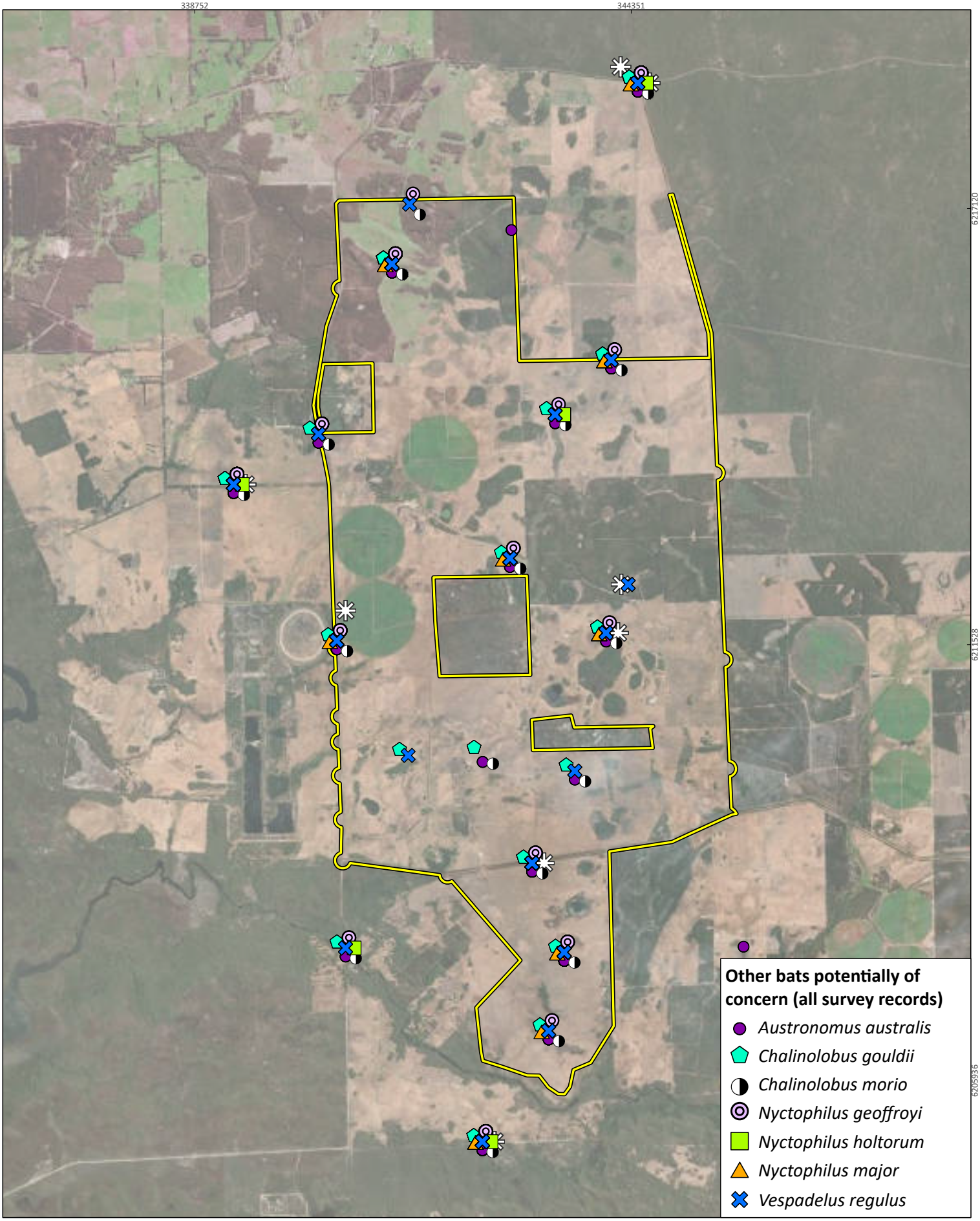
A single conservation significant bat species, Western False Pipistrelle (*Falsistrellus mackenziei*; P4), was recorded across both the BBRAS and the Basic and Targeted fauna survey (Phoenix 2025a). The species was detected once each from 4 BBRAS sites within the WFA and twice at site BUS015 and in 3 consecutive nights at BUS014, both of which are located outside the WFA (within Chester National Park and on the Scott River respectively). It was also detected at site VER-43 on one occasion (Table 5-12). It was recorded from 3 habitat types, Marri-Jarrah-Peppermint woodland, seasonally inundated sedgeland (wetland) and Cleared areas (Figure 5-7).

The timing of the calls for Western False Pipistrelle display no obvious pattern with sparse records throughout the night. Detections were rare, and occurred at sporadic times, over several seasons, primarily in summer (Table 5-12). On this basis it is difficult to say whether or not it is resident in the WFA. The literature suggests it has a strong preference for dense 'old-growth'/mature wet sclerophyll forests of Karri, Jarrah and Tuart (Churchill 2008), from which it rarely ventures far, and this data tends to support that understanding. Within the WFA suitable nesting/roosting habitat occurs in the hollow-supporting MJP woodland, located primarily on the northern boundary, and near Governor Broome Road in the southeast, south and southwest. Abundant, suitable roosting habitat is present in the forested conservation reserves and the Scott River outside the WFA, where this species was most frequently detected.

Table 5-12 Western False Pipistrelle detections

Area	Site	Site description	Season	Date	Time	No. detections
Impact	BUS004	Cleared, open paddock, near several small remnants, in study area.	Spring	18/11/2023	01:00	1
Reference	BUS001	Cleared paddock, directly adjacent narrow roadside Marri-Jarrah-Peppermint woodland, in study area.	Spring	18/11/2023	23:00	1
	BUS011	Cleared roadside, directly adjacent narrow roadside seasonally inundated shrubland, in study area.	Summer	13/01/2024	20:00	1
	BUS013	Narrow roadside remnant vegetation directly adjacent paddock, outside (west of) study area.	Autumn	24/05/2023	19:30	1
	BUS014	Cleared, roadside, directly adjacent large contiguous woodland (conservation reserve), outside (north of) study area.	Summer	12/01/2024	22:30	1
			Summer	13/01/2024	00:30	1
			Summer	14/01/2024	04:00	1
	BUS015	Cleared paddock, directly adjoining vegetation remnant outside (south of) study area.	Autumn	25/05/2023	18:30	1
			Summer	12/01/2024	23:00	1
	VER-43[1]	Seasonally inundated sedgeland (wetland), in study area; within Bluegum plantation stand.	Summer	10/12/2023	00:00	1

[1]Site from the basic/targeted fauna survey (Phoenix 2025a).





SynergyRED
Scott River Wind Fam

Project No	1585
Date	19/06/2025
Drawn by	BK
Map author	JC

0 0.9 1.8
Kilometers

1:62,703 (at A4) GDA 1994 MGA Zone 50

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Study area

Significant bats (all survey records)

Falsistrellus mackenziei, P4 (DBCA list)

Figure 5-11

Recorded conservation significant bats and other bats potentially of concern

PHOENIX ENVIRONMENTAL SCIENCES

5.3 LIKELIHOOD OF OCCURRENCE ASSESSMENT

Aside from the 7 conservation significant bird and one significant bat species that were recorded in the WFA or wider BIA (sections 5.1.4 and 5.2.3), the likelihood of occurrence assessment for the remaining 33 significant species identified in the regional overview as potentially relevant to the Project (section 4.2) determined 2 were likely to occur in the WFA, 9 may possibly occur and 10 may also possibly occur on rare occasions (Table 5-13). The remaining 12 significant species were considered unlikely to occur in the WFA and therefore are not considered potential species of concern to the Project (Table 5-13).

The 7 conservation significant Migratory shorebirds that were recorded in the survey only at Hardy Inlet Regional sites (section 5.1.4) are included in Table 5-13 so that comment can be made on their likelihood of occurrence in the WFA.

Table 5-13 Likelihood of occurrence assessment for significant species not recorded in the WFA/BIA

Species	Cons. status	LOO	Comment	Suitable habitats in study area									
				SIPW[1]	SISE[1]	SISH[1]	MJP[1]	OWP[1]	Cleared	Clrd–DS[1]	Dam	Bluegum[1]	Pine[1]
Oxyura australis Blue-billed Duck	P4 (DBCA list)	Likely	Previously recorded near the WFA from multiple sources. Desktop records are greater than 10 years old (some <15 years) but there are close records from several sources, and suitable habitat in the WFA, particularly the larger lakes. Therefore, is it considered likely to occur, at least on occasion.	●									
Apus pacificus Fork-tailed Swift	Mig. (EPBC & BC Acts)	Possible	WFA within species distribution but no previous records within 10 km. Known to occur in a wide range of habitats. Aerial feeder, may feed over the WFA on occasion.	●	●	●	●	●	●	●	●		
Botaurus poiciloptilus Australasian Bittern	EN (EPBC & BC Acts)	Possible	WFA is within known range and potentially suitable habitat is present. No previous records within 10 km (nearest desktop records from Hardy Inlet ~12 km SW and Gingilup/ wetlands ~30 km SE, dates unknown). While targeted searches and ARUs deployed did not detect the species during the surveys, potential for occasional presence cannot be discounted. Potential for rare use of the larger wetlands in the WFA but unlikely a regular visitor or regularly transit through the WFA.	●	●	●							
Anarhynchus bicinctus Double-banded Plover	Mig. (EPBC & BC Acts)	Possible (rare)	Previous desktop records within 10 km of WFA but old (1979-80) and from a single site near the artificial wetlands. No other desktop records returned. While the species is known to use terrestrial wetlands and pasture near the coast, it occurs rarely in WA. Therefore, considered unlikely to occur except as possibly a very rare visitor.	●	●	●			●	●			
Anarhynchus leschenaultii Greater Sand Plover	VU/Mig. (EPBC Act); VU (BC Act)	Unlikely	Suitable habitat not present in WFA, occurs in littoral and estuarine habitats large intertidal mudflats or sandbanks. There are desktop records from a single site near the artificial wetlands but old (1980).										

Species	Cons. status	LOO	Comment	Suitable habitats in study area									
				SIPW[1]	SISE[1]	SISH[1]	MJP[1]	OWP[1]	Cleared	Clrd–DS[1]	Dam	Bluegum[1]	Pine[1]
Anarhynchus mongolus Siberian Sand Plover	EN/Mig. (EPBC Act); EN (BC Act)	Possible (rare)	Previous old (1980) desktop record within 10 km of WFA but mainly uses coastal habitats such as beaches, mudflats and sandflats. Potential for rare use of wetlands in WFA.	●	●	●							
Charadrius cucullatus Hooded Plover/Dotterel	P4 (DBCA list)	Unlikely	Nearby record but is from sandy beach habitat. Suitable habitat not present in WFA, generally a beach and salt lake species.										
Pluvialis fulva Pacific Golden Plover	Mig. (EPBC & BC Acts)	Possible	Previous desktop record within 10 km of WFA, though not recent. Mainly uses coastal habitats but also recorded from wetlands, paddocks. Potential for occasional use of the larger wetlands in the WFA but unlikely a regular visitor to the WFA when present in the southwest. Very limited overlap between species arrival in region (desktop records indicate December) and when most wetlands in WFA have suitable foraging habitat.	●	●	●			●	●			
Pluvialis squatarola Grey Plover	VU/Mig. (EPBC Act); Mig. (BC Acts)	Possible (rare)	No previous record within 10 km of WFA. Suitable main habitat not present, prefers coastal habitats. Potential for rare use of wetlands, paddocks in WFA.	●	●	●			●	●			
Anous tenuirostris melanops Australian Lesser Noddy	VU (EPBC Act); EN (BC Act)	Unlikely	Desktop record is projected distribution only. No nearby records, and no suitable habitat in WFA.										
Hydroprogne caspia Caspian Tern	Mig. (EPBC & BC Acts)	Recorded Regional sites, Possible (rare) in WFA	Previous desktop records within 10 km of WFA and was recorded in survey only at Hardy Inlet Regional sites. Mainly found in sheltered coastal embayments. May also occur in near-coastal terrestrial wetlands; however, the wetlands present in the WFA are shallow and unlikely to provide the species' preferred food sources (hunts for fish). Habitat in WFA therefore considered marginal. May occur as rare visitor or transit through but unlikely to utilise the WFA.	●	●	●							

Species	Cons. status	LOO	Comment	Suitable habitats in study area									
				SIPW[1]	SISE[1]	SISH[1]	MJP[1]	OWP[1]	Cleared	Clrd–DS[1]	Dam	Bluegum[1]	Pine[1]
Onychoprion anaethetus Bridled Tern	Mig. (EPBC & BC Acts)	Unlikely	No previous records within 10 km of WFA. Mainly offshore species. No suitable habitat in WFA.										
Sternula nereis nereis Fairy Tern	VU (EPBC & BC Acts)	Recorded Regional sites, Unlikely in WFA	Desktop record was projected distribution only but was recorded in the survey at Hardy Inlet Regional sites only. Occurs in coastal habitats and on offshore islands. Suitable habitat not present in WFA. Species is unlikely to utilise WFA.	●	●	●							
Thalasseus bergii Greater Crested Tern	Mig. (EPBC & BC Acts)	Recorded Regional sites, Unlikely in WFA	Desktop records within 10 km but not recent. All recent desktop records associated with the Hardy Inlet and the coast. Survey records only from Hardy Inlet Regional sites. No suitable habitat present in WFA. species is unlikely to utilise the WFA.										
Leipoa ocellata Malleefowl	VU (EPBC & BC Acts)	Unlikely	Locally extinct.										
Motacilla cinerea Grey Wagtail	Mig. (EPBC & BC Acts)	Possible (rare)	Desktop record is projected distribution only. Suitable habitat is present but occurs in a wide range of habitats. Very few records of this species from the region. May occur in the WFA on rare occasion only.	●	●	●			●	●	●		
Actitis hypoleucos Common Sandpiper	Mig. (EPBC & BC Acts)	Possible	Previous recent desktop records within 10 km of WFA. Uses variety of coastal and inland wetlands. Suitable habitat present when species arrives in the region (September-October). Occasional use of the larger wetlands in the WFA possible, but unlikely a regular visitor or regular transit through the WFA.	●	●	●							
Arenaria interpres Ruddy Turnstone	VU/Mig. (EPBC Act); Mig. (BC Act)	Unlikely	Few desktop records none within 10 km (i.e. from Hardy Inlet and over open ocean). Species mainly uses coastal habitats.										

Species	Cons. status	LOO	Comment	Suitable habitats in study area									
				SIPW[1]	SISE[1]	SISH[1]	MJP[1]	OWP[1]	Cleared	Clrd–DS[1]	Dam	Bluegum[1]	Pine[1]
Calidris acuminata Sharp-tailed Sandpiper	VU/Mig. (EPBC Act); Mig. (BC Act)	Recorded Regional sites, Possible in WFA	Previous desktop records within 10 km of WFA, not recent. Uses shallow fresh or brackish wetlands, with inundated or emergent vegetation and inundated paddocks. Suitable habitat present in early spring when it arrives in the southwest (from September). Occasional occurrence in the WFA possible, but unlikely a regular visitor or regular transit through.	●	●	●			●	●	●		
Calidris alba Sanderling	Mig. (EPBC & BC Acts)	Recorded Regional sites, Unlikely in WFA	Old (1979-80) desktop records within 10 km of WFA from site near the artificial wetlands. All other desktop records are associated with the Hardy Inlet and the coast. Survey records also only from Hardy Inlet Regional sites. Almost always prefers coastal habitats. Suitable habitat not present in WFA.										
Calidris canutus Red Knot	VU/Mig. (EPBC Act); EN (BC Act)	Unlikely	Old (1979-80) desktop records within 10 km of WFA from site near the artificial wetlands. All recent desktop records are from the Hardy Inlet. Mainly uses coastal habitats. Suitable habitat not present.										
Calidris falcinellus Broad-billed Sandpiper	Mig. (EPBC & BC Acts)	Possible (rare)	Old (1979-80) desktop records within 10 km of WFA from site near the artificial wetlands. All recent desktop records are from the Hardy Inlet. Mainly uses sheltered coastal habitats, favouring estuarine mudflats. Only occasional records from swamps and lakes. Arrives in southwest in September, but rare.	●	●	●							
Calidris ferruginea Curlew Sandpiper	CR/Mig. (EPBC Act); CR (BC Act)	Possible	Old (1979-80) desktop records within 10 km of WFA from site near the artificial wetlands. All recent desktop records are from the Hardy Inlet. Uses intertidal and wetland habitats, sometimes forages in flooded paddocks. Desktop records indicate arrival in region from September. Suitable habitat present. Occasional use of paddocks, wetland habitats in the WFA possible.	●	●	●			●	●	●		

Species	Cons. status	LOO	Comment	Suitable habitats in study area									
				SIPW[1]	SISE[1]	SISH[1]	MJP[1]	OWP[1]	Cleared	Clrd–DS[1]	Dam	Bluegum[1]	Pine[1]
Calidris melanotos Pectoral Sandpiper	Mig. (EPBC & BC Acts)	Possible	No previous records within 10 km from WFA; however, desktop record just outside the BIA SW of the WFA on the Hardy Inlet. Uses a variety of wetland habitats and inundated grasslands. Arrives in southwest in spring. Suitable habitat present. Occasional use of paddocks, wetland habitats in the WFA possible.	●	●	●			●	●			
Calidris ruficollis Red-necked Stint	Mig. (EPBC & BC Acts)	Recorded Regional sites, Possible in WFA	Old (1980) desktop records within 10 km of WFA from a site near the artificial wetlands, and another near the Blackwood River. All other desktop records, including all recent records, are associated with the Hardy Inlet. Survey records also only from Hardy Inlet Regional sites. Found across a wide range of open mudflat-like habitats in salt and freshwater systems. Uses coastal and wetland habitats and inundated paddocks. Arrives in the southwest in spring. Occasional use of paddocks, wetland habitats in the WFA possible.	●	●	●			●	●	●		
Calidris tenuirostris Great Knot	VU/Mig. (EPBC Act); CR (BC Act)	Possible (rare)	Old (1979-80) desktop records within 10 km of WFA from site near the artificial wetlands. All recent desktop records are from the Hardy Inlet. Prefers sheltered coastal habitats with large intertidal flats. Rarely uses swamps near the coast and saltlakes. Uncommon in the Southwest.	●	●	●							
Limosa lapponica Bar-tailed Godwit	Mig. (EPBC & BC Acts)	Recorded Regional sites, Possible (rare) in WFA	Old (1980) desktop records within 10 km of WFA from a site near the artificial wetlands, and another near the Blackwood River. All other desktop records, including all recent records, are associated with the Hardy Inlet and coast. Survey records also only from Hardy Inlet Regional sites. Occurs almost entirely in coastal habitats such as intertidal sandflats, mudflats and estuaries. It has been observed on occasion on inland wetlands and paddocks but potential presence in the WFA is considered likely very rare.		●	●			●				

Species	Cons. status	LOO	Comment	Suitable habitats in study area									
				SIPW[1]	SISE[1]	SISH[1]	MJP[1]	OWP[1]	Cleared	Clrd–DS[1]	Dam	Bluegum[1]	Pine[1]
Limosa limosa Black-tailed Godwit	EN/Mig. (EPBC Act); Mig. (BC Act)	Possible (rare)	Old (1981) desktop records within 10 km of WFA from site near the artificial wetlands. All recent desktop records are from the Hardy Inlet. Prefers coastal habitats but will use shallow and sparsely vegetated, near-coastal wetlands, such as river pools, swamps and floodplains on occasion.	●	●	●			●				
Numenius madagascariensis Eastern Curlew	CR/Mig. (EPBC Act); CR (BC Act)	Unlikely	Old (1981) desktop records within 10 km of WFA from a site near the Blackwood River. No other desktop records. Mainly uses sheltered intertidal sandflats/ mudflats with no vegetation. No suitable habitat present in the WFA.										
Numenius phaeopus Whimbrel	Mig. (EPBC & BC Acts)	Unlikely	Old (1981) desktop records within 10 km of WFA from site near the artificial wetlands. All recent desktop records are from the Hardy Inlet. Inhabits coastal habitats. Suitable habitat not present in the WFA.										
Tringa brevipes Grey-tailed Tattler	Mig. (EPBC and BC Acts); P4 DBCA list	Possible (rare)	Three old (1978) desktop records within 10 km of WFA but offshore. No other desktop records returned. Inhabits coastal habitats, and occasionally found around near-coastal wetlands, such as lakes. Inland records for the species are rare.	●	●	●							
Tringa nebularia Common Greenshank	EN/Mig. (EPBC Act); Mig. (BC Act)	Likely	Several recent records within 10 km of WFA. Uses variety of wetlands and coastal habitats, as well as inundated paddocks. Habitat present in WFA when species arrives in early spring.	●	●	●				●	●		
Tringa stagnatilis Marsh Sandpiper	Mig. (EPBC & BC Acts)	Possible	No previous desktop records within 10 km of study area, last record in December 2000 (BirdLife 2023) at Swan Lake which is part of the Hardy Inlet. Inhabits a range of permanent or ephemeral wetlands and inundated floodplains. Suitable habitat present when species arrives in southwest in early spring.	●	●	●			●	●	●		

[1]SIPW – seasonally inundated paperbark woodland (wetland); SISE – seasonally inundated sedgeland (wetland); SISH – seasonally inundated shrubland; MJP – Marri-Jarrah-Peppermint woodland; OWP – Open woodland of Peppermint trees (degraded); Clrd DS – Cleared–degraded sumpland; Bluegum – Bluegum plantation; Pine – Pine plantation.

5.4 ESTIMATE OF SURVEY COMPLETENESS

In order to gauge whether the survey effort completed can be considered adequate to capture the seasonal diversity of the 2 assemblages present in the study area, 2 sets of species accumulation curves were produced based on the Chao2, Jacknife2, Sobs and Bootstrap indices, one set for birds (Figure 5-12) and one set for bats (Figure 5-13); as each group was systematically surveyed using different methods. For birds, the curves were based on the fixed-point method only. While for bats the curves were derived from echolocation recordings completed at the same BBRAS sites in Year 1.

For birds all 3 curves came close to a horizontal asymptote, indicating that few species remain undetected (Figure 5-12). The Chao2, Jacknife2 and Bootstrap indices calculated an expected species richness of 110, 118 and 106, respectively, compared with a recorded species richness of 97. The results therefore indicate that the effort undertaken is adequate to characterise the avian assemblage.

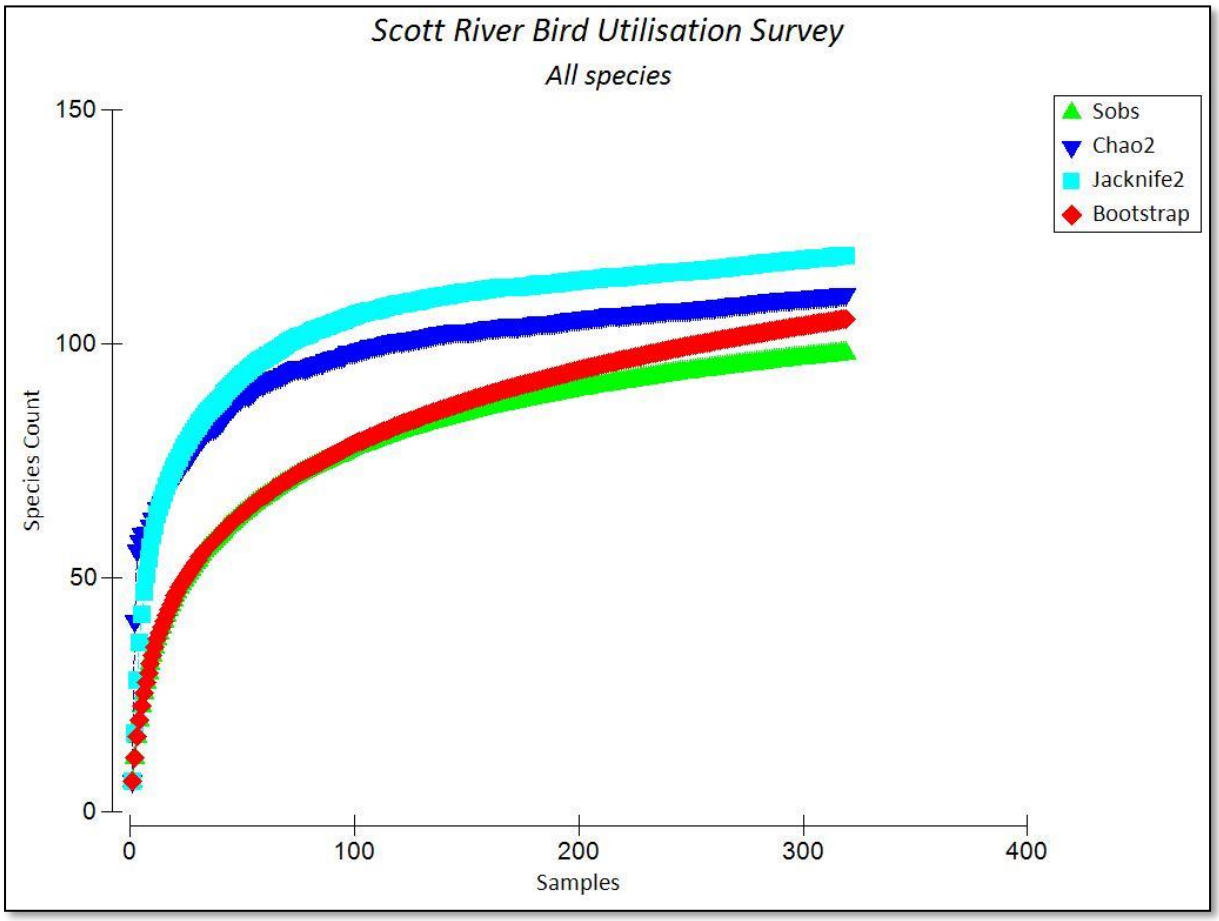


Figure 5-12 Species accumulation curve of bird data for BBRAS survey

The species accumulation curves derived from the Chao1, Jacknife1, Sobs and Bootstrap indices for bats all reached the asymptote at approximately 32 samples (Figure 5-13), with no additional species being detected after that. The curves therefore strongly indicate that is it unlikely any additional bat species would be detected with additional sampling using the echolocation sampling method. This is also evident when the assemblage per site is compared, which showed a largely homogenous assemblage across all sites (Table 5-8).

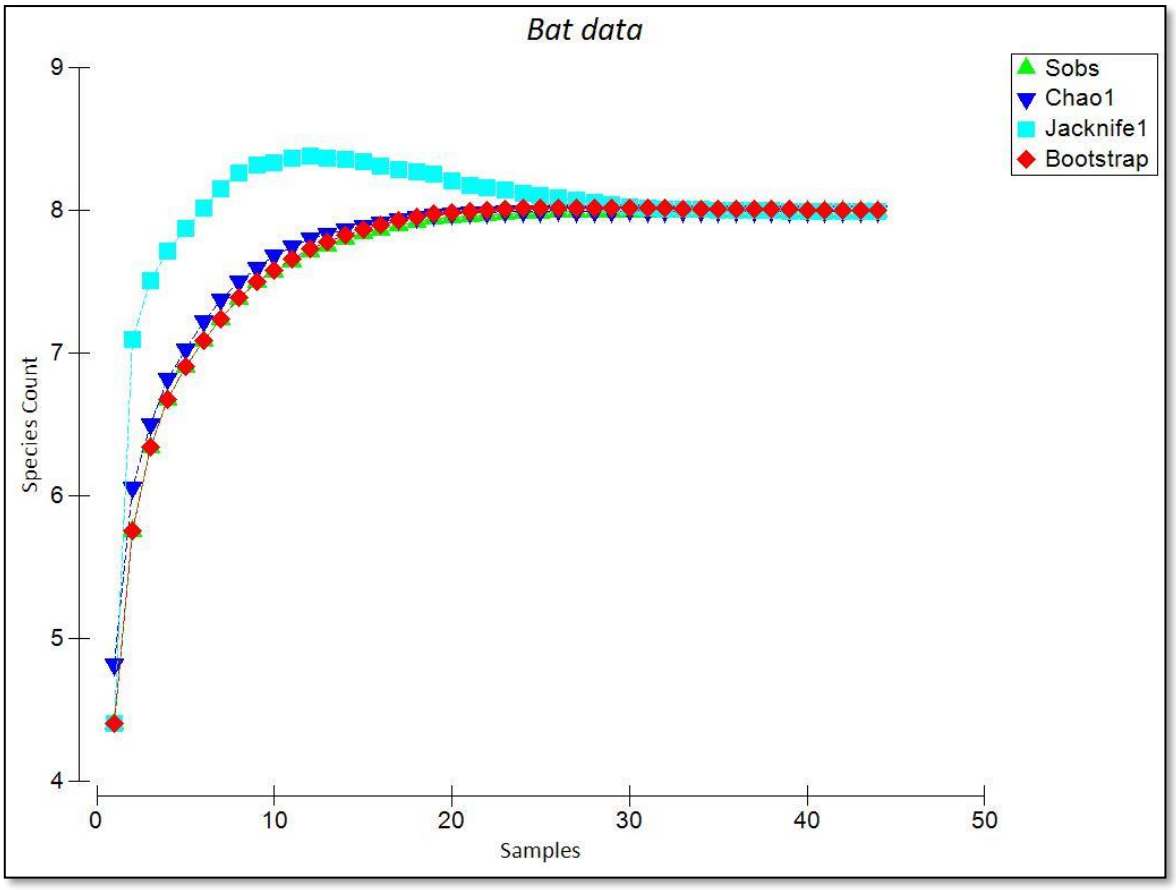


Figure 5-13 Species accumulation curve of bat data for BBRAS survey

5.5 SURVEY LIMITATIONS

The limitations of the survey have been considered in accordance with EPA (2020) and are presented in Table 5-14.

Table 5-14 Consideration of potential survey limitations

Limitations	Comments
Availability of contextual information at a regional and local scale	Database searches and previous surveys within the vicinity of the Project provided a comprehensive species list for birds within the region. There was not a comprehensive species list for bats available, and as such several species were detected during the surveys that were not returned by the database and literature searches.
Competency/experience of the team carrying out the survey	The survey team members all have extensive experience conducting fauna surveys.
Scope and completeness	Sampling effort was adequate for the size of the study area and to meet the objectives of the BBRAS. The basic/targeted fauna survey provided supplemental data to define the bird and bat assemblages of the study area. As bats were detected via echolocation recording rather than direct observation, it was not possible to determine flight heights, or distance and direction from the recording device.
Proportion of fauna recorded and/or collected, any identification issues	Based on species accumulation curves the sample effort was considered adequate to characterise the bird and bat assemblages present in the period the survey was conducted (Section 5.4). Well below average rainfall between July and November may have influenced the number and diversity of Migratory bird records in the spring 2024 sampling event.
Access within the study area	All parts of the study area were accessible for most of the year. Some sites had to be sampled a hundred or so metres from the initial location when the study area was inundated over winter in Year 1. Two sites were on land that was not accessible due to land holder restrictions that took effect in early Year 1 and were not surveyed again (BUS012 and BUS035).
Timing, rainfall, season	Year 1 sampling was completed across all 4 seasons (four sampling events). In Year 2, sampling concentrated on the drier period of the year targeting species of concern identified during Year 1 (i.e., migratory shorebirds and breeding period of the 3 black cockatoo species). Year 2 involved monthly sampling between September 2024 and March 2025. This resulted in a total of 12 sampling events over 2 consecutive years satisfying the relevant guidance (Brett Lane and Associates 2005; DCCEEW 2024). All efforts were made to undertake fixed-point bird sampling during favourable weather conditions.
Disturbance that may have affected the results of the survey	No disturbances affected the results of the survey.

6 RISK ASSESSMENT FOR POTENTIAL SPECIES OF CONCERN

6.1 POTENTIAL IMPACTS

The main risks to birds and bats from wind farms (Section 2.3) have been considered for relevance to the current Project below in Table 6-1.

Table 6-1 Consideration of potential impacts

Potential impact	Comments
Habitat loss through clearing for turbines and other infrastructure	Minimal clearing of native vegetation proposed – no more than 2 ha total (at the time of this assessment), and less than 1 ha of black cockatoo foraging habitat. No removal of PNTs. No clearing of any native vegetation growing in association with wetlands., Proposed maximum number of turbines is 20, all within the WFA. Proposed site placement of turbines is within cleared paddock areas or Bluegum plantation that is scheduled to be harvested prior to construction and will not be replanted (Figure 6-1).
Mortality or injury from collision with turbine blade or as a result of barotrauma[1]	Birds or bats that fly within heights of the RSA at-risk of rotor strike and/or barotrauma. Potential RSA height is within the range of 25–250 m. Encompasses 4 of the flight height categories recorded in the surveys (see section 3.2.1): • 25-50 m • 51-75 m • 76-150 m • 151-250 m.
Alienation of important sites, e.g. key roosting, feeding or breeding areas	No important roosting or breeding sites for birds or bats have been detected within the WFA. Black cockatoos however were observed to forage widely in the WFA principally within MJP woodland, and raptors were observed to forage widely across the entire site. There is therefore potential for the turbines to deter some birds from continuing to forage within the WFA, including the excised areas within the study area of which one is a conservation reserve (Figure 4-2). However, it is not clear how relevant or impactful such a deterrence would be with respect to conservation significant species and other species of potential concern recorded, due to a paucity of such data with respect to WA species.
Displacement leading disruption to feeding or breeding patterns, e.g. from wind turbine noise and/or artificial light sources	May affect birds or bats that would usually use the WFA to move between (for example) roosting sites and foraging habitat. Birds/bats may have to fly longer distances to get to foraging/breeding areas. For example, black cockatoos moving between roost sites in conservation reserves north of the WFA to foraging habitat in Scott National Park/Hardy Inlet, or coastal vegetation south of the WFA. Directional movements of most birds, including black cockatoos, show movements are mainly S-N/N-S and E-W/W-E, though a very limited number of distinct movements were detected and thus no clear trends could be determined. Construction activities are likely to generate the loudest noise (e.g. from vehicle and machinery operation), but will be temporary, the construction period likely to be between 18-24 months. During operations, the wind turbines will be the primary noise source, followed by the substation. The aerodynamic noise generated by a turbine typically increases with rotor speed, which is directly correlated to wind speed. Maximum predicted noise levels at each turbine range from 35-55dB(A), dependent on wind

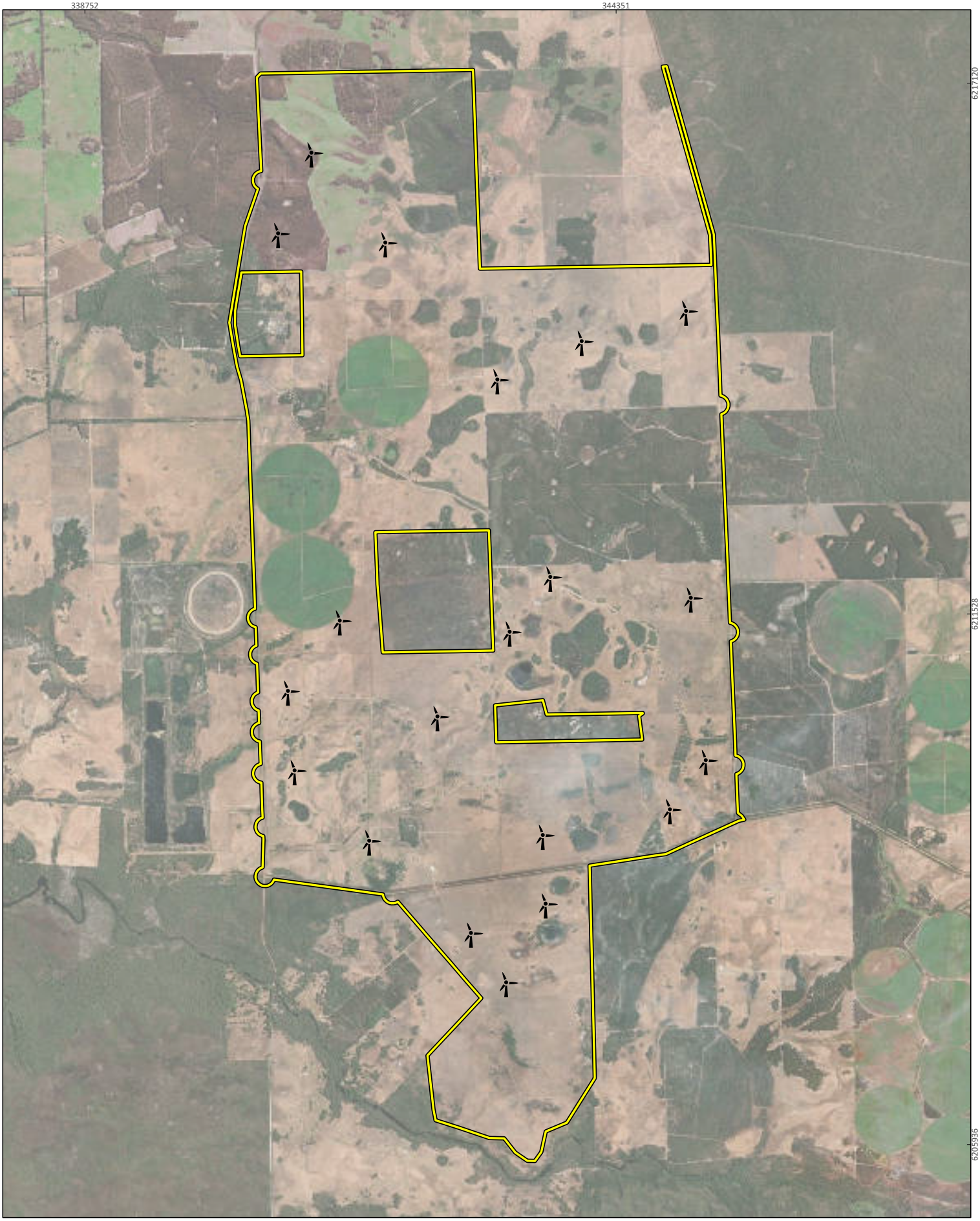
Potential impact	Comments
	speed, and reducing with distance. Existing background noise as measured in the vicinity of the proposed wind farm ranged from 20-50dB(A). Sources of artificial light during construction are expected to be minimal, assuming construction activities will be restricted to daylight hours. Mobile lighting towers may be used to ensure safe work environment in certain situations. Light sources during operations will primarily be associated with night lighting around the perimeter of buildings and substation for security and emergency purposes. SynergyRED advises consultation to date has suggested aviation obstruction lighting will not be required; however, this may change if the Civil Aviation Safety Authority determines there to be suitable risk to aviation safety. Generally, aviation lighting involves the installation of red LED lights on the nacelle of turbines around the perimeter of the Project. Overall, lighting for the Project is unlikely to be of a scale that would cause significant displacement of birds or bats.

[1]Risk of barotrauma treated together here with collision risk, as noted in Section 2.3.

6.2 POTENTIAL SPECIES OF CONCERN

Based on the findings of the site and species characterisation (Section 3.1.1 and Section 3.1.2), and the field surveys (Section 5), 29 conservation significant species are considered potential species of concern, including the 8 species that were recorded in the WFA or wider BIA (7 birds, Section 5.1.4 and one bat, Section 5.2.3) and the 21 additional species considered likely, possibly or possibly (rare) to occur in the WFA (Section 5.3). Detailed profiles for the conservation significant species are provided in Appendix 4.

In addition, the 11 non-significant raptors and 7 non-significant bat species recorded during the survey were also identified as potential species of concern (Section 5.1.4 and Section 5.2.2) and are therefore included in the risk assessment (Section 6.3).





SynergyRED
Scott River Wind Fam

Project No	1585
Date	13/08/2025
Drawn by	BK
Map author	JC

0 1 2
Kilometers

1:51,525 (at A4) GDA 1994 MGA Zone 50

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Study area

Proposed turbine locations

Figure 6-1

Preliminary turbine locations

PHOENIX ENVIRONMENTAL SCIENCES

6.3 RISK ASSESSMENT OUTCOMES

A risk assessment was conducted for all potential species of concern in accordance with the risk assessment framework defined in Section 3.5. The risk assessment outcomes for conservation significant species are detailed in Table 6-2. From this assessment, 3 conservation significant species were considered at moderate risk of impact from the Project, Forest Red-tailed Black Cockatoo, Baudin's Cockatoo and Carnaby's Cockatoo. Two species were considered at low risk, Australasian Bittern and Western False Pipistrelle. Risk was assessed as negligible for the remaining 24 conservation significant species (Table 6-2).

The risk assessment for other potential species of concern (i.e. non-conservation significant) is detailed separately in Table 6-3. None of the other potential species of concern assessed received a high or moderate risk rating. Six birds and 2 bats were assessed as at low risk from the Project, Wedge-tailed Eagle, Swamp Harrier, Black-shouldered Kite, Brown Goshawk, Brown Falcon, Australian Kestrel, White-striped Free-tailed Bat and Southern Forest Bat. The risk rating was found to be negligible for the remaining species (Table 6-3).

Table 6-2 Risk assessment for conservation significant potential species of concern

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
Pandion haliaetus (Osprey)	Mig. (EPBC & BC Acts)	Occasional foraging	7 (7)	0-75 m	Direct collision/ barotrauma	Potential	Insignificant	Negligible	Recorded only once in WFA across all surveys. Recorded flying within RSA heights at Regional reference sites. No mortalities recorded in carcass monitoring from reviewed sources at Australian sites, but collision deaths have been reported overseas. Common and widely distributed in coastal regions across most of the country. Many individual Osprey are known in the Busselton to Augusta region (pers. comm. B. Wykes). The population is limited by viable nest sites, not biological factors. Desktop records are nearly all SW of the WFA associated with Hardy Inlet, Augusta beaches, Scott and Blackwood Rivers. Sampling at the Regional reference sites supports this, with several records made during the Year 2 surveys at the Hardy Inlet coastal sites. Unlikely to utilise habitats in study area regularly because it primarily feeds on fish, though may be an occasional foraging site. Potential for rare loss of individuals but no reduction in population viability.
Oxyura australis (Blue-billed Duck)	P4 (DBCA list)	Foraging Roosting Breeding	-		Direct collision/ barotrauma	Potential	Insignificant	Negligible	No record from surveys; however, although considered likely to occur within the WFA on occasion (Table 5-13). Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Potential for occasional use of the larger wetlands in the WFA but unlikely to be a regular visitor. A few records from the artificial wetlands west of the WFA but limited desktop records returned within 10 km, and all from 2010 or older. Potential for rare loss of individuals but no reduction in population viability.

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
Apus pacificus (Fork-tailed Swift)	Mig. (EPBC & BC Acts)	Foraging	-		Direct collision/ barotrauma	Potential	Insignificant	Negligible	No record from surveys, although considered to possibly occur within the WFA (Table 5-13). Suspected to fly at heights within RSA. Only one mortality recorded in carcass monitoring from reviewed sources. Common species, considered to possibly occur on occasion. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%).
Botaurus poiciloptilus (Australasian Bittern)	EN (EPBC & BC Acts)	Foraging Roosting	-		Direct collision/ barotrauma	Unlikely	Medium	Low	No record from surveys, although considered to possibly occur within the WFA (Table 5-13). Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Known from Hardy Inlet ~12 km SW of the WFA and the Gingilup/Quitchup/Jasper wetlands ~30 km SE (dates of records unknown). Latter is an important wetland suite for the species. Potential for rare use of the larger wetlands in the WFA but unlikely a regular visitor or regularly transit through the WFA. WA population very small therefore any loss of individuals may have temporary impact on local population viability.
Calyptorhynchus banksii naso (Forest Red-tailed Black Cockatoo)	VU (EPBC & BC Acts)	Foraging Roosting Breeding NCS[2]	45 (159)	0-50 m	Direct collision/ barotrauma, Displacement, Habitat loss	Likely	Medium	Moderate	Recorded frequently in WFA in low numbers (mostly singles). A large flock (53 individuals) recorded west of WFA so may also occur in WFA in large flocks on occasion. Heights not recorded for many observations, mostly observed at or below tree height but 2 of 5 records at RSA height. No mortality monitoring data available for this species but there are no reported mortalities in carcass monitoring for surrogate species *Zanda funerea*. High and moderate quality foraging habitat in WFA. Foraging habitat also likely to be present in the excised

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
									areas in the centre of the WFA one of which is a conservation reserve. No known breeding or roost sites within BIA. Minor foraging habitat loss only. Small total population, pair bonding and slow breeding. Loss in numbers of individuals may lead to minor reduction in population viability for between one and 5 years.
Zanda baudinii (Baudin's Cockatoo)	EN (EPBC & BC Acts)	Foraging Roosting Breeding NCS[2]	7 (57)	0-25 m	Direct collision/ barotrauma, Displacement, Habitat loss	Likely	Medium	Moderate	Recorded frequently in WFA in low numbers (singles, small flocks). No records within the RSA of the WFA but suspected to fly at RSA height. No mortality monitoring data available for this species but there are no reported mortalities in carcass monitoring for surrogate species *Zanda funerea*. High and moderate quality foraging habitat in WFA. Foraging habitat also likely to be present in the excised areas in the centre of the WFA one of which is a conservation reserve. Minor foraging habitat loss only. No known breeding sites within BIA but 2 known *Zanda* sp. roosts located within 12 km of the WFA; black cockatoos known to forage in areas up to 20 km from night roosting habitat during the non-breeding season. Small total population, pair bonding and slow breeding. Loss in numbers of individuals may lead to minor reduction in population viability for between one and 5 years.

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
Zanda latirostris (Carnaby's Cockatoo)	EN (EPBC & BC Acts)	Foraging Roosting Breeding NCS[2]	36 (150)		Direct collision/ barotrauma, Displacement, Habitat loss	Likely	Medium	Moderate	Recorded frequently in WFA, in low numbers (mostly singles). Recorded within the RSA of the WFA (2 records), though most recorded heights below the RSA. No mortality monitoring data available for this species but there are no reported mortalities in carcass monitoring for surrogate species *Zanda funerea*. High and moderate quality foraging habitat in WFA. Foraging habitat also likely to be present in the (excised) conservation reserve and covenant areas in the centre of the WFA. Minor habitat loss only. No known breeding sites within BIA but 2 known Zanda sp. roosts located within 12 km of the WFA; black cockatoos known to forage in areas up to 20 km from night roosting habitat during the non-breeding season. Small total population, pair bonding and slow breeding. Loss in numbers of individuals may lead to minor reduction in population viability for between one and 5 years.
Anarhynchus bicinctus (Double-banded Plover)	Mig. (EPBC & BC Acts)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although may possibly occur within the WFA on very rare occasion (Table 5-13). Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Utilises terrestrial wetlands and pasture near the coast but rarely occurs in WA. Previous desktop records within 10 km of WFA but old (1979-80). Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%).

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
Anarhynchus mongolus (Siberian Sand Plover)	EN/Mig. (EPBC Act); EN (BC Act)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although may possibly occur within the WFA on rare occasion (Table 5-13). Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Utilises terrestrial wetlands and pasture near the coast but rarely occurs in WA. Previous old (1980) desktop record within 10 km of WFA but mainly uses coastal habitats such as beaches, mudflats and sandflats. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%).
Pluvialis fulva (Pacific Golden Plover)	Mig. (EPBC & BC Acts)	Foraging	-		Direct collision/ barotrauma	Potential	Insignificant	Negligible	No record from surveys, although considered to possibly occur within the WFA (Table 5-13). Desktop records all SW of the WFA associated with the Hardy Inlet and Scott River. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Mainly uses coastal habitats. Potential for occasional use of the larger wetlands in the WFA but unlikely a regular visitor to the WFA when present in the region, noting very limited overlap between species arrival in region (December) and persistence of suitable foraging habitat in the WFA. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%).
Pluvialis squatarola (Grey Plover)	VU/Mig. (EPBC Act); Mig. (BC Acts)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although may possibly occur within the WFA on rare occasion (Table 5-13). Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Mainly utilises coastal habitats but potential for rare use of wetlands/paddocks in WFA. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%).

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
Falco peregrinus (Peregrine Falcon)	OS (BC Act)	Foraging	1 (1)	26-50 m	Direct collision/ barotrauma	Potential	Insignificant	Negligible	Recorded in WFA only once across all surveys. Recorded flying at height within RSA of the WFA. Recorded mortalities in carcass monitoring from reviewed sources. WFA considered foraging habitat within a resident bird's home range. Unlikely to nest in WFA. Several desktop records, nearly all SW of the WFA, mainly associated with the Hardy Inlet and Scott River. Individuals/pairs may hunt in the WFA on occasion as part of their large home range, and or transit through. Potential for rare loss of individuals but unlikely to lead to reduction in population viability.
Hydroprogne caspia (Caspian Tern)	Mig. (EPBC & BC Acts)	None	6 (62)		Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although may possibly occur within the WFA on rare occasion (Table 5-13). Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Previous desktop record within 10 km of WFA . Known to utilise near-coastal terrestrial wetlands. May occur as a visitor but the wetlands present in the WFA are too shallow to provide the species' preferred food source (fish). Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%).
Motacilla cinerea (Grey Wagtail)	Mig. (EPBC & BC Acts)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although may possibly occur within the WFA on rare occasion (Table 5-13). Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. No previous desktop records within 10 km of WFA. Occurs in a wide range of habitats. Potential for rare loss of individuals but no reduction in population viability.

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
Actitis hypoleucos (Common Sandpiper)	Mig. (EPBC & BC Acts)	Foraging	-		Direct collision/ barotrauma	Potential	Insignificant	Negligible	No record from surveys, although considered to possibly occur within the WFA (Table 5-13). Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Most desktop records associated with the Hardy Inlet SW of the study area. Does not form large flocks (mainly occurs singly or in pairs). Potential for occasional use of the larger wetlands in the WFA, but unlikely a regular visitor or regular transit through the WFA when present in the region. Limited overlap between species arrival (September-October) and when wetlands in WFA have suitable foraging habitat. Potential for rare loss of individuals / undetectable loss of EAAF population over 10 years (<0.005%).
Calidris acuminata (Sharp-tailed Sandpiper)	VU/Mig. (EPBC Act); Mig. (BC Act)	Foraging	1 (40)		Direct collision/ barotrauma	Potential	Insignificant	Negligible	Recorded in survey only from Regional site. Record is from Hardy Inlet in much more suitable and extensive habitat than WFA. Considered to possibly occur within the WFA (Table 5-13). Desktop records all SW of the WFA associated with Hardy Inlet and Scott River, with one record from the artificial wetlands west of the WFA. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. May arrive in Augusta area from September. Potential for occasional occurrence in the WFA, but unlikely a regular visitor or regular transit through the WFA when present in the region. Limited overlap between species arrival and when wetlands/paddocks in WFA have suitable foraging habitat. Potential for rare loss of individuals / undetectable loss of EAAF population over 10 years (<0.005%).

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
Calidris falcinellus (Broad-billed Sandpiper)	Mig. (EPBC & BC Acts)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although may possibly occur within the WFA on rare occasion (Table 5-13). Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Mainly utilises coastal habitats but occasional records from swamps and lakes so potential for rare use of wetlands in WFA. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%).
Calidris ferruginea (Curlew Sandpiper)	CR/Mig. (EPBC Act); CR (BC Act)	Foraging	-		Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although considered to possibly occur within the WFA (Table 5-13). Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Desktop records nearly all SW of the WFA associated with Hardy Inlet, which aligns with its preferred foraging habitats. Desktop records indicate arrival from September. Potential for occasional use of paddocks, wetland habitats in the WFA, but unlikely a regular visitor or regular transit through the WFA when present in the region. Limited overlap between species arrival and when wetlands/ paddocks in WFA have suitable foraging habitat. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%).
Calidris melanotos (Pectoral Sandpiper)	Mig. (EPBC & BC Acts)	Foraging	-		Direct collision/ barotrauma	Potential	Insignificant	Negligible	No record from surveys, although considered to possibly occur within the WFA (Table 5-13). Desktop records just outside the BIA SW of the WFA on the Hardy Inlet. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Arrives in the southwest in spring. Potential for occasional use of paddocks, wetland habitats in the WFA, but unlikely

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
									a regular visitor or regular transit through the WFA when present in the region. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%).
Calidris ruficollis (Red-necked Stint)	Mig. (EPBC & BC Acts)	Foraging	2 (72)		Direct collision/ barotrauma	Potential	Insignificant	Negligible	Recorded in survey only from Regional site. Records are from Hardy Inlet in much more suitable and extensive habitat than WFA. Desktop records also mainly SW of the WFA, associated with Hardy Inlet. Considered to possibly occur within the WFA (Table 5-13). Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Arrives in the southwest in spring. Potential for occasional use of paddocks, wetland habitats in the WFA, but unlikely a regular visitor or regular transit through the WFA when present in the region. Potential for rare loss of individuals / undetectable loss of EAAF population over 10 years (<0.005%).
Calidris tenuirostris (Great Knot)	VU/Mig. (EPBC Act); CR (BC Act)	Foraging	-	-	Direct collision/ barotrauma	Potential	Insignificant	Negligible	No record from surveys, although may possibly occur within the WFA on very rare occasion (Table 5-13). Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Old (1980) desktop records within 10 km of the WFA from near the artificial wetlands. Occurs mostly in coastal intertidal habitats, but rare use of swamps. Potential presence in the WFA is considered likely very rare. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%).

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
Limosa lapponica (Bar-tailed Godwit)	Mig. (EPBC & BC Acts)	Foraging	1 (1)		Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although may possibly occur within the WFA on very rare occasion (Table 5-13). Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Old (1980) desktop records within 10 km of the WFA from near the artificial wetlands and at Blackwood River. Occurs mostly in coastal habitats but occasionally observed at inland wetlands and paddocks. Potential presence in the WFA is considered likely very rare. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%).
Limosa limosa (Black-tailed Godwit)	EN/Mig. (EPBC Act); Mig. (BC Act)	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although may possibly occur within the WFA on very rare occasion (Table 5-13). Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Old (1980) desktop records within 10 km of the WFA from near the artificial wetlands. Occurs mostly in coastal habitats but occasionally uses near-coastal wetlands and floodplains. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%).
Tringa brevipes (Grey-tailed Tattler)	Mig. (EPBC and BC Acts); P4 DBCA list	Foraging	-	-	Direct collision/ barotrauma	Unlikely	Insignificant	Negligible	No record from surveys, although may possibly occur within the WFA on very rare occasion (Table 5-13). Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Old (1981) desktop records within 10 km of the WFA. Occurs mostly in coastal habitats but occasionally observed at near-coastal wetlands. Potential presence in the WFA is considered likely very rare.

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
									Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%).
Tringa glareola (Wood Sandpiper)	Mig. (EPBC & BC Acts)	Foraging	1 (3)	0-25 m	Direct collision/ barotrauma	Potential	Insignificant	Negligible	Three individuals recorded in a single observation within the WFA, across all surveys. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Limited desktop records (only 2 just west of WFA). Mainly occurs singly, in pairs or small flocks. Arrives in southwest in spring, though more common from summer to autumn when habitat in WFA mainly unsuitable (largely dried out). Occasional use of wetlands in WFA and transit through WFA by small numbers of birds. Potential for rare loss of individuals/undetectable loss of EAAF population over 10 years (<0.005%).
Tringa nebularia (Common Greenshank)	EN/Mig. (EPBC Act); Mig. (BC Act)	Foraging	-		Direct collision/ barotrauma	Potential	Insignificant	Negligible	No record from surveys, however considered likely to occur within the WFA (Table 5-13). Desktop records within 10 km of WFA. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Desktop records all SW of the WFA, mainly associated with Hardy Inlet, Scott River, but also recorded from the artificial wetlands directly west of the WFA. Arrives in the southwest in early spring. Occasional use of the paddocks/wetland habitats in the WFA.

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
									Potential for rare loss of individuals but undetectable loss of EAAF population over 10 years (<0.005%).
Tringa stagnatilis (Marsh Sandpiper)	Mig. (EPBC & BC Acts)	Foraging	-		Direct collision/ barotrauma	Potential	Insignificant	Negligible	No records from surveys, although considered to possibly occur within the WFA (Table 5-13). Suitable habitat present in the WFA when they arrive in early spring. Suspected to fly at heights within RSA. No mortalities recorded in carcass monitoring from reviewed sources. Limited desktop records, SW of WFA at Augusta. Occasional use of paddocks, wetland habitats in the WFA. Potential for rare loss of individuals / undetectable loss of EAAF population over 10 years (<0.005%).
Tyto novaehollandiae novaehollandiae (Masked Owl (southwest))	P3 (DBCA list)	Foraging Roosting Breeding	2 (2)	NR[3]	Direct collision/ barotrauma, Displacement	Unlikely	Insignificant	Negligible	Recorded at 2 locations outside the WFA, as singles. Only likely to fly at RSA heights when displaying courtship over a prospective nest site of which none are present in study area. Unlikely to fly within RSA while hunting. No mortality monitoring data available for this species. No other Masked Owl mortalities from reviewed sources. May hunt in woodland habitats of the study area and transit through but not likely to utilise extensively. Potential for rare loss of individuals but unlikely to lead to reduction in population viability.

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
Falsistrellus mackenziei (Western False Pipistrelle)	P4 (DBCA list)	Foraging Roosting Breeding	Low	NR[3]	Direct collision/ barotrauma	Potential	Minor	Low	Infrequently detected in WFA and low number of calls (1 mean detection per night). Suspected to fly at heights within RSA. No mortality monitoring data available for this species but there are reported mortalities in carcass monitoring for closely related species Falsistrellus tasmaniensis. Consistent single detections suggest rare/occasional movement through cleared habitats between remnant patches, and thus foraging typically close to vegetation, rather than open paddocks. May possibly roost and breed in best examples of MJP woodland, where the PNT assessment (Phoenix 2025a) recorded most trees with hollows, many of which would be considered suitably sized to support the species. Occasional loss of small numbers of individuals possible but unlikely to lead to reduction in local population viability.

[1]No. records (no. individuals) for birds; activity level for bats (see section 3.2.2). [2]Breeding NCS – study area contains PNTs but none with hollows currently suitable for breeding. [3]NR – not recorded; species detected via audio recording only.

Table 6-3 Risk assessment for other potential species of concern

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
Aquila audax (Wedge-tailed Eagle)	Not listed	Foraging Roosting Breeding	37 (50)		Direct collision/ barotrauma	Almost certain	Minor	Low	Frequently recorded in WFA, as singles/pairs. Frequently recorded flying at heights within RSA. Recorded high mortalities (>100) in carcass monitoring from reviewed sources. Lower avoidance rate than other raptors. Likely uses the WFA regularly for foraging. Potential for breeding but no known nest sites in WFA. Loss of individuals likely but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability.
Circus approximans (Swamp Harrier)	Not listed	Foraging Roosting Breeding	57 (66)		Direct collision/ barotrauma	Almost certain	Minor	Low	Frequently recorded in WFA, as singles/pairs. Frequently recorded flying at RSA heights. Recorded moderate mortalities (10 - 100) in carcass monitoring from reviewed sources. Likely uses the WFA regularly for foraging. Potential for breeding but no known nest sites in WFA. Occasional loss of individuals likely but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability.
Elanus axillaris (Black-shouldered Kite)	Not listed	Foraging Roosting Breeding	4 (4)		Direct collision/ barotrauma	Potential	Minor	Low	Infrequently recorded in WFA, as singles. Recorded flying at RSA height. Recorded moderate mortalities (10 - 100) in carcass monitoring from reviewed sources. Likely to forage in WFA. Potential for breeding but no known nest sites in WFA. Widespread, abundant species. Occasional loss of individuals likely but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability.

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
Haliaeetus leucogaster (White-bellied Sea-Eagle)	Not listed	Foraging	2 (2)		Direct collision/ barotrauma	Potential	Insignificant	Negligible	Only one record in WFA of a bird flying over. Recorded flying at RSA height. Only one recorded mortality in carcass monitoring from reviewed sources. Mostly occurs in coastal habitats. May hunt for waterbirds in the WFA on occasion, or transit through but no breeding and unlikely to be a regular visitor. Territorial and occur sparsely across their range. Rare loss of individuals possible but reduction in population viability unlikely.
Haliastur sphenurus (Whistling Kite)	Not listed	Foraging Roosting Breeding	8 (9)		Direct collision/ barotrauma	Potential	Insignificant	Negligible	Infrequently recorded in WFA, as singles, one pair. Recorded flying at heights within RSA. Recorded low mortalities (<10) in carcass monitoring from reviewed sources. Likely to forage in WFA. Potential for breeding but no known nest sites in WFA. Rare loss of individuals possible but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability.
Hieraaetus morphnoides (Little Eagle)	Not listed	Foraging Roosting Breeding	3 (3)		Direct collision/ barotrauma	Potential	Insignificant	Negligible	Infrequently recorded in WFA, as singles. Recorded flying at RSA height. Recorded low mortalities (<10) in carcass monitoring from reviewed sources. Likely to forage in WFA. Potential for breeding but no known nest sites in WFA. Rare loss of individuals possible but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability.
Tachyspiza cirrocephala (Collared Sparrowhawk)	Not listed	Foraging Roosting Breeding	4 (4)		Direct collision/ barotrauma	Potential	Insignificant	Negligible	Infrequently recorded in WFA, as singles. Recorded flying at heights within RSA. Recorded low mortalities (<10) in carcass monitoring from reviewed sources. Highly manoeuvrable species. Likely to forage in WFA. Potential for breeding but no known nest sites in WFA. Rare loss of individuals possible but is a widespread, abundant species,

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
									therefore unlikely to lead to reduction in population viability.
Tachyspiza fasciata (Brown Goshawk)	Not listed	Foraging Roosting Breeding	6 (7)		Direct collision/ barotrauma	Potential	Minor	Low	Infrequently recorded in WFA, as singles, one pair. Recorded flying at heights within RSA. Recorded moderate mortalities (10 - 100) in carcass monitoring from reviewed sources. Likely to forage in WFA. Potential for breeding but no known nest sites in WFA. Occasional loss of individuals possible but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability.
Falco berigora (Brown Falcon)	Not listed	Foraging Roosting Breeding	17 (21)		Direct collision/ barotrauma	Almost certain	Minor	Low	Frequently recorded in WFA, as singles, pairs. Recorded flying at heights within RSA. Recorded high mortalities (>100) in carcass monitoring from reviewed sources. Relatively heavy slow flight. Likely to forage in WFA regularly. Potential for breeding but no known nest sites in WFA. Occasional loss of individuals likely but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability.
Falco cenchroides (Australian Kestrel)	Not listed	Foraging Roosting Breeding	47 (58)		Direct collision/ barotrauma	Almost certain	Minor	Low	Frequently recorded in WFA, as singles, pairs. Recorded flying at heights within RSA. Recorded high mortalities (>100) in carcass monitoring from reviewed sources. Observed foraging in WFA and likely to hunt there regularly. Potential for breeding but no known nest sites in WFA. Loss of individuals likely but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability.
Falco longipennis (Australian Hobby)	Not listed	Foraging Roosting Breeding	3 (4)		Direct collision/ barotrauma	Potential	Insignificant	Negligible	Infrequently recorded in WFA, as singles, one pair. Recorded flying at height within RSA. Only 1 mortality in carcass monitoring from reviewed sources. Occasional foraging in WFA likely but not a regular inhabitant.

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
									Potential for breeding but no known nest sites in WFA. Rare loss of individuals possible but is a widespread, abundant species, therefore unlikely to lead to reduction in population viability.
Austronomus australis (White-striped Free-tailed Bat)	Not listed	Foraging Roosting Breeding	High		Direct collision/ barotrauma	Almost certain	Minor	Low	Activity levels highest within the WFA. Second highest total number of calls recorded, overall. Largely absent in winter and autumn. Suspected to fly at heights within RSA. Recorded high mortalities (>100) in carcass monitoring from reviewed sources. Often represents the species with highest documented mortality. Loss in numbers of individuals likely but is a widespread and relatively abundant species in the WFA and surrounds, therefore unlikely to lead to reduction in population viability.
Chalinolobus gouldii (Gould's Wattled Bat)	Not listed	Foraging Roosting Breeding	Low		Direct collision/ barotrauma	Potential	Insignificant	Negligible	Low activity levels in WFA and BIA, all year. Suspected to fly at heights within RSA. Recorded moderate mortalities (10 - 100) in carcass monitoring from reviewed sources. Rare loss of individuals due to low activity in WFA, reduction in population viability unlikely.
Chalinolobus morio (Chocolate Wattled Bat)	Not listed	Foraging Roosting Breeding	Low		Direct collision/ barotrauma	Potential	Insignificant	Negligible	Low activity levels in WFA and BIA overall. Far more active in summer by a factor of 10-20 compared with other seasons. Suspected to fly at heights within RSA. Recorded moderate mortalities (10-100) in carcass monitoring from reviewed sources. Rare loss of individuals due to low activity in WFA, reduction in population viability unlikely.
Nyctophilus geoffroyi (Lesser Long-eared Bat)	Not listed	Foraging Roosting Breeding	Low		Direct collision/ barotrauma	Potential	Insignificant	Negligible	Low activity levels in WFA and BIA, all year. Suspected to fly at heights within RSA. Recorded moderate mortalities (10 - 100) in carcass monitoring from reviewed sources. Rare loss of individuals due to low activity in WFA, reduction in population viability unlikely.

Species	Cons. status	Potential use in WFA	No records/ detects (birds) Activity level (bats)[1]	Rec. flight height range	Potential impact	Likelhd.	Conseq.	Risk rating	Justification
Nyctophilus holtorum (Holt's Long-eared Bat)	Not listed	Foraging Roosting Breeding	Low		Direct collision/ barotrauma	Potential	Insignificant	Negligible	Low activity levels in WFA and BIA, present in summer and autumn only. Suspected to fly at heights within RSA. No data found on wind farm mortalities but was previously classified within C. gouldii (Parnaby *et al.* 2021) therefore assume similar mortality risk to this species (moderate mortalities). Rare loss of individuals due to low activity in WFA, reduction in population viability unlikely.
Nyctophilus major (Greater Long-eared Bat)	Not listed	Foraging Roosting Breeding	Low		Direct collision/ barotrauma	Potential	Insignificant	Negligible	Low activity levels in WFA and BIA, all year, almost absent in winter. Suspected to fly at heights within RSA. No data found on wind farm mortalities. Rare loss of individuals due to low activity in WFA, reduction in population viability unlikely.
Vespadelus regulus (Southern Forest Bat)	Not listed	Foraging Roosting Breeding	Mod. (WFA) High (BIA)		Direct collision/ barotrauma	Almost certain	Minor	Low	Moderate activity levels in the WFA and high activity levels in the BIA. Highest total number of calls recorded, but also highest number of detections, so activity lower than for A. australis. Active all seasons. Suspected to fly at heights within RSA. Recorded moderate mortalities (10-100) in carcass monitoring from reviewed sources. Loss in numbers of individuals likely but is a widespread and relatively abundant species in the WFA and surrounds, therefore unlikely to lead to reduction in population viability.

[1]No. records (no. individuals) for birds; activity level for bats (see section 3.2.2).

7 DISCUSSION

This report documents the results of the two-year BBRAS, commencing in autumn 2023 and finishing in autumn 2025. Most analyses presented in this report (Section 5) have focused on the data collected in the fixed-point counts (birds) and 'ultrasonic recordings' (bats) from the BBRAS survey sites. The risk assessment (Section 6) also incorporates results from the Basic and Targeted fauna survey undertaken for the Project, with respect to birds and bats, as this provided additional data for potential species of concern (Phoenix 2025a).

The survey work completed to date represents a bird and bat utilisation survey program equivalent to a Level Two investigation in accordance with Brett Lane and Associates (2005). The risk assessment completed serves to evaluate the potential environmental impacts to birds and bats associated with the Project.

7.1 REGIONAL OVERVIEW

The climate of the WFA is moderate Mediterranean, with a strong seasonal rainfall gradient where over 65% of annual rainfall occurs between May and August each year. As such, the WFA has a distinct wet-dry regime over the course of a year. For around 3–4 months of the year (May–August), surface water is present across much of the Cleared areas, which essentially act as flooded grassland habitat, but which dissipates rapidly thereafter. Many of the wetlands retain surface water into spring, with at least one wetland, located south of Governor Broome Road, retaining water into summer and possibly permanently. This hydrologic regime is not as evident in the assemblage data as would be expected.

The study area is situated in a region of high floristic diversity (Phoenix 2025b) and is surrounded by a variety of bird and bat attracting landscape features/habitats, some occurring within the BIA outside the WFA boundary, such as dense forests (some of which are preserved in State Forest and National Park) and regionally important rivers (such as the Blackwood River and associated Hardy Inlet, and Scott River). Forest and woodland vegetation complexes mapped in the BIA (DBCA 2018) contain black cockatoo foraging, nesting and roosting plant species (e.g. *Acacia saligna*, *Agonis flexuosa*, *Banksia attenuata*, *B. grandis*, *B. littoralis*, *C. calophylla*, *E. marginata*, *E. patens* and *E. megacarpa*).

There are a number of ESAs associated with Threatened flora, TECs and wetlands, and a PEC present either in the WFA or the wider BIA. Artificial wetlands are present immediately west of the WFA which contain desktop records for a diversity of birds, including several conservation significant species in low numbers that were not recorded in this survey (Ninox 2011). There are no RAMSAR sites or internationally important wetlands located within the BIA; however, the 'Blackwood River (Lower Reaches) and Tributaries System' located ~4.5 km west of the WFA at its closest point (within the BIA) is listed as a nationally important wetland. The WFA is situated at the junction of 3 regional ecological linkages (Molloy *et al.* 2009a).

The topography of the WFA is generally flat to undulating. There are no outstanding topographic features that may cause updraft areas for soaring birds for example (though many soaring bird observations were made), or unique nesting opportunities, such as on cliffs tops or faces. This is important as the availability of nesting resources is often the limiting factor for raptor breeding, such as for Wedge-tailed Eagle, Peregrine Falcon and Osprey.

The regional overview found a diverse bird and bat assemblage as potentially occurring (199 and 7 species, respectively), that included 58 conservation significant birds and one conservation significant bat. Most of the conservation significant birds were listed as Migratory under the EPBC Act and/or BC Act. Three conservation significant species, the 3 Threatened black cockatoo species, had previously been recorded within the WFA (Figure 4-7), although the nature of how the cockatoos were using the site was not noted in the desktop records.

Fauna habitat mapping generated from the Detailed flora and vegetation survey (Phoenix 2025b) and the Basic and Targeted fauna survey (Phoenix 2025a) found 10 fauna habitat types in the WFA, including 3 wetland habitats, 2 woodlands and 5 highly modified habitats (comprising cleared areas, plantations and dams), with 68.7% of the WFA mapped as Cleared areas. The native habitats largely align with the habitats described for the Warren bioregion in which the majority of the WFA is located (May & McKenzie 2003).

7.2 FIELD SURVEY RESULTS

The fixed-point counts from the BBRAS field surveys recorded 96 bird species, which represents 49% of those identified in the desktop review. Eight bat species were recorded, which is one more than identified in the desktop review.

Despite the variety of habitats present in the WFA, and the BIA more broadly, just 6 of the 58 conservation significant birds from the regional overview were detected in the WFA during the surveys, including 5 in this BBRAS survey and Wood Sandpiper (Mig.) only during the Basic and Targeted fauna surveys Phoenix (2025a). The 3 Threatened black cockatoo species, Forest Red-tailed Black Cockatoo (VU), Baudin's Cockatoo (EN) and Carnaby's Cockatoo (EN), including those where the species could not be determined) were overwhelmingly the dominant conservation significant species recorded, collectively contributing 98% of such records in the WFA. All 3 black cockatoo species were directly observed feeding and were recorded from old feeding debris. However, while the PNT assessment conducted as part of the Basic and Targeted fauna survey (Phoenix 2025a) identified PNTs with hollows suitable for breeding in the WFA, no evidence of roosting or breeding was recorded.

The remaining 3 significant birds recorded in the WFA, Wood Sandpiper (Mig.), Osprey (Mig.) and Peregrine Falcon (OS), were all recorded from single observations, suggesting they are uncommon in the WFA. For Osprey and Peregrine Falcon, the data suggests the WFA forms a portion of a much larger home range and that breeding is taking place outside the WFA. This is supported by multiple records of Osprey that were obtained from the Regional reference sites at the Hardy Inlet. Another conservation significant bird, Masked Owl (southwest; P3), was recorded outside but near to the WFA, again only in low numbers (twice). One conservation significant bat species, Western False Pipistrelle, was recorded in the WFA, in this survey and Basic and Targeted fauna surveys Phoenix (2025a), from only 4 ultrasonic call detections.

Additional sites included in Year 2 of the BBRAS at the Hardy Inlet (Regional reference sites) recorded a further 7 conservation significant species (only at those sites), all Migratory. Five of these species were considered unlikely to occur within the WFA due to absence of suitable habitats and dietary preferences. The remaining 2 species, Sharp-tailed Sandpiper and Red-necked Stint may possibly occur in the WFA on occasion.

The likelihood of occurrence assessment for conservation significant species identified during the regional overview that were not detected during the surveys (see Section 5.3) determined an additional 2 conservation significant species to be likely to occur (1 Migratory species and one Priority species) on the basis of the proximity and recency of desktop records and presence of suitable habitat. Nine species were determined to possibly occur (all Migratory species, except for Australasian Bittern which is Endangered) and a further 10 were considered to possibly occur on rare occasion only.

In consideration of the survey records from 2 years of systematic bird surveys, the WFA supports few conservation significant bird species. Those that were recorded represent only a small portion of both the recorded bird assemblage and overall bird abundance. The various wetlands present, many of which retain water into the start of the migratory bird season were essentially absent Migratory species, with just the Wood Sandpiper being recorded, and only once. Banded Lapwing was the only 'shorebird' recorded (on 3 occasions) from wetland habitat; this species is not Migratory or otherwise conservation significant. Wetland habitats were instead found to support an array of ducks and

cormorants, and wading birds, such as Australian White Ibis, Straw-necked Ibis, and rarely Royal Spoonbill and Yellow-billed Spoonbill. The various remnant woodlands in the WFA, with their larger array of flowering plants were the habitats of primary value, as they support feeding for the 3 black cockatoo species.

As shown in section 5.1.2 the 10 most abundant species collectively represented 73.6% of the overall abundance of birds and the top 20 species represented 86.2%. Throughout the year Straw-necked Ibis and Australian White Ibis were pervasive, with small and large flocks regularly seen foraging in paddocks, or moving within, and in and out of, the WFA. Australian Raven was seen moving between sites and many nests were seen in degraded Peppermint woodlands and MJP woodland. Tree Martins, Australian Ringneck, Yellow-rumped Thornbill and Willie Wagtail dominated the records in open paddocks at or near ground-level often coming in close to observers. Pacific Black Duck and Australian Shelduck were commonly observed foraging in flooded paddocks over winter–spring months and in the wetlands for the remainder of the year. All 10 are species that are advantaged by modified habitats. Bird diversity and abundance did not correlate with seasons or the amount of standing water in the WFA (Figure 5-2).

Importantly, the wet period only partially overlaps the arrival of EAAF Migratory species, which start arriving in southwest WA in late spring, at which point the modified floodplain has dried (or is close to dry), but which would likely attract several Migratory species if it remained inundated. Further, despite the pronounced wet period where large areas of flooded grasslands are present, no overwintering Migratory bird species have been observed to date. Some of the basin wetlands (particularly those with a canopy of *Melaleuca* species) remain inundated through to early summer when Migratory species have arrived; however, they do not appear to be utilised by these species, with only a single species (Wood Sandpiper) being observed (3 individuals from single observation) during the Basic and Targeted fauna survey (Phoenix 2025a). It is considered most likely that the wetlands simply are not productive enough, or do not support the preferred food sources of many of the Migratory shorebirds.

Notwithstanding the above, minor incursions of Migratory species to the basin wetlands are likely to occur from time to time. The data therefore suggests that despite the abundance of 'wetland' habitats that could be expected to support a range of Migratory species, the inundation cycle, low productivity and available food sources precludes their presence, and instead the largely highly-modified environment favours species that respond positively to such environments, such as Pacific Black Duck, Australian Shelduck, Black Swan, and to a lesser extent species of cormorant and heron.

Bird flight height and direction of travel data was captured so that movements could be analysed within the context of the proposed turbine locations and modelled against the RSA airframe in support of any future collision risk modelling. The flight height and direction data however showed no clear trends, with movement N–S and E–W being fairly well balanced (Table 5-5). Further, movements, such as between habitat patches or into and out of the WFA were limited, being just 7.7% of all 2,634 observations. Therefore, the utility and importance of the WFA as a linkage between the large tracts of forest to the north and east, the Hardy Inlet at Augusta and the Proteaceous woodlands and shrublands to the south is not strongly supported. The data and general observations do however more strongly support the assumption that the habitats within the WFA, particularly the north-south chain of remnant bushland and wetlands (largely in the central area) act as internal stepping stones for small-moderate bush birds, such as Australian Raven, Australian Ringneck, Willie Wagtail, Australian Magpie, White-fronted Chat and Grey Butcherbird, which were regularly seen crossing paddocks from one remnant to the next. Raptors were observed hunting from <10 m to 800 m above ground-level, moving over open paddocks and remnants. Raptors comprised the two Orders most recorded within the RSA height range and had the highest mean flight height (Appendix 6). The importance of remnants in the maintenance of biodiversity and as stepping stones in agricultural landscapes for birds (and bats) is well documented (Arnold *et al.* 1987; Bentley & Catterall 1997;

Collard *et al.* 2009; Donald & Evans 2006; Fischer & Lindenmayer 2002a, b; Johnson *et al.* 2007; Major *et al.* 2001).

7.3 RISK ASSESSMENT

Four potential impacts to birds and bats arise from wind farms, including habitat loss, mortality or injury from collision with wind turbine blades, and alienation or displacement leading to disruption to feeding or breeding behaviour (Table 6-1). In consideration of these potential impacts a risk assessment was undertaken for all conservation significant species recorded or considered likely or potentially occurring (Table 6-2), as well as for all other potential species of concern, that is, non-conservation significant species that are particularly vulnerable to collision risk due to their morphology, behaviour, flight type and/or habitat use (i.e. birds of prey and bats; Table 6-3).

The assessment found no species to be at high risk from the Project, but 3 species to be at moderate risk, Forest Red-tailed Black Cockatoo, Baudin's Cockatoo and Carnaby's Cockatoo. The risk profile and reasoning was similar for all 3 black cockatoo species: all were recorded on multiple occasions in the WFA and within the RSA (except Baudin's Cockatoo), they all have small total population estimates, are slow breeding and display strong pair bonding. No mortality monitoring data was available for these species; however, the related *Zanda funerea* from south-eastern Australia, which may be considered a suitable surrogate due morphological, habitat and movement characteristics, had no reported mortalities from the reviewed literature sources. However, both Forest Red-tailed Black Cockatoo and Carnaby's Cockatoo were recorded flying at heights within the RSA of the WFA, but only twice each. This is similar to the results of (BCE 2025) which found just 1.9% of Carnaby's Cockatoo flights were above 18 m (within the original RSA) and that increasing the minimum rotor height to 50 m would reduce the number of flight within the RSA to 0.13%. (BCE 2025) also notes personal observations of Carnaby's Cockatoo adjusting flight heights as they approach turbines, perhaps suggested a learnt behaviour response.

While Baudin's Cockatoo was not recorded at RSA heights, it is suspected to reach RSA heights on occasion. Given that, and the lack of species-specific data on turbine strike risk for the 3 WA species, a precautionary assessment is warranted. It is noted that the RSA flight heights for Forest Red-tailed Black Cockatoo and Carnaby's Cockatoo were limited to the lowest RSA category of 26-50 m.

The mortality risk for the 3 black cockatoo species is reduced by the relatively low numbers recorded in the WFA, considering the number of sampling phases, survey effort and duration of the survey program. The abundance data indicates that their local populations are small and any mortality experienced is unlikely to have a significant impact on the total population, with the risk assessment finding potential for minor reduction in population viability for between one and 5 years from loss of individuals from turbine strike. The risk is also reduced by the lack of breeding or roosting sites within the WFA or wider BIA. While there is high and moderate quality foraging habitat in WFA, the proposed cleared of the small amount (<1 ha) of this habitat is unlikely to affect the local populations when extensive suitable foraging habitat is present outside the WFA.

Risk was assessed as negligible for the remaining 4 conservation significant bird species recorded in the WFA (Wood Sandpiper, Osprey, Peregrine Falcon) or wider BIA (Masked Owl (southwest)). Direct collision with turbine blades is considered the primary potential impact to these species but they are considered at negligible risk principally because they were recorded so rarely (once or twice each) and as single birds (Osprey, Peregrine Falcon, Masked Owl) or small groups (Wood Sandpiper, flock of 3), indicating likely only occasional occurrence in the WFA. Even for the 2 species recorded at RSA heights (Osprey and Peregrine Falcon), their limited presence and lack of breeding on site means the associated risk from the proposed wind farm is negligible.

The risk assessment for Western False Pipistrelle (P4), the only conservation significant bat species detected, determined that the proposed wind farm represents a low risk to this species. This species

was the least recorded bat species. Direct turbine blade strike is again considered the most likely impact from the Project; however, it is noted that the literature suggests it typically stays close to remnant vegetation, rarely venturing out into open paddocks. This is supported by the survey data, of the 6 recorded sites, only one is in open paddock, and was located between a cluster of remnants. The other 5 sites were in or at the edge of larger native remnants or roadside remnants. A precautionary approach has been taken as so little is known of this species, therefore, it has been assumed the species will fly at RSA heights and so has the potential to be at strike-risk, but due primarily to the lack of knowledge was determined to be at low risk, rather than negligible risk.

The Australasian Bittern (EN), which was also rated low risk. It was not recorded within the WFA or wider BIA, despite audio recordings taken at suitable habitat through the breeding season (Phoenix 2025a). However, it has been reported from Hardy Inlet (12 km west) and Gingilup/Quitchup/Jasper wetlands (~30 km SE) and limited information was available on the local population distribution. As the WA population of Australasian Bittern is very small, any loss of individuals may have a temporary impact on local population viability. Given this, and because of its potential to occasionally use the larger wetlands in the WFA and potentially fly within the height of the RSA, it was assigned a risk rating of low.

For the 2 undetected conservation significant species considered likely to occur (Blue-billed Duck, P4 and Common Greenshank, Mig.) the risk was determined to be negligible. For Blue-billed Duck there are no records from the WFA and no mortalities have been reported from carcass monitoring. Similarly, Common Greenshank has no records in the WFA, however suitable habitat is present in the form of flooded paddocks and wetlands. No mortalities have been reported in carcass monitoring and its population size means losses would be expected to be undetectable.

The risk to the 18 additional undetected conservation significant species considered to possibly occur, or possibly occur on rare occasion, was also found to be negligible. Most of these are Migratory shorebirds, many of which largely favour marine/intertidal habitats but cannot be discounted from occurring on occasion, with none considered likely to utilise the WFA on a regular basis during the Migratory shorebird season. The 2 non-shorebird species, Fork-tailed Swift and Grey Wagtail, are typically more northern species and their presence in the desktop is a function of 'modelled distribution' rather than actual records.

Curlew Sandpiper (CR, Mig.) Sharp-tailed Sandpiper (VU, Mig.) have not been recorded close to the WFA in a long time (1979/1980) from the adjacent artificial wetlands. All other records are from to the Hardy Inlet. Inland freshwater wetlands are not their preferred habitats, but they will use them on occasion in southwest WA. As such the risk to these two species is negligible.

For the non-significant bird species of concern (11 raptor species; Wedge-tailed Eagle, Swamp Harrier, Black-shouldered Kite, White-bellied Sea-Eagle, Whistling Kite, Little Eagle, Collared Sparrowhawk, Brown Goshawk, Brown Falcon, Australian Kestrel and Australian Hobby) the risk assessment found the risk to be low to negligible. While the likelihood of a collision for the majority of those 11 species ranged from potential to almost certain, the consequence of strike was considered insignificant to minor as the loss of small numbers of individuals is unlikely to impact local and regional populations. Those individuals would be readily replaced by individuals already occupying the abundant habitat available outside the WFA.

The preliminary risk assessment for non-significant bats found the risk to be negligible for 5 of the 7 species present (Gould's Wattled Bat, Chocolate Wattled Bat, Lesser Long-eared Bat, Holt's Long-eared Bat and Greater Long-eared Bat). Southern Forest Bat and White-striped Free-tailed bat were found to be at low risk. Similarly to the non-significant bird species of concern, the likelihood of collision for these species ranged from potential to almost certain; and the consequence of collisions was considered insignificant to minor. For the Southern Forest Bat and White-striped Free-tailed bat the

consequence was assessed as minor due to the combination of their higher activity level in the WFA and their high recorded mortality from reviewed sources.

Based on the flight heights recorded, the data suggests that increasing the minimum blade height to 50 m would reduce the total number of birds species recorded flying within the RSA from 52 to 24 species, a 54% reduction. This includes the 3 black cockatoos and Western False Pipistrelle but excludes raptors, which were often recorded flying above 50 m. Further, with the RSA minimum raised to 50 m, only 3.8% of all flight where height observations were recorded would be from within the RSA. As well as increasing the minimum RSA height, collision risk could be further reduced by limiting the concentration of turbines and increasing the separation distance of turbines from important habitat to maintain adequate open areas for bird and bat movement.

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Appendix 1 Survey site locations

BBRAS sites (current survey)

Site	Latitude	Longitude
BUS001	-34.22466	115.26917
BUS002	-34.26111	115.30009
BUS003	-34.23805	115.27883
BUS004	-34.22428	115.30666
BUS005	-34.21547	115.29346
BUS006	-34.18121	115.27773
BUS007	-34.23796	115.2892
BUS008	-34.19273	115.30802
BUS009	-34.19894	115.30008
BUS010	-34.24018	115.30199
BUS011	-34.25074	115.29583
BUS012	-34.25982	115.3251
BUS013	-34.20639	115.25518
BUS014	-34.16078	115.31235

Site	Latitude	Longitude
BUS015	-34.28284	115.28826
BUS016	-34.23337	115.27104
BUS018	-34.19148	115.28455
BUS019	-34.24013	115.32174
BUS020	-34.24712	115.27984
BUS025	-34.20266	115.29829
BUS026	-34.19817	115.31756
BUS027	-34.22569	115.31795
BUS030	-34.31733	115.17962
BUS031	-34.28922	115.17638
BUS032	-34.32004	115.16611
BUS033	-34.32238	115.17119
BUS034	-34.31655	115.18542
BUS035	-34.27017	115.29774

Basic and Targeted fauna survey sites (Phoenix 2025a) with bird/bat survey effort and/or bird/bat records

Site	Latitude	Longitude
AQU-01	-34.2475	115.2713
AQU-02	-34.2487	115.2761
AQU-03	-34.2495	115.2794
AQU-15	-34.1805	115.2805
AQU-18	-34.1852	115.2766
AQU-25	-34.1748	115.2828
AQU-28	-34.2349	115.3125
AQU-30	-34.2323	115.3077
AQU-39	-34.2578	115.2982
AQU-40	-34.2561	115.3021
AQU-45	-34.2311	115.2995
AQU-51	-34.2251	115.3052
AQU-53	-34.2267	115.3004
AQU-55	-34.207	115.3006
AQU-57	-34.1984	115.2935
AQU-Opp04	-34.2387	115.2695
BC2024_01	-34.1993	115.3148
BCForaging	-34.1994	115.3119
BCRoosting01	-34.1926	115.2777
BCRoosting03	-34.1985	115.3015
BCRoosting04	-34.2242	115.3068
BCRoosting05	-34.2402	115.3138
BCRoosting06	-34.2502	115.2801
BCRoosting07	-34.1982	115.3156
BCRoosting09	-34.2478	115.3156
BCRoosting10	-34.1738	115.291
BCRoosting11	-34.1766	115.2949
BCRoosting12	-34.2379	115.3231
BCRoosting13	-34.2443	115.3233

Site	Latitude	Longitude
BCRoosting14	-34.2619	115.2944
BCRoosting15	-34.1746	115.2741
BCRoosting16	-34.1927	115.3217
BCRoosting17	-34.2565	115.3011
BCRoosting18	-34.2243	115.3209
Bfalcon	-34.2402	115.2936
Birding01	-34.1971	115.3075
Birding02	-34.2285	115.3093
Birding03	-34.2426	115.3207
Black Cockatoos	-34.2593	115.2679
CarnabysCockies02	-34.1601	115.3133
FRTBC-01	-34.2379	115.3224
FRTBC-02	-34.2492	115.2843
FRTBC-03	-34.1994	115.3119
FRTBC-04	-34.2609	115.2702
FRTBC-05	-34.1875	115.2747
FRTBC-06	-34.1844	115.2825
Mowl01	-34.2597	115.2701
Opp06	-34.2166	115.2693
Opp07	-34.2138	115.2696
Opp11	-34.2343	115.2812
Opp12	-34.2001	115.3119
Opp13	-34.1875	115.321
Opp15	-34.1938	115.3221
Opp17	-34.21	115.282
Opp19	-34.1772	115.2804
Opp20	-34.2568	115.3016
Osprey	-34.2438	115.281
Raven01	-34.2377	115.3226

Site	Latitude	Longitude
SM4-01	-34.1998	115.3143
SM4-02	-34.1996	115.312
SM4-03 (failed)	-34.2375	115.3203
SM4-04	-34.2455	115.3215
SM4-05	-34.251	115.2829
SM4-06	-34.1919	115.2732
SM4-07	-34.192	115.2695
Tawny01	-34.2377	115.3223
VER-09	-34.2002	115.2949
VER-16	-34.2399	115.3064
VER-17	-34.2602	115.2697
VER-21	-34.2518	115.283
VER-22	-34.2505	115.2698
VER-30	-34.1598	115.2783
VER-31	-34.1613	115.3128
VER-32	-34.1569	115.4017
VER-33	-34.2296	115.3028
VER-35	-34.2308	115.2975
VER-36	-34.217	115.2886
VER-37	-34.2103	115.284

Site	Latitude	Longitude
VER-38	-34.2511	115.3038
VER-39	-34.2563	115.3021
VER-40	-34.2757	115.3051
VER-41	-34.2756	115.2922
VER-42	-34.2769	115.3021
VER-43	-34.2187	115.3099
VER-44	-34.2007	115.2671
VER-45	-34.1754	115.2838
VER-46	-34.1743	115.2803
VER-47	-34.1783	115.29
VER-49	-34.1832	115.2848
VER-Opp01	-34.2457	115.3229
VER-Opp04	-34.159	115.2781
VER-Opp07	-34.1743	115.2803
VER-Opp08	-34.1739	115.2933
WedgeyOpp	-34.1728	115.2743
Wetland01	-34.2513	115.3033
Wetland02	-34.2568	115.3023
Wetland03	-34.1803	115.2816
White-tail_Foraging	-34.1848	115.2819

Appendix 2 Survey site descriptions

Site details			
Site	**BUS001**	**Position (WGS84)**	115.2692, -34.2247
Slope	negligible	**Topography**	floodplain
Soil colour	black, brown	**Soil texture**	clay loam, sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary

Sample no.	Sample method	Date start	Date stop
1	Fixed-point count	24 May 2023	24 May 2023
1	Ultrasonic recording	24 May 2023	25 May 2023
1	Site description	24 May 2023	24 May 2023
1	Opportunistic sighting	24 May 2023	24 May 2023
1	Opportunistic sighting	24 May 2023	24 May 2023
2	Opportunistic sighting	25 May 2023	25 May 2023
2	Fixed-point count	25 May 2023	25 May 2023
3	Fixed-point count	14 Aug 2023	14 Aug 2023
1	Audio recording	14 Aug 2023	15 Aug 2023
2	Ultrasonic recording	14 Aug 2023	15 Aug 2023
4	Fixed-point count	15 Aug 2023	15 Aug 2023
5	Fixed-point count	17 Nov 2023	17 Nov 2023
6	Fixed-point count	18 Nov 2023	18 Nov 2023
2	Audio recording	18 Nov 2023	19 Nov 2023
3	Ultrasonic recording	18 Nov 2023	19 Nov 2023
7	Fixed-point count	10 Jan 2024	10 Jan 2024
8	Fixed-point count	11 Jan 2024	11 Jan 2024
3	Audio recording	11 Jan 2024	14 Jan 2024
4	Ultrasonic recording	11 Jan 2024	14 Jan 2024
9	Fixed-point count	27 Sep 2024	27 Sep 2024
10	Fixed-point count	30 Sep 2024	30 Sep 2024
11	Fixed-point count	18 Oct 2024	18 Oct 2024
12	Fixed-point count	21 Oct 2024	21 Oct 2024
13	Fixed-point count	13 Nov 2024	13 Nov 2024
14	Fixed-point count	14 Nov 2024	14 Nov 2024
15	Fixed-point count	12 Dec 2024	12 Dec 2024
16	Fixed-point count	12 Dec 2024	12 Dec 2024
17	Fixed-point count	16 Jan 2025	16 Jan 2025
18	Fixed-point count	17 Jan 2025	17 Jan 2025
19	Fixed-point count	14 Feb 2025	14 Feb 2025
20	Fixed-point count	14 Feb 2025	14 Feb 2025
21	Fixed-point count	07 Mar 2025	07 Mar 2025
1	Site description	07 Mar 2025	07 Mar 2025
22	Fixed-point count	07 Mar 2025	07 Mar 2025

Site description - Sample no. 1 (24 May 2023)			
Paddock with autumn-early spring pools and small stream; completely degraded. Beenup constructed wetlands across the road to the West. Roadside vegetation condition weed infested and in completely degraded condition.			
Habitat	grassland		
Disturbance	large-scale clearing, grazing-high		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS002**	**Position (WGS84)**	115.3001, -34.2611
Slope	negligible	**Topography**	floodplain
Soil colour	black	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Fixed-point count	25 May 2023	25 May 2023
1	Ultrasonic recording	25 May 2023	26 May 2023
1	Site description	25 May 2023	25 May 2023
2	Fixed-point count	26 May 2023	26 May 2023
1	Audio recording	14 Aug 2023	15 Aug 2023
2	Ultrasonic recording	14 Aug 2023	15 Aug 2023
3	Fixed-point count	14 Aug 2023	14 Aug 2023
4	Fixed-point count	15 Aug 2023	15 Aug 2023
5	Fixed-point count	17 Nov 2023	17 Nov 2023
2	Audio recording	17 Nov 2023	18 Nov 2023
3	Ultrasonic recording	17 Nov 2023	18 Nov 2023
6	Fixed-point count	18 Nov 2023	18 Nov 2023
7	Fixed-point count	10 Jan 2024	10 Jan 2024
3	Audio recording	11 Jan 2024	14 Jan 2024
4	Ultrasonic recording	11 Jan 2024	14 Jan 2024
8	Fixed-point count	11 Jan 2024	11 Jan 2024
9	Fixed-point count	27 Sep 2024	27 Sep 2024
10	Fixed-point count	30 Sep 2024	30 Sep 2024
11	Fixed-point count	18 Oct 2024	18 Oct 2024
12	Fixed-point count	18 Oct 2024	18 Oct 2024
13	Fixed-point count	13 Nov 2024	13 Nov 2024
14	Fixed-point count	14 Nov 2024	14 Nov 2024
15	Fixed-point count	12 Dec 2024	12 Dec 2024
16	Fixed-point count	12 Dec 2024	12 Dec 2024
17	Fixed-point count	16 Jan 2025	16 Jan 2025
18	Fixed-point count	17 Jan 2025	17 Jan 2025
19	Fixed-point count	14 Feb 2025	14 Feb 2025
20	Fixed-point count	14 Feb 2025	14 Feb 2025
21	Fixed-point count	07 Mar 2025	07 Mar 2025
1	Site description	07 Mar 2025	07 Mar 2025
22	Fixed-point count	07 Mar 2025	07 Mar 2025

Site description - Sample no. 1 (25 May 2023)			
Paddock, with small water body containing no fringing native vegetation. Dead Melaleuca sp. trees pushed over and into piles. Some water birds using waterbody, including nesting black swans.			
Habitat	grassland		
Disturbance	large-scale clearing, grazing-high		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS003**	**Position (WGS84)**	115.2788, -34.2381
Slope	negligible	**Topography**	floodplain
Soil colour	black, grey	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Fixed-point count	25 May 2023	25 May 2023
1	Ultrasonic recording	25 May 2023	26 May 2023
1	Site description	25 May 2023	25 May 2023
2	Fixed-point count	26 May 2023	26 May 2023
3	Fixed-point count	15 Aug 2023	15 Aug 2023
1	Audio recording	15 Aug 2023	16 Aug 2023
2	Ultrasonic recording	15 Aug 2023	16 Aug 2023
4	Fixed-point count	16 Aug 2023	16 Aug 2023
5	Fixed-point count	17 Nov 2023	17 Nov 2023
6	Fixed-point count	18 Nov 2023	18 Nov 2023
2	Audio recording	18 Nov 2023	19 Nov 2023
3	Ultrasonic recording	18 Nov 2023	19 Nov 2023
1	Opportunistic sighting	19 Nov 2023	19 Nov 2023
4	Ultrasonic recording	10 Jan 2024	11 Jan 2024
3	Audio recording	10 Jan 2024	11 Jan 2024
7	Fixed-point count	10 Jan 2024	10 Jan 2024
8	Fixed-point count	11 Jan 2024	11 Jan 2024

Site description - Sample no. 1 (25 May 2023)			
Open paddock, with a few stands of Agonis sp. (peppermint) trees present, and no understorey. Completely degraded.			
Habitat	grassland		
Disturbance	large-scale clearing, grazing-high		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS004**	**Position (WGS84)**	115.3067, -34.2243
Slope	negligible	**Topography**	floodplain
Soil colour	grey, brown	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Ultrasonic recording	25 May 2023	26 May 2023
1	Fixed-point count	26 May 2023	26 May 2023
1	Site description	26 May 2023	26 May 2023
2	Fixed-point count	26 May 2023	26 May 2023
3	Fixed-point count	16 Aug 2023	16 Aug 2023
4	Fixed-point count	17 Nov 2023	17 Nov 2023
1	Audio recording	18 Nov 2023	19 Nov 2023
2	Ultrasonic recording	18 Nov 2023	19 Nov 2023
5	Fixed-point count	18 Nov 2023	18 Nov 2023
2	Audio recording	10 Jan 2024	11 Jan 2024
3	Ultrasonic recording	10 Jan 2024	11 Jan 2024
6	Fixed-point count	10 Jan 2024	10 Jan 2024
7	Fixed-point count	11 Jan 2024	11 Jan 2024
8	Fixed-point count	27 Sep 2024	27 Sep 2024
9	Fixed-point count	30 Sep 2024	30 Sep 2024
10	Fixed-point count	17 Oct 2024	17 Oct 2024
11	Fixed-point count	17 Oct 2024	17 Oct 2024
12	Fixed-point count	13 Nov 2024	13 Nov 2024
13	Fixed-point count	14 Nov 2024	14 Nov 2024
14	Fixed-point count	11 Dec 2024	11 Dec 2024
15	Fixed-point count	11 Dec 2024	11 Dec 2024
16	Fixed-point count	16 Jan 2025	16 Jan 2025
17	Fixed-point count	16 Jan 2025	16 Jan 2025
18	Fixed-point count	13 Feb 2025	13 Feb 2025
19	Fixed-point count	13 Feb 2025	13 Feb 2025
20	Fixed-point count	06 Mar 2025	06 Mar 2025
1	Site description	06 Mar 2025	06 Mar 2025
21	Fixed-point count	06 Mar 2025	06 Mar 2025

Site description - Sample no. 1 (26 May 2023)			
Open paddock, with blue gum plantation to the north, wetlands to the south, Peppermint parkland to the north-east.			
Habitat	grassland		
Disturbance	large-scale clearing, grazing-high		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS005**	**Position (WGS84)**	115.2935, -34.2155
Slope	negligible	**Topography**	floodplain
Soil colour	black, grey	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary

Sample no.	Sample method	Date start	Date stop
1	Ultrasonic recording	25 May 2023	26 May 2023
1	Fixed-point count	26 May 2023	26 May 2023
1	Site description	26 May 2023	26 May 2023
1	Opportunistic sighting	26 May 2023	26 May 2023
2	Fixed-point count	26 May 2023	26 May 2023
3	Fixed-point count	16 Aug 2023	16 Aug 2023
4	Fixed-point count	17 Nov 2023	17 Nov 2023
5	Fixed-point count	18 Nov 2023	18 Nov 2023
1	Audio recording	18 Nov 2023	19 Nov 2023
2	Ultrasonic recording	18 Nov 2023	19 Nov 2023
2	Audio recording	10 Jan 2024	11 Jan 2024
3	Ultrasonic recording	10 Jan 2024	11 Jan 2024
6	Fixed-point count	10 Jan 2024	10 Jan 2024
7	Fixed-point count	11 Jan 2024	11 Jan 2024
1	Fixed-point count	27 Sep 2024	27 Sep 2024
2	Fixed-point count	30 Sep 2024	30 Sep 2024
3	Fixed-point count	17 Oct 2024	17 Oct 2024
4	Fixed-point count	17 Oct 2024	17 Oct 2024
5	Fixed-point count	13 Nov 2024	13 Nov 2024
6	Fixed-point count	14 Nov 2024	14 Nov 2024
7	Fixed-point count	11 Dec 2024	11 Dec 2024
8	Fixed-point count	11 Dec 2024	11 Dec 2024
9	Fixed-point count	16 Jan 2025	16 Jan 2025
10	Fixed-point count	16 Jan 2025	16 Jan 2025
11	Fixed-point count	13 Feb 2025	13 Feb 2025
12	Fixed-point count	13 Feb 2025	13 Feb 2025
13	Fixed-point count	06 Mar 2025	06 Mar 2025
1	Site description	06 Mar 2025	06 Mar 2025
14	Fixed-point count	06 Mar 2025	06 Mar 2025

Site description - Sample no. 1 (26 May 2023)			
Paddock site surrounded by excellent condition remnant vegetation, including narrow a strip of quality Banksia/Peppermint woodland immediately to the north; and a large, connected remnant of Eucalypt-wetland and Peppermint/Melaleuca bushland to the west, east and south.			
Habitat	grassland		
Disturbance	large-scale clearing, grazing-high		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS006**	**Position (WGS84)**	115.2777, -34.1812
Slope	gentle	**Topography**	floodplain
Soil colour	black	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Fixed-point count	25 May 2023	25 May 2023
1	Site description	25 May 2023	25 May 2023
1	Ultrasonic recording	25 May 2023	28 May 2023
2	Fixed-point count	26 May 2023	26 May 2023
2	Ultrasonic recording	14 Aug 2023	15 Aug 2023
1	Audio recording	14 Aug 2023	15 Aug 2023
3	Fixed-point count	14 Aug 2023	14 Aug 2023
4	Fixed-point count	15 Aug 2023	15 Aug 2023
5	Fixed-point count	17 Nov 2023	17 Nov 2023
6	Fixed-point count	18 Nov 2023	18 Nov 2023
2	Audio recording	18 Nov 2023	19 Nov 2023
3	Ultrasonic recording	18 Nov 2023	19 Nov 2023
7	Fixed-point count	11 Jan 2024	11 Jan 2024
3	Audio recording	11 Jan 2024	14 Jan 2024
4	Ultrasonic recording	11 Jan 2024	14 Jan 2024
8	Fixed-point count	12 Jan 2024	12 Jan 2024

Site description - Sample no. 1 (25 May 2023)			
Paddock, with Blue gum plantation 120m to the west. High quality remnant woodland to the NW and various sumplands in vicinity.			
Habitat	grassland		
Disturbance	large-scale clearing, grazing-high		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS007**	**Position (WGS84)**	115.2892, -34.2380
Slope	negligible	**Topography**	floodplain
Soil colour	brown	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Fixed-point count	25 May 2023	25 May 2023
1	Ultrasonic recording	25 May 2023	26 May 2023
1	Site description	25 May 2023	25 May 2023
2	Fixed-point count	26 May 2023	26 May 2023
3	Fixed-point count	15 Aug 2023	15 Aug 2023
1	Audio recording	15 Aug 2023	16 Aug 2023
2	Ultrasonic recording	15 Aug 2023	16 Aug 2023
4	Fixed-point count	16 Aug 2023	16 Aug 2023
5	Fixed-point count	17 Nov 2023	17 Nov 2023
6	Fixed-point count	18 Nov 2023	18 Nov 2023
3	Ultrasonic recording	18 Nov 2023	19 Nov 2023
2	Audio recording	18 Nov 2023	19 Nov 2023
7	Fixed-point count	10 Jan 2024	10 Jan 2024
4	Ultrasonic recording	10 Jan 2024	11 Jan 2024
3	Audio recording	10 Jan 2024	11 Jan 2024
8	Fixed-point count	11 Jan 2024	11 Jan 2024

Site description - Sample no. 1 (25 May 2023)			
Open paddock with isolated peppermint trees. Gently undulating.			
Habitat	grassland		
Disturbance	large-scale clearing, grazing-high		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS008**	**Position (WGS84)**	115.3080, -34.1927
Slope	negligible	**Topography**	floodplain
Soil colour	brown	**Soil texture**	clay loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary

Sample no.	Sample method	Date start	Date stop
1	Fixed-point count	24 May 2023	24 May 2023
1	Site description	24 May 2023	24 May 2023
1	Ultrasonic recording	24 May 2023	25 May 2023
2	Fixed-point count	25 May 2023	25 May 2023
1	Opportunistic sighting	24 May 2023	24 May 2023
3	Fixed-point count	14 Aug 2023	14 Aug 2023
1	Audio recording	15 Aug 2023	16 Aug 2023
2	Ultrasonic recording	15 Aug 2023	16 Aug 2023
4	Fixed-point count	15 Aug 2023	15 Aug 2023
3	Ultrasonic recording	17 Nov 2023	18 Nov 2023
2	Audio recording	17 Nov 2023	18 Nov 2023
5	Fixed-point count	10 Jan 2024	10 Jan 2024
3	Audio recording	10 Jan 2024	11 Jan 2024
4	Ultrasonic recording	10 Jan 2024	11 Jan 2024
6	Fixed-point count	11 Jan 2024	11 Jan 2024
7	Fixed-point count	27 Sep 2024	27 Sep 2024
8	Fixed-point count	30 Sep 2024	30 Sep 2024
9	Fixed-point count	17 Oct 2024	17 Oct 2024
10	Fixed-point count	17 Oct 2024	17 Oct 2024
11	Fixed-point count	13 Nov 2024	13 Nov 2024
12	Fixed-point count	14 Nov 2024	14 Nov 2024
13	Fixed-point count	11 Dec 2024	11 Dec 2024
14	Fixed-point count	11 Dec 2024	11 Dec 2024
15	Fixed-point count	17 Jan 2025	17 Jan 2025
16	Fixed-point count	17 Jan 2025	17 Jan 2025
17	Fixed-point count	13 Feb 2025	13 Feb 2025
18	Fixed-point count	13 Feb 2025	13 Feb 2025
19	Fixed-point count	06 Mar 2025	06 Mar 2025
1	Site description	06 Mar 2025	06 Mar 2025
20	Fixed-point count	06 Mar 2025	06 Mar 2025

Site description - Sample no. 1 (24 May 2023)			
Open paddock, near flat, under powerlines, adjacent small degraded seasonally inundated shrubland.			
Habitat	grassland		
Disturbance	large-scale clearing, grazing-high		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS009**	**Position (WGS84)**	115.3001, -34.1989
Slope	negligible	**Topography**	floodplain
Soil colour	brown	**Soil texture**	clay loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Fixed-point count	24 May 2023	24 May 2023
1	Ultrasonic recording	24 May 2023	25 May 2023
1	Site description	24 May 2023	24 May 2023
2	Fixed-point count	25 May 2023	25 May 2023
1	Opportunistic sighting	25 May 2023	25 May 2023
3	Fixed-point count	17 Nov 2023	17 Nov 2023
2	Ultrasonic recording	17 Nov 2023	18 Nov 2023
1	Audio recording	17 Nov 2023	18 Nov 2023
4	Fixed-point count	18 Nov 2023	18 Nov 2023
5	Fixed-point count	10 Jan 2024	10 Jan 2024
2	Audio recording	10 Jan 2024	11 Jan 2024
3	Ultrasonic recording	10 Jan 2024	11 Jan 2024
6	Fixed-point count	11 Jan 2024	11 Jan 2024

Site description - Sample no. 1 (24 May 2023)			
Paddock alongside small, fenced wetland with windmill feeding small dam - attracting birds. Small degraded remnants of Peppermint woodland to the east and northeast, and excellent condition wetlands to the southwest.			
Habitat	grassland		
Disturbance	large-scale clearing, grazing-high		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS010**	**Position (WGS84)**	115.3020, -34.2402
Slope	negligible	**Topography**	floodplain
Soil colour	brown	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Fixed-point count	25 May 2023	25 May 2023
1	Ultrasonic recording	25 May 2023	26 May 2023
1	Site description	25 May 2023	25 May 2023
2	Fixed-point count	26 May 2023	26 May 2023
3	Fixed-point count	14 Aug 2023	14 Aug 2023
4	Fixed-point count	15 Aug 2023	15 Aug 2023
1	Audio recording	15 Aug 2023	16 Aug 2023
2	Ultrasonic recording	15 Aug 2023	16 Aug 2023
5	Fixed-point count	17 Nov 2023	17 Nov 2023
3	Ultrasonic recording	17 Nov 2023	18 Nov 2023
2	Audio recording	17 Nov 2023	18 Nov 2023
6	Fixed-point count	18 Nov 2023	18 Nov 2023
7	Fixed-point count	10 Jan 2024	10 Jan 2024
3	Audio recording	10 Jan 2024	11 Jan 2024
4	Ultrasonic recording	10 Jan 2024	11 Jan 2024
8	Fixed-point count	11 Jan 2024	11 Jan 2024
9	Fixed-point count	27 Sep 2024	27 Sep 2024
10	Fixed-point count	30 Sep 2024	30 Sep 2024
11	Fixed-point count	17 Oct 2024	17 Oct 2024
12	Fixed-point count	18 Oct 2024	18 Oct 2024
13	Fixed-point count	13 Nov 2024	13 Nov 2024
14	Fixed-point count	13 Nov 2024	13 Nov 2024
15	Fixed-point count	12 Dec 2024	12 Dec 2024
16	Fixed-point count	12 Dec 2024	12 Dec 2024
16	Fixed-point count	16 Jan 2025	16 Jan 2025
17	Fixed-point count	17 Jan 2025	17 Jan 2025
18	Fixed-point count	14 Feb 2025	14 Feb 2025
19	Fixed-point count	14 Feb 2025	14 Feb 2025
20	Fixed-point count	07 Mar 2025	07 Mar 2025
1	Site description	07 Mar 2025	07 Mar 2025
21	Fixed-point count	07 Mar 2025	07 Mar 2025

Site description - Sample no. 1 (25 May 2023)			
Open, flat paddock, with isolated peppermint low trees and tall shrubs. Completely degraded.			
Habitat	grassland		
Disturbance	large-scale clearing, grazing-high		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS011**	**Position (WGS84)**	115.2958, -34.2507
Slope	negligible	**Topography**	floodplain
Soil colour	brown	**Soil texture**	clay loam, sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary

Sample no.	Sample method	Date start	Date stop
1	Fixed-point count	24 May 2023	24 May 2023
1	Site description	24 May 2023	24 May 2023
1	Ultrasonic recording	24 May 2023	25 May 2023
2	Fixed-point count	25 May 2023	25 May 2023
1	Opportunistic sighting	24 May 2023	24 May 2023
1	Audio recording	14 Aug 2023	15 Aug 2023
2	Ultrasonic recording	14 Aug 2023	15 Aug 2023
3	Fixed-point count	14 Aug 2023	14 Aug 2023
4	Fixed-point count	15 Aug 2023	15 Aug 2023
5	Fixed-point count	17 Nov 2023	17 Nov 2023
3	Ultrasonic recording	17 Nov 2023	18 Nov 2023
2	Audio recording	17 Nov 2023	18 Nov 2023
6	Fixed-point count	10 Jan 2024	10 Jan 2024
7	Fixed-point count	11 Jan 2024	11 Jan 2024
3	Audio recording	11 Jan 2024	14 Jan 2024
4	Ultrasonic recording	11 Jan 2024	14 Jan 2024
8	Fixed-point count	27 Sep 2024	27 Sep 2024
9	Fixed-point count	30 Sep 2024	30 Sep 2024
10	Fixed-point count	17 Oct 2024	17 Oct 2024
11	Fixed-point count	18 Oct 2024	18 Oct 2024
12	Fixed-point count	13 Nov 2024	13 Nov 2024
13	Fixed-point count	14 Nov 2024	14 Nov 2024
14	Fixed-point count	12 Dec 2024	12 Dec 2024
15	Fixed-point count	12 Dec 2024	12 Dec 2024
16	Fixed-point count	16 Jan 2025	16 Jan 2025
17	Fixed-point count	17 Jan 2025	17 Jan 2025
18	Fixed-point count	14 Feb 2025	14 Feb 2025
19	Fixed-point count	14 Feb 2025	14 Feb 2025
20	Fixed-point count	07 Mar 2025	07 Mar 2025
1	Site description	07 Mar 2025	07 Mar 2025
21	Fixed-point count	07 Mar 2025	07 Mar 2025

Site description - Sample no. 1 (24 May 2023)			
Open, flat paddock adjacent excellent condition roadside shrubland. Paddock gently slopes south toward the coast and Scott River.			
Habitat	grassland		
Disturbance	large-scale clearing, grazing-high		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS012**	**Position (WGS84)**	115.3251, -34.2598
Slope	negligible	**Topography**	floodplain
Soil colour	black, brown	**Soil texture**	sandy clay, sandy loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Fixed-point count	14 Aug 2023	14 Aug 2023
1	Site description	14 Aug 2023	14 Aug 2023
2	Fixed-point count	15 Aug 2023	15 Aug 2023
1	Audio recording	15 Aug 2023	16 Aug 2023
1	Ultrasonic recording	15 Aug 2023	16 Aug 2023

Site description - Sample no. 1 (14 Aug 2023)			
Open paddock, adjacent small dam to the north and degraded peppermint woodland remnants to the south.			
Habitat	grassland		
Disturbance	large-scale clearing, grazing-high		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS013**	**Position (WGS84)**	115.2552, -34.2064
Slope	negligible	**Topography**	floodplain
Soil colour	brown	**Soil texture**	clay loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Ultrasonic recording	24 May 2023	25 May 2023
1	Site description	24 May 2023	24 May 2023
2	Fixed-point count	25 May 2023	25 May 2023
1	Opportunistic sighting	24 May 2023	24 May 2023
1	Fixed-point count	24 May 2023	24 May 2023
3	Fixed-point count	14 Aug 2023	14 Aug 2023
2	Ultrasonic recording	14 Aug 2023	15 Aug 2023
1	Audio recording	14 Aug 2023	15 Aug 2023
4	Fixed-point count	15 Aug 2023	15 Aug 2023
5	Fixed-point count	17 Nov 2023	17 Nov 2023
6	Fixed-point count	18 Nov 2023	18 Nov 2023
2	Audio recording	18 Nov 2023	19 Nov 2023
3	Ultrasonic recording	18 Nov 2023	19 Nov 2023
7	Fixed-point count	10 Jan 2024	10 Jan 2024
8	Fixed-point count	11 Jan 2024	11 Jan 2024
3	Audio recording	11 Jan 2024	14 Jan 2024
4	Ultrasonic recording	11 Jan 2024	14 Jan 2024

Site description - Sample no. 1 (24 May 2023)			
Flat, open paddock, with few trees present. Adjacent roadside Jarrah-Marri forest remnant in excellent good condition for the most part.			
Habitat	grassland		
Disturbance	grazing-high, large-scale clearing		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS014**	**Position (WGS84)**	115.3123, -34.1608
Slope	negligible	**Topography**	floodplain
Soil colour	black, brown	**Soil texture**	sand, clay loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Fixed-point count	24 May 2023	24 May 2023
1	Ultrasonic recording	24 May 2023	25 May 2023
1	Site description	24 May 2023	24 May 2023
2	Fixed-point count	25 May 2023	25 May 2023
1	Opportunistic sighting	24 May 2023	24 May 2023
1	Audio recording	14 Aug 2023	15 Aug 2023
2	Ultrasonic recording	14 Aug 2023	15 Aug 2023
3	Fixed-point count	14 Aug 2023	14 Aug 2023
4	Fixed-point count	15 Aug 2023	15 Aug 2023
5	Fixed-point count	18 Nov 2023	18 Nov 2023
2	Audio recording	19 Nov 2023	20 Nov 2023
3	Ultrasonic recording	19 Nov 2023	20 Nov 2023
6	Fixed-point count	19 Nov 2023	19 Nov 2023
7	Fixed-point count	11 Jan 2024	11 Jan 2024
3	Audio recording	11 Jan 2024	14 Jan 2024
4	Ultrasonic recording	11 Jan 2024	14 Jan 2024
8	Fixed-point count	12 Jan 2024	12 Jan 2024

Site description - Sample no. 1 (24 May 2023)			
Open paddock with no trees remaining. Adjacent high-quality roadside remnant of Jarrah-Marri woodland, so the east and north. And with large expanse of National Park and Reserves also to the east and north.			
Habitat	grassland		
Disturbance	large-scale clearing, grazing-high		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS015**	**Position (WGS84)**	115.2883, -34.2828
Slope	gentle	**Topography**	floodplain
Soil colour	grey	**Soil texture**	sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Site description	25 May 2023	25 May 2023
1	Fixed-point count	25 May 2023	25 May 2023
1	Ultrasonic recording	25 May 2023	26 May 2023
2	Fixed-point count	26 May 2023	26 May 2023
2	Ultrasonic recording	14 Aug 2023	15 Aug 2023
1	Audio recording	14 Aug 2023	15 Aug 2023
3	Fixed-point count	14 Aug 2023	14 Aug 2023
4	Fixed-point count	16 Aug 2023	16 Aug 2023
5	Fixed-point count	17 Nov 2023	17 Nov 2023
2	Audio recording	17 Nov 2023	18 Nov 2023
3	Ultrasonic recording	17 Nov 2023	18 Nov 2023
6	Fixed-point count	18 Nov 2023	18 Nov 2023
7	Fixed-point count	10 Jan 2024	10 Jan 2024
8	Fixed-point count	11 Jan 2024	11 Jan 2024
3	Audio recording	11 Jan 2024	14 Jan 2024
4	Ultrasonic recording	11 Jan 2024	14 Jan 2024

Site description - Sample no. 1 (25 May 2023)			
Open paddock gently sloping down toward a Scott River to the north. Stands of degraded Peppermint woodland present, devoid of vegetated understorey, but with excellent condition native vegetation immediately to the south.			
Habitat	grassland		
Disturbance	grazing-high, large-scale clearing		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	101	**Litter distribution**	none
Tree cover (%)	1	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS016**	**Position (WGS84)**	115.2710, -34.2334
Slope	negligible	**Topography**	floodplain
Soil colour	red-brown	**Soil texture**	loamy sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Fixed-point count	27 Sep 2024	27 Sep 2024
2	Fixed-point count	30 Sep 2024	30 Sep 2024
3	Fixed-point count	18 Oct 2024	18 Oct 2024
4	Fixed-point count	21 Oct 2024	21 Oct 2024
5	Fixed-point count	13 Nov 2024	13 Nov 2024
6	Fixed-point count	14 Nov 2024	14 Nov 2024
7	Fixed-point count	12 Dec 2024	12 Dec 2024
8	Fixed-point count	12 Dec 2024	12 Dec 2024
9	Fixed-point count	16 Jan 2025	16 Jan 2025
10	Fixed-point count	17 Jan 2025	17 Jan 2025
11	Fixed-point count	14 Feb 2025	14 Feb 2025
12	Fixed-point count	14 Feb 2025	14 Feb 2025
13	Fixed-point count	07 Mar 2025	07 Mar 2025
1	Site description	07 Mar 2025	07 Mar 2025
14	Fixed-point count	07 Mar 2025	07 Mar 2025

Site description - Sample no. 1 (07 Mar 2025)			
Open, flat paddock. Nearest trees are a strip of mature Pine, 200m to the west.			
Habitat	grassland		
Disturbance	grazing-high, large-scale clearing		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS018**	**Position (WGS84)**	115.2845, -34.1915
Slope	negligible	**Topography**	floodplain
Soil colour	brown-grey	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Fixed-point count	27 Sep 2024	27 Sep 2024
2	Fixed-point count	30 Sep 2024	30 Sep 2024
3	Fixed-point count	18 Oct 2024	18 Oct 2024
4	Fixed-point count	21 Oct 2024	21 Oct 2024
5	Fixed-point count	13 Nov 2024	13 Nov 2024
6	Fixed-point count	14 Nov 2024	14 Nov 2024
7	Fixed-point count	11 Dec 2024	11 Dec 2024
8	Fixed-point count	11 Dec 2024	11 Dec 2024
9	Fixed-point count	16 Jan 2025	16 Jan 2025
10	Fixed-point count	17 Jan 2025	17 Jan 2025
11	Fixed-point count	13 Feb 2025	13 Feb 2025
12	Fixed-point count	13 Feb 2025	13 Feb 2025
13	Fixed-point count	06 Mar 2025	06 Mar 2025
1	Site description	06 Mar 2025	06 Mar 2025
14	Fixed-point count	06 Mar 2025	06 Mar 2025

Site description - Sample no. 1 (06 Mar 2025)			
Open, gently undulating paddock. Nearest native vegetation is approximately 450m to the northeast and is a degraded Jarrah-Marri woodland. A Bluegum plantation occurs 650m to the west.			
Habitat	grassland		
Disturbance	grazing-high, large-scale clearing		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS019**	**Position (WGS84)**	115.3217, -34.2401
Slope	negligible	**Topography**	floodplain
Soil colour	brown-grey	**Soil texture**	loamy sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary

Sample no.	Sample method	Date start	Date stop
1	Fixed-point count	27 Sep 2024	27 Sep 2024
2	Fixed-point count	30 Sep 2024	30 Sep 2024
3	Fixed-point count	17 Oct 2024	17 Oct 2024
4	Fixed-point count	18 Oct 2024	18 Oct 2024
5	Fixed-point count	13 Nov 2024	13 Nov 2024
6	Fixed-point count	13 Nov 2024	13 Nov 2024
7	Fixed-point count	11 Dec 2024	11 Dec 2024
8	Fixed-point count	11 Dec 2024	11 Dec 2024
9	Fixed-point count	16 Jan 2025	16 Jan 2025
10	Fixed-point count	17 Jan 2025	17 Jan 2025
11	Fixed-point count	14 Feb 2025	14 Feb 2025
12	Fixed-point count	14 Feb 2025	14 Feb 2025
13	Fixed-point count	07 Mar 2025	07 Mar 2025
1	Site description	07 Mar 2025	07 Mar 2025
14	Fixed-point count	07 Mar 2025	07 Mar 2025

Site description - Sample no. 1 (07 Mar 2025)

Open, gently undulating paddock, dissected by track. Excellent condition Jarrah-Marri-Peppermint woodland 240m to the north. Eucalypt plantation 160m to the east. A few old Peppermint shade trees in southern paddock, but no trees in the northern paddock.

Habitat	grassland		
Disturbance	grazing-high, large-scale clearing		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	2	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	98	**Herb cover (%)**	0



Site details			
Site	**BUS020**	**Position (WGS84)**	115.2798, -34.2471
Slope	negligible	**Topography**	floodplain
Soil colour	brown-grey	**Soil texture**	loamy sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary

Sample no.	Sample method	Date start	Date stop
1	Fixed-point count	27 Sep 2024	27 Sep 2024
2	Fixed-point count	30 Sep 2024	30 Sep 2024
3	Fixed-point count	18 Oct 2024	18 Oct 2024
4	Fixed-point count	18 Oct 2024	18 Oct 2024
5	Fixed-point count	13 Nov 2024	13 Nov 2024
6	Fixed-point count	14 Nov 2024	14 Nov 2024
7	Fixed-point count	12 Dec 2024	12 Dec 2024
8	Fixed-point count	12 Dec 2024	12 Dec 2024
9	Fixed-point count	16 Jan 2025	16 Jan 2025
10	Fixed-point count	17 Jan 2025	17 Jan 2025
11	Fixed-point count	14 Feb 2025	14 Feb 2025
12	Fixed-point count	14 Feb 2025	14 Feb 2025
13	Fixed-point count	07 Mar 2025	07 Mar 2025
14	Fixed-point count	07 Mar 2025	07 Mar 2025
1	Site description	07 Mar 2025	07 Mar 2025

Site description - Sample no. 1 (07 Mar 2025)

Open, flat paddock intersected by track and drain. The area is generally highly degraded. The nearest trees occur as a windbreak line of introduced Eucalypts to the NW

Habitat	grassland		
Disturbance	grazing-high, large-scale clearing		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS025**	**Position (WGS84)**	115.2983, -34.2027
Slope	negligible	**Topography**	floodplain
Soil colour	brown-grey	**Soil texture**	sandy loam
Rock cover (%)	0	**Rock type**	none

Sample and effort summary

Sample no.	Sample method	Date start	Date stop
1	Fixed-point count	27 Sep 2024	27 Sep 2024
2	Fixed-point count	30 Sep 2024	30 Sep 2024
3	Fixed-point count	17 Oct 2024	17 Oct 2024
4	Fixed-point count	17 Oct 2024	17 Oct 2024
5	Fixed-point count	13 Nov 2024	13 Nov 2024
6	Fixed-point count	14 Nov 2024	14 Nov 2024
7	Fixed-point count	11 Dec 2024	11 Dec 2024
8	Fixed-point count	11 Dec 2024	11 Dec 2024
9	Fixed-point count	17 Jan 2025	17 Jan 2025
10	Fixed-point count	17 Jan 2025	17 Jan 2025
11	Fixed-point count	13 Feb 2025	13 Feb 2025
12	Fixed-point count	13 Feb 2025	13 Feb 2025
13	Fixed-point count	06 Mar 2025	06 Mar 2025
1	Site description	06 Mar 2025	06 Mar 2025
14	Fixed-point count	06 Mar 2025	06 Mar 2025

Site description - Sample no. 1 (06 Mar 2025)

Paddock with seasonally wet depression containing small Melaleuca-grove, mostly dead 100m to the north. An excellent condition seasonally inundated shrubland occurs 100m to the north, and excellent condition Jarrah-Marri woodland 200m to the east.

Habitat	grassland		
Disturbance	grazing-high, large-scale clearing		
Vegetation condition	Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS026**	**Position (WGS84)**	115.3176, -34.1982
Slope	negligible	**Topography**	floodplain
Soil colour	grey	**Soil texture**	sand
Rock cover (%)	0	**Rock type**	none

Sample and effort summary

Sample no.	Sample method	Date start	Date stop
1	Fixed-point count	27 Sep 2024	27 Sep 2024
2	Fixed-point count	30 Sep 2024	30 Sep 2024
3	Fixed-point count	17 Oct 2024	17 Oct 2024
4	Fixed-point count	17 Oct 2024	17 Oct 2024
5	Fixed-point count	13 Nov 2024	13 Nov 2024
6	Fixed-point count	14 Nov 2024	14 Nov 2024
7	Fixed-point count	11 Dec 2024	11 Dec 2024
8	Fixed-point count	11 Dec 2024	11 Dec 2024
9	Fixed-point count	16 Jan 2025	16 Jan 2025
10	Fixed-point count	17 Jan 2025	17 Jan 2025
11	Fixed-point count	13 Feb 2025	13 Feb 2025
12	Fixed-point count	13 Feb 2025	13 Feb 2025
13	Fixed-point count	06 Mar 2025	06 Mar 2025
1	Site description	06 Mar 2025	06 Mar 2025
14	Fixed-point count	06 Mar 2025	06 Mar 2025

Site description - Sample no. 1 (06 Mar 2025)

Open, flat paddock, with only a few remaining small trees present. The nearest native remnant is excellent condition bushland 230m to the west.

Habitat	grassland		
Disturbance	grazing-high, large-scale clearing		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS027**	**Position (WGS84)**	115.3180, -34.2257
Slope	negligible	**Topography**	floodplain
Soil colour	brown-grey	**Soil texture**	sandy loam
Rock cover (%)	5	**Rock type**	laterite

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Fixed-point count	27 Sep 2024	27 Sep 2024
2	Fixed-point count	30 Sep 2024	30 Sep 2024
3	Fixed-point count	17 Oct 2024	17 Oct 2024
4	Fixed-point count	17 Oct 2024	17 Oct 2024
5	Fixed-point count	13 Nov 2024	13 Nov 2024
6	Fixed-point count	14 Nov 2024	14 Nov 2024
7	Fixed-point count	11 Dec 2024	11 Dec 2024
8	Fixed-point count	11 Dec 2024	11 Dec 2024
9	Fixed-point count	16 Jan 2025	16 Jan 2025
10	Fixed-point count	16 Jan 2025	16 Jan 2025
11	Fixed-point count	13 Feb 2025	13 Feb 2025
12	Fixed-point count	13 Feb 2025	13 Feb 2025
13	Fixed-point count	06 Mar 2025	06 Mar 2025
1	Site description	06 Mar 2025	06 Mar 2025
14	Fixed-point count	06 Mar 2025	06 Mar 2025

Site description - Sample no. 1 (06 Mar 2025)			
Open, gently undulating paddock with scattered Peppermint Trees. The closest remnant vegetation is a Peppermint-Melaleuca woodland with a wetland, 350m to the southwest.			
Habitat	grassland		
Disturbance	grazing-high, large-scale clearing		
Vegetation condition	Completely Degraded	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	100	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	100	**Herb cover (%)**	0



Site details			
Site	**BUS030**	**Position (WGS84)**	115.1796, -34.3173
Slope	negligible	**Topography**	tidal wetland
Soil colour	not applicable	**Soil texture**	not applicable
Rock cover (%)	0	**Rock type**	not applicable

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Fixed-point count	29 Sep 2024	29 Sep 2024
2	Fixed-point count	02 Dec 2024	02 Dec 2024
1	Site description	29 Sep 2024	29 Sep 2024

Site description - Sample no. 1 (29 Sep 2024)			
Relatively deep section of Swan Lake, margins vegetated for the most part. With areas of varying water column depth present due to sandbars, offering a variety of feeding opportunities for waterbirds.			
Habitat	beach		
Disturbance	none		
Vegetation condition	Pristine	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	0	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	0	**Herb cover (%)**	0



Site details			
Site	**BUS031**	**Position (WGS84)**	115.1764, -34.2892
Slope	negligible	**Topography**	river - sand bar
Soil colour	not applicable	**Soil texture**	not applicable
Rock cover (%)	0	**Rock type**	not applicable

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Fixed-point count	29 Sep 2024	29 Sep 2024
2	Fixed-point count	02 Dec 2024	02 Dec 2024
1	Site description	29 Sep 2024	29 Sep 2024

Site description - Sample no. 1 (29 Sep 2024)			
Sandbar in Blackwood River channel, approximately 5km north of the river mouth. This bar holds abundant small to large waterbirds over the summer months, but overwintering birds are also common. It is often completely inundated on higher tides at which time only larger birds remain. Feeding and roosting/loading take place on mid-low tides.			
Habitat	beach		
Disturbance	none		
Vegetation condition	Pristine	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	0	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	0	**Herb cover (%)**	0



Site details			
Site	**BUS032**	**Position (WGS84)**	115.1661, -34.3200
Slope	negligible	**Topography**	inlet
Soil colour	not applicable	**Soil texture**	not applicable
Rock cover (%)	0	**Rock type**	not applicable

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Fixed-point count	29 Sep 2024	29 Sep 2024
2	Fixed-point count	02 Dec 2024	02 Dec 2024
1	Site description	29 Sep 2024	29 Sep 2024

Site description - Sample no. 1 (29 Sep 2024)			
Sandbar 800 north of the Blackwood River mouth. As with others, this bar also holds abundant small to large waterbirds over the summer months, but overwintering birds are also common. It is often completely inundated on higher tides at which time only larger birds remain. Feeding and roosting/loading take place on mid-low tides.			
Habitat	beach		
Disturbance			
Vegetation condition		**Fire age**	
Total veg. cover (%)	0	**Litter distribution**	
Tree cover (%)		**Litter depth (cm)**	0.0
Shrub cover (%)		**Litter cover (%)**	0
Grass cover (%)		**Herb cover (%)**	



Site details			
Site	**BUS033**	**Position (WGS84)**	115.1712, -34.3224
Slope	negligible	**Topography**	inlet
Soil colour	not applicable	**Soil texture**	not applicable
Rock cover (%)	0	**Rock type**	not applicable

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Fixed-point count	29 Sep 2024	29 Sep 2024
1	Site description	29 Sep 2024	29 Sep 2024

Site description - Sample no. 1 (29 Sep 2024)			
Sandbar at the confluence of Blackwood River and 'dead water' entrances. The bar is usually flooded at high tide and offers feeding and roosting opportunities at lower tides for a variety of waterbirds.			
Habitat	beach		
Disturbance	none		
Vegetation condition	Pristine	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	0	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	0	**Herb cover (%)**	0



Site details			
Site	**BUS034**	**Position (WGS84)**	115.1854, -34.3166
Slope	negligible	**Topography**	embayment
Soil colour	not applicable	**Soil texture**	not applicable
Rock cover (%)	0	**Rock type**	not applicable

Sample and effort summary			
Sample no.	**Sample method**	**Date start**	**Date stop**
1	Fixed-point count	29 Sep 2024	29 Sep 2024
2	Fixed-point count	02 Dec 2024	02 Dec 2024
1	Site description	29 Sep 2024	29 Sep 2024

Site description - Sample no. 1 (29 Sep 2024)			
Shallow embayment at the eastern end of 'dead water'. Algal mat covering surface. Lots of birds feeding. Open water to the west, opens into Hardy Inlet and the Blackwood River mouth.			
Habitat	beach		
Disturbance			
Vegetation condition	Pristine	**Fire age**	long-unburnt (>10 years)
Total veg. cover (%)	0	**Litter distribution**	none
Tree cover (%)	0	**Litter depth (cm)**	0.0
Shrub cover (%)	0	**Litter cover (%)**	0
Grass cover (%)	0	**Herb cover (%)**	0



Appendix 3 Desktop and field survey bird and bat species records

Family	Species[1]	Vernacular	Status	Biota (2009)	Birdata (Birdlife Australia 2023)	NatureMap (DBCA 2023a)	ELM (2017)	PM[2] (DCCEEW 2023)	Harewood (2018)	LEC (1990)	Litoria Ecoservices (2017)	Ninox (2011)	TPFA[3] (DBCA 2023c)	B & T survey (Phoenix 2025a)	This survey
Birds (207)															
Anatidae	*Anas castanea*	Chestnut Teal										•		•	
Anatidae	*Anas gracilis*	Grey Teal			•	•						•		•	•
Anatidae	*Anas superciliosa*	Pacific Black Duck			•	•				•		•		•	•
Anatidae	*Aythya australis*	Hardhead			•	•						•			
Anatidae	*Biziura lobata*	Musk Duck			•	•						•		•	•
Anatidae	*Chenonetta jubata*	Australian Wood Duck			•	•				•		•		•	•
Anatidae	*Cygnus atratus*	Black Swan		•	•	•						•		•	•
Anatidae	*Malacorhynchus membranaceus*	Pink-eared Duck										•		•	
Anatidae	*Oxyura australis*	Blue-billed Duck	P4 (DBCA list)		•	•						•	•		
Anatidae	*Spatula rhynchotis*	Australasian Shoveler			•	•						•		•	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		•	•	•				•		•		•	•
Apodidae	*Apus pacificus*	Fork-tailed Swift	Mig. (EPBC & BC Acts)					•							
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar			•	•				•					
Podargidae	*Podargus strigoides*	Tawny Frogmouth			•	•				•				•	
Charadriidae	*Anarhynchus bicinctus*	Double-banded Plover	Mig. (EPBC & BC Acts)										•		
Charadriidae	*Anarhynchus leschenaultii*	Greater Sand Plover	VU/Mig. (EPBC Act); VU (BC Act)		•			•					•		
Charadriidae	*Anarhynchus mongolus*	Siberian Sand Plover	EN/Mig. (EPBC Act); EN (BC Act)										•		
Charadriidae	*Anarhynchus ruficapillus*	Red-capped Plover		•	•	•		•				•			•[4]
Charadriidae	*Charadrius cucullatus*	Hooded Plover/Dotterel	P4 (DBCA list)		•	•		•					•		
Charadriidae	*Charadrius melanops*	Black-fronted Dotterel			•							•		•	
Charadriidae	*Pluvialis fulva*	Pacific Golden Plover	Mig. (EPBC & BC Acts)		•			•					•		
Charadriidae	*Pluvialis squatarola*	Grey Plover	VU/Mig. (EPBC Act); Mig. (BC Act)		•										
Charadriidae	*Vanellus tricolor*	Banded Lapwing			•	•						•		•	•
Haematopodidae	*Haematopus fuliginosus*	Sooty Oystercatcher			•										
Haematopodidae	*Haematopus longirostris*	Pied Oystercatcher		•	•	•									•[4]
Laridae	*Anous tenuirostris melanops*	Australian Lesser Noddy	VU (EPBC Act); EN (BC Act)					•							
Laridae	*Chlidonias hybrida*	Whiskered Tern			•										
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull		•	•	•						•			•[4]
Laridae	*Hydroprogne caspia*	Caspian Tern	Mig. (EPBC & BC Acts)		•	•		•				•	•		•[4]
Laridae	*Larus dominicanus*	Kelp Gull			•										
Laridae	*Larus pacificus*	Pacific Gull		•	•	•		•							•[4]
Laridae	*Onychoprion anaethetus*	Bridled Tern	Mig. (EPBC & BC Acts)		•			•					•		
Laridae	*Stercorarius pomarinus*	Pomarine Skua (Pomarine Jaeger)	Mig. (EPBC & BC Acts)		•										
Laridae	*Sternula nereis nereis*	Fairy Tern	VU (EPBC & BC Acts)		•	•		•							•[4]
Laridae	*Thalasseus bergii*	Greater Crested Tern	Mig. (EPBC & BC Acts)		•	•							•		•[4]
Recurvirostridae	*Cladorhynchus leucocephalus*	Banded Stilt			•										
Recurvirostridae	*Himantopus himantopus*	Black-winged Stilt			•							•			
Recurvirostridae	*Recurvirostra novaehollandiae*	Red-necked Avocet			•	•									
Scolopacidae	*Actitis hypoleucos*	Common Sandpiper	Mig. (EPBC & BC Acts)		•			•				•	•		
Scolopacidae	*Arenaria interpres*	Ruddy Turnstone	VU/Mig. (EPBC Act); Mig. (BC Act)		•								•		
Scolopacidae	*Calidris acuminata*	Sharp-tailed Sandpiper	VU/Mig. (EPBC Act); Mig. (BC Act)					•				•	•		•[4]
Scolopacidae	*Calidris alba*	Sanderling	Mig. (EPBC & BC Acts)		•	•		•					•		•[4]

Family	Species[1]	Vernacular	Status	Biota (2009)	Birdata (Birdlife Australia 2023)	NatureMap (DBCA 2023a)	ELM (2017)	PM[2] (DCCEEW 2023)	Harewood (2018)	LEC (1990)	Litoria Ecoservices (2017)	Ninox (2011)	TPFA[3] (DBCA 2023c)	B & T survey (Phoenix 2025a)	This survey
Scolopacidae	*Calidris canutus*	Red Knot	VU/Mig. (EPBC Act); EN (BC Act)		•			•					•		
Scolopacidae	*Calidris falcinellus*	Broad-billed Sandpiper	Mig. (EPBC & BC Acts)		•								•		
Scolopacidae	*Calidris ferruginea*	Curlew Sandpiper	CR/Mig. (EPBC Act); CR (BC Act)		•			•					•		
Scolopacidae	*Calidris melanotos*	Pectoral Sandpiper	Mig. (EPBC & BC Acts)		•			•							
Scolopacidae	*Calidris ruficollis*	Red-necked Stint	Mig. (EPBC & BC Acts)		•			•					•		•[4]
Scolopacidae	*Calidris tenuirostris*	Great Knot	VU/Mig. (EPBC Act); CR (BC Act)		•			•					•		
Scolopacidae	*Limosa lapponica*	Bar-tailed Godwit	Mig. (EPBC & BC Acts)		•			•					•		•[4]
Scolopacidae	*Limosa limosa*	Black-tailed Godwit	EN/Mig. (EPBC Act); Mig. (BC Act)		•								•		
Scolopacidae	*Numenius madagascariensis*	Eastern Curlew	CR/Mig. (EPBC Act); CR (BC Act)					•					•		
Scolopacidae	*Numenius phaeopus*	Whimbrel	Mig. (EPBC & BC Acts)		•								•		
Scolopacidae	*Tringa brevipes*	Grey-tailed Tattler	Mig. (EPBC & BC Acts) P4 (DBCA list)										•		
Scolopacidae	*Tringa glareola*	Wood Sandpiper	Mig. (EPBC & BC Acts)		•									•	
Scolopacidae	*Tringa nebularia*	Common Greenshank	EN/Mig. (EPBC Act); Mig. (BC Act)		•	•		•				•	•		
Scolopacidae	*Tringa stagnatilis*	Marsh Sandpiper	Mig. (EPBC & BC Acts)		•										
Ardeidae	*Ardea alba*	Great Egret (Eastern Great Egret)			•	•						•			
Ardeidae	*Ardea pacifica*	White-necked Heron			•	•				•		•		•	•
Ardeidae	*Botaurus poiciloptilus*	Australasian Bittern	EN (EPBC & BC Acts)					•							
Ardeidae	*Bubulcus coromandus*	Cattle Egret			•			•						•	
Ardeidae	*Egretta garzetta*	Little Egret			•										•[4]
Ardeidae	*Egretta novaehollandiae*	White-faced Heron			•	•				•		•		•	•
Ardeidae	*Egretta sacra*	Eastern Reef Egret			•										
Ardeidae	*Ixobrychus flavicollis*	Black Bittern			•	•									
Ardeidae	*Nycticorax caledonicus*	Rufous Night Heron			•	•									
Threskiornithidae	*Platalea flavipes*	Yellow-billed Spoonbill			•	•						•		•	•
Threskiornithidae	*Platalea regia*	Royal Spoonbill			•	•				•					•
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		•	•	•						•		•	•
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		•	•	•				•		•		•	•
Columbidae	*Ocyphaps lophotes*	Crested Pigeon			•	•						•		•	•
Columbidae	*Phaps chalcoptera*	Common Bronzewing		•	•	•			•	•		•		•	•
Columbidae	*Phaps elegans*	Brush Bronzewing			•	•									
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra	Introduced	•	•	•			•	•		•		•	•
Halcyonidae	*Todiramphus sanctus*	Sacred Kingfisher			•	•				•				•	
Meropidae	*Merops ornatus*	Rainbow Bee-eater		•	•	•		•						•	
Cuculidae	*Cacomantis flabelliformis*	Fan-tailed Cuckoo			•	•				•		•			•
Cuculidae	*Chalcites basalis*	Horsfield's Bronze Cuckoo		•	•					•		•		•	•
Cuculidae	*Chalcites lucidus*	Shining Bronze Cuckoo		•	•					•		•		•	•
Cuculidae	*Heteroscenes pallidus*	Pallid Cuckoo			•	•				•		•			
Accipitridae	*Aquila audax*	Wedge-tailed Eagle			•	•				•		•		•	•
Accipitridae	*Circus approximans*	Swamp Harrier		•	•					•		•		•	•
Accipitridae	*Elanus axillaris*	Black-shouldered Kite			•	•						•		•	•
Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea-Eagle			•	•		•		•		•			•
Accipitridae	*Haliastur sphenurus*	Whistling Kite			•	•						•		•	•
Accipitridae	*Hamirostra isura*	Square-tailed Kite			•										
Accipitridae	*Hieraaetus morphnoides*	Little Eagle			•	•								•	•
Accipitridae	*Milvus migrans*	Black Kite			•	•									

Family	Species[1]	Vernacular	Status	Biota (2009)	Birdata (Birdlife Australia 2023)	NatureMap (DBCA 2023a)	ELM (2017)	PM[2] (DCCEEW 2023)	Harewood (2018)	LEC (1990)	Litoria Ecoservices (2017)	Ninox (2011)	TPFA[3] (DBCA 2023c)	B & T survey (Phoenix 2025a)	This survey
Accipitridae	*Pandion haliaetus*	Osprey	Mig. (EPBC & BC Acts)		•	•		•				•	•	•	•
Accipitridae	*Tachyspiza cirrocephala*	Collared Sparrowhawk			•	•						•			•
Accipitridae	*Tachyspiza fasciata*	Brown Goshawk			•	•						•		•	•
Falconidae	*Falco berigora*	Brown Falcon			•	•				•		•		•	•
Falconidae	*Falco cenchroides*	Australian Kestrel		•	•	•				•		•		•	•
Falconidae	*Falco longipennis*	Australian Hobby		•	•	•				•		•			•
Falconidae	*Falco peregrinus*	Peregrine Falcon	OS (BC Act)		•	•				•		•	•		•
Megapodiidae	*Leipoa ocellata*	Malleefowl	VU (EPBC & BC Acts)			•							•		
Phasianidae	*Coturnix pectoralis*	Stubble Quail			•	•						•		•	•
Phasianidae	*Synoicus ypsilophorus*	Brown Quail			•	•				•					
Rallidae	*Fulica atra*	Eurasian Coot			•	•						•		•	
Rallidae	*Gallinula tenebrosa*	Dusky Moorhen			•	•									
Rallidae	*Porphyrio melanotus*	Australasian Swamphen			•	•						•		•	
Rallidae	*Zapornia pusilla*	Baillon's Crake			•	•									
Rallidae	*Zapornia tabuensis*	Spotless Crake			•	•						•			
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		•	•	•				•		•		•	•
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		•	•	•				•		•		•	•
Acanthizidae	*Acanthiza inornata*	Western Thornbill			•	•				•		•			
Acanthizidae	*Gerygone fusca*	Western Gerygone		•	•	•				•				•	•
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		•	•	•			•	•		•		•	•
Acanthizidae	*Smicrornis brevirostris*	Weebill			•	•								•	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow			•	•				•		•		•	•
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow			•	•				•		•			•
Artamidae	*Cracticus nigrogularis*	Pied Butcherbird												•	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		•	•	•				•		•		•	•
Artamidae	*Gymnorhina tibicen*	Australian Magpie		•	•	•				•		•		•	•
Artamidae	*Strepera versicolor*	Grey Currawong		•	•	•				•					
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		•	•	•				•		•		•	•
Campephagidae	*Lalage tricolor*	White-winged Triller			•					•		•		•	•
Climacteridae	*Climacteris rufus*	Rufous Treecreeper			•	•								•	
Corvidae	*Corvus coronoides*	Australian Raven		•	•	•				•		•		•	•
Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird												•	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark			•	•				•		•		•	•
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		•	•	•			•	•		•		•	•
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		•	•	•				•		•		•	•
Estrildidae	*Stagonopleura oculata*	Red-eared Firetail			•	•				•					
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		•	•	•				•		•		•	•
Hirundinidae	*Petrochelidon ariel*	Fairy Martin			•	•									
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		•	•	•				•		•		•	•
Locustellidae	*Cincloramphus cruralis*	Brown Songlark								•				•	•
Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark								•					•
Locustellidae	*Poodytes gramineus*	Little Grassbird			•	•				•		•			
Maluridae	*Malurus elegans*	Red-winged Fairy-wren		•	•	•			•	•				•	•
Maluridae	*Malurus splendens*	Splendid Fairy-wren		•	•	•				•		•		•	•
Maluridae	*Stipiturus malachurus*	Southern Emu-wren			•	•				•		•			•

Family	Species[1]	Vernacular	Status	Biota (2009)	Birdata (Birdlife Australia 2023)	NatureMap (DBCA 2023a)	ELM (2017)	PM[2] (DCCEEW 2023)	Harewood (2018)	LEC (1990)	Litoria Ecoservices (2017)	Ninox (2011)	TPFA[3] (DBCA 2023c)	B & T survey (Phoenix 2025a)	This survey
Meliphagidae	*Acanthorhynchus superciliosus*	Western Spinebill			•	•				•		•		•	•
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		•	•	•			•	•		•		•	•
Meliphagidae	*Anthochaera lunulata*	Western Little Wattlebird		•	•	•				•		•			
Meliphagidae	*Epthianura albifrons*	White-fronted Chat			•	•				•		•		•	•
Meliphagidae	*Gavicalis virescens*	Singing Honeyeater		•	•	•								•	
Meliphagidae	*Gliciphila melanops*	Tawny-crowned honeyeater			•	•				•					
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater			•	•				•				•	•
Meliphagidae	*Manorina flavigula*	Yellow-throated Miner												•	
Meliphagidae	*Melithreptus chloropsis*	Western White-naped Honeyeater			•	•				•		•			
Meliphagidae	*Phylidonyris niger*	White-cheeked Honeyeater			•	•				•					
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater		•	•	•				•		•		•	•
Motacillidae	*Anthus australis*	Australian Pipit		•	•					•		•		•	•
Motacillidae	*Motacilla cinerea*	Grey Wagtail	Mig. (EPBC & BC Acts)					•							
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella			•	•				•					
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush		•	•	•				•				•	•
Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler		•	•	•				•		•		•	•
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler			•	•				•		•		•	
Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote		•	•	•				•				•	
Pardalotidae	*Pardalotus striatus*	Striated Pardalote		•	•	•				•				•	•
Petroicidae	*Eopsaltria griseogularis*	Western Yellow Robin		•	•	•									
Petroicidae	*Microeca fascinans*	Jacky Winter													•
Petroicidae	*Petroica boodang*	Scarlet Robin		•	•	•				•		•			•
Petroicidae	*Petroica goodenovii*	Red-capped Robin			•										
Petroicidae	*Quoyornis georgianus*	White-breasted Robin		•	•	•				•		•		•	
Sylviidae	*Acrocephalus australis*	Australian Reed Warbler			•	•						•			
Zosteropidae	*Zosterops lateralis*	Silvereye		•	•	•			•	•		•		•	•
Anhingidae	*Anhinga novaehollandiae*	Australasian Darter			•	•						•			•[4]
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican			•	•						•			•[4]
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant			•	•				•				•	•
Phalacrocoracidae	*Phalacrocorax carbo*	Great Cormorant			•	•						•			•
Phalacrocoracidae	*Phalacrocorax sulcirostris*	Little Black Cormorant			•	•						•		•	•
Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant			•	•						•			•
Sulidae	*Morus serrator*	Australasian Gannet			•	•									
Podicipedidae	*Podiceps cristatus*	Great Crested Grebe										•			
Podicipedidae	*Poliocephalus poliocephalus*	Hoary-headed Grebe			•	•						•			
Podicipedidae	*Tachybaptus novaehollandiae*	Australasian Grebe			•	•						•		•	
Diomedeidae	*Diomedea amsterdamensis*	Amsterdam Albatross	EN/Mig. (EPBC Act); CR/Mig. (BC Act)					•							
Diomedeidae	*Diomedea dabbenena*	Tristan Albatross	EN/Mig. (EPBC Act); CR/Mig. (BC Act)					•							
Diomedeidae	*Diomedea epomophora*	Southern Royal Albatross	VU/Mig. (EPBC & BC Acts)					•							
Diomedeidae	*Diomedea exulans*	Wandering Albatross	VU/Mig. (EPBC & BC Acts)					•					•		
Diomedeidae	*Diomedea sanfordi*	Northern Royal Albatross	EN/Mig. (EPBC & BC Acts)					•							
Diomedeidae	*Phoebetria fusca*	Sooty Albatross	VU/Mig. (EPBC Act); EN/Mig. (BC Act)					•							
Diomedeidae	*Thalassarche carteri*	Indian Yellow-nosed Albatross	VU/Mig. (EPBC Act); EN/Mig. (BC Act)		•			•							
Diomedeidae	*Thalassarche cauta*	Shy Albatross	VU/Mig. (EPBC & BC Acts)					•							
Diomedeidae	*Thalassarche chlororhynchos*	Atlantic Yellow-nosed Albatross	VU/Mig. (BC Act)			•							•		

Family	Species[1]	Vernacular	Status	Biota (2009)	Birdata (Birdlife Australia 2023)	NatureMap (DBCA 2023a)	ELM (2017)	PM[2] (DCCEEW 2023)	Harewood (2018)	LEC (1990)	Litoria Ecoservices (2017)	Ninox (2011)	TPFA[3] (DBCA 2023c)	B & T survey (Phoenix 2025a)	This survey
Diomedeidae	*Thalassarche impavida*	Campbell Albatross	VU/Mig. (EPBC & BC Acts)					•							
Diomedeidae	*Thalassarche melanophris*	Black-browed Albatross	VU/Mig. (EPBC Act); EN/Mig. (BC Act)					•					•		
Oceanitidae	*Pelagodroma marina*	White-faced Storm Petrel			•										
Procellariidae	*Ardenna carneipes*	Flesh-footed Shearwater	VU/Mig. (BC Act)					•							
Procellariidae	*Ardenna grisea*	Sooty Shearwater	Mig. (BC Act)					•							
Procellariidae	*Halobaena caerulea*	Blue Petrel	VU (EPBC Act)					•							
Procellariidae	*Macronectes giganteus*	Southern Giant Petrel	EN/Mig. (EPBC Act); Mig. (BC Act)					•							
Procellariidae	*Macronectes halli*	Northern Giant Petrel	VU/Mig. (EPBC Act); Mig. (BC Act)					•							
Procellariidae	*Pachyptila turtur*	Fairy Prion						•							
Procellariidae	*Pterodroma mollis*	Soft-plumaged Petrel	VU (EPBC Act)					•							
Procellariidae	*Puffinus assimilis*	Little Shearwater						•							
Cacatuidae	*Cacatua sanguinea*	Little Corella												•	
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)		•	•		•		•		•	•	•	•
Cacatuidae	*Calyptorhynchus* sp.	black cockatoo species[5]	EN-VU (EPBC & BC Acts)		•										
Cacatuidae	*Calyptorhynchus/Zanda* sp.	black cockatoo species	EN-VU (EPBC & BC Acts)											•	•
Cacatuidae	*Eolophus roseicapilla*	Galah			•									•	•
Cacatuidae	*Zanda baudinii*	Baudin's Cockatoo	EN (EPBC & BC Acts)	•	•	•		•				•	•	•	•
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	•	•	•		•					•	•	•
Cacatuidae	*Zanda* sp.	white-tailed black cockatoo species	EN (EPBC & BC Acts)	•		•				•			•	•	•
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		•	•	•				•		•		•	•
Psittaculidae	*Neophema elegans*	Elegant Parrot			•	•				•		•		•	•
Psittaculidae	*Neophema petrophila*	Rock Parrot			•	•									
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		•	•	•				•				•	•
Psittaculidae	*Platycercus icterotis*	Western Rosella		•	•	•				•		•			•
Psittaculidae	*Purpureicephalus spurius*	Red-capped Parrot		•	•	•						•			•
Strigidae	*Ninox boobook*	Boobook Owl			•	•									•
Tytonidae	*Tyto javanica*	Eastern barn owl										•		•	
Tytonidae	*Tyto novaehollandiae novaehollandiae*	Masked Owl (southwest)	P3 (DBCA list)		•									•	•
Dromaiidae	*Dromaius novaehollandiae*	Emu		•	•	•				•		•		•	•
Turnicidae	*Turnix varius*	Painted Button-quail										•			
Bats (10)															
Molossidae	*Austronomus australis*	White-striped Free-tailed Bat										•		•	•
Molossidae	*Mormopterus kitcheneri*	South-western Free-tailed Bat										•			
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat		•								•		•	•
Vespertilionidae	*Chalinolobus morio*	Chocolate Wattled Bat		•		•						•		•	•
Vespertilionidae	*Falsistrellus mackenziei*	Western False Pipistrelle	P4 (DBCA list)	•		•						•	•	•	•
Vespertilionidae	*Nyctophilus geoffroyi*	Lesser Long-eared Bat												•	•
Vespertilionidae	*Nyctophilus gouldi*	Gould's Long-eared Bat				•									
Vespertilionidae	*Nyctophilus holtorum*	Holt's Long-eared Bat												•	•
Vespertilionidae	*Nyctophilus major*	Greater Long-eared Bat													•
Vespertilionidae	*Vespadelus regulus*	Southern Forest Bat		•		•						•		•	•

[1]Species shaded in grey are pelagic seabirds and unlikely to occur in the study area. [2]PM – Protected Matters Database. [3]TPFA – Threatened and Priority Fauna Database. [4]Species only recorded at regional sites and not in study area in either the BBRAS or Basic and Targeted fauna survey. [5]Could represent red- or white-tailed black cockatoo as some desktop records predate taxonomic revision of Carnaby's and Baudins into *Zanda* genus.

Appendix 4 Profiles for conservation significant species of concern

Osprey (*Pandion cristatus*; Mig. EPBC & BC Acts)

Information gathered from Bierregaard (2020) and DCCEEW (2024f).

Behaviour

Ospreys primarily feed on fish, especially mullet, but may also eat molluscs, crustaceans, insects, reptiles, birds, and mammals. They mostly forage during the day, sometimes hunting at night, by soaring, quartering, or circling above water to locate prey. Once prey is spotted, they hover briefly before diving feet first to capture it. Hunting also occurs from perches when necessary. This behaviour is typical of their hunting style and is largely focused on locating fish near the surface of bodies of water.

Habitat

Ospreys occur in littoral and coastal habitats, as well as terrestrial wetlands across tropical and temperate Australia and offshore islands. They are found in a variety of wetland habitats, including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, exposed reeds, and along major rivers. They show a preference for coastal cliffs and elevated islands in some areas but may also inhabit low sandy, muddy, or rocky shores and coral cays. Additionally, they may travel through heath, woodland, or forest habitats when moving between foraging sites.

Movement

Ospreys are classified as migratory in some parts of the world, where they move north and south depending on weather conditions. However, the species is considered a resident in Australia. They do not typically migrate long distances within the country but may move locally in response to changes in weather or food availability.

Flight behaviour

Most flight occurs during the day during hunting and movement between nesting and foraging habitat. Ospreys generally search for prey by soaring, quartering or circling above a body of water (possibly within RSA height) and scanning below for fish. They occasionally search for prey by scanning from a perch. When a prey item is located while soaring or circling, they hover momentarily and then dive down, sometimes in stages.

Demographic factors

The Australian population size is unclear, but they are common and widely distribution in coastal regions across most of the country. There are estimated to be approximately 100,000–1,200,000 mature individuals globally.

Blue-billed Duck (*Oxyura australis*; P4 DBCA list)

Information gathered from Birdlife International (2024).

Habitat

Blue-billed Ducks occur in shallow freshwater marshes, swamps and lakes with extensive bordering reedbeds and other dense vegetation (e.g. Typha). Outside breeding season, they are also found on larger lakes, sewage ponds, lagoons and wide rivers, including saltwater bodies. They infrequently occur on marine waters.

Movement

Not truly migratory, though relatively dispersive as breeding grounds are generally abandoned after breeding is completed. They concentrate in a few favourable areas where they undergo moult and stay until just before the start of next breeding season. Widespread dispersal follows exceptional flooding events.

Behaviour

Breeding occurs between September – March. They feed on seeds and vegetative parts of aquatic plants and aquatic insects and their larvae, mostly by sieving bottom debris while (usually for <10 seconds). They also dabble on surface and strips seeds from overhanging plants.

Flight behaviour

Flight is mostly diurnal. They form large, loose flocks, especially in non-breeding season, and can travel long distances. This long distance flight is likely higher than normal flight, which is relatively low and direct over water.

Demographic factors

The population size in Australia is estimated to be between 11,000–19,000 with 15,000 mature individuals

Fork-tailed Swift (*Apus pacificus*; Mig. EPBC & BC Acts)

Information gathered from DAWE (2021a).

Habitat

In Australia, Fork-tailed Swifts are found across a variety of habitat. They mostly occur over inland plains but sometimes above foothills or in coastal areas, as well as over cliffs, beaches, islands and sometimes well out to sea. Over land, they mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They also occur over settled areas.

Fork-tailed Swifts probably roost aerially but are occasionally observed to land. They were once recorded roosting in trees, using a bare exposed branch emergent above the foliage. Breeding does not occur in Australia.

Movement

Fork-tailed Swifts are a widespread migratory species that overwinters in Australia. They are transitory across all habitat types. In WA, there are sparsely scattered records of the Fork-tailed Swift along the south coast. They are widespread in coastal and subcoastal areas between on the lower and mid-west coast, including on nearshore and offshore islands.

Fork-tailed Swifts usually arrive in Australia around October; some rarely arriving early in September. Most observations of arrival occur in the south due to a lack of observers in the north of the country. Some birds have been sighted in WA arriving from Indonesia between October–November. In north and north-west WA, most have departed by the end of April.

They are highly mobile within Australia, and large flocks often precede or follow low pressure systems as they cross the country in search of food. In WA, they are common in Broome, with maximum numbers occurring in February.

Behaviour

Fork-tailed Swifts are exclusively aerial (1–300 m above ground). Foraging occurs in the air, often along the edge of low-pressure systems. Often occur in areas of updraughts, especially around cliffs.

Flight behaviour

Feeding flight is characterized by circular flight patterns throughout areas of high prey concentration, whilst dispersal flight is more direct. They feed in flocks ranging from 10–1,000 birds, but the largest recorded flock in Australia was 90,000 birds.

Demographic factors

The global population size has not been quantified, but they are reported to be generally common throughout most of the breeding range. The species is highly transitory, and the Australian population is estimated as at least in the tens of thousands.

Australasian Bittern (*Botaurus poiciloptilus*; EN EPBC & BC Acts)

Information gathered from DCCEEW (2022) and Marchant and Higgins (1990).

Habitat

Australasian Bitterns occur mainly in freshwater wetlands in the temperate southeast and southwest of Australia. They also rarely occur in estuaries or tidal wetlands. Their preferred habitat comprises wetlands with dense vegetation, especially where there is a mosaic of cover, from 0.5–3.5 m in height, where they forage in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. They favour freshwater habitats with permanent or seasonal water, particularly those dominated by sedges, rushes and/or reeds growing over a muddy or peaty substrate. In south-western Australia, they also occur in wetlands where thickets of wetland shrubs (e.g. *Melaleuca*, *Agonis* spp.).

Movement

Australasian Bitterns will move long distances between habitats when according to changes in suitability, but generally do not move seasonally. During wet years, they occur in high densities in temporary or infrequently filled wetlands and utilise ephemeral wetlands when moving from areas that are drying out. During non-breeding season from April to October, there are an influx of birds in regularly monitored wetlands in the Melbourne area.

Behaviour

The Australasian Bittern breeds from October to February in solitary pairs, or polygamously with up to three nesting females per booming male. Usually nocturnal. Feeds on tadpoles, frogs, fish and dragonfly larvae in wetland habitat.

Flight behaviour

The Australasian Bittern occurs solitarily, in pairs or dispersed aggregations of up to 34 birds. Flies with steady, slow wing-beats that are owl-like. Long-distance flight is likely higher than normal flight, though heights are unclear.

Demographic factors

The estimated number of mature individuals is <2,000 globally with approximately 1,300 (range 750–1,800) in Australia. The WA population is considered to comprise fewer than 100 individuals.

Pacific Golden Plover (*Pluvialis fulva*; Mig. EPBC & BC Acts)

Information gathered from DAWE (2021b); Geering *et al.* (2007); Newton (2008); Kloeckner *et al.* (1982); Johnson OWP *et al.* (2024) and Hansen *et al.* (2016).

Habitat

In non-breeding grounds in Australia, Pacific Golden Plovers usually inhabit coastal habitats and occasionally occurs around inland wetlands. They occur on beaches, mudflats, sandflats, mangroves, low saltmarsh, beds of seagrass in sheltered areas, harbours, estuaries, lagoons, and evaporation ponds in saltworks. They are also sometimes recorded on islands, sand and coral cays and exposed reefs and rocks. They are less common in terrestrial habitats, usually wetlands such as fresh, brackish or saline lakes, billabongs, pools, swamps and wet claypans. Other terrestrial habitats inhabited include short or long grass in paddocks, crops, airstrips, ploughed and recently burnt areas. They are very occasionally recorded well away from water.

Movement

Migratory. Pacific Golden Plovers occur at non-breeding grounds in Australia mostly between September and May, with highest numbers in eastern and south-eastern Australia. They generally arrive in the Kimberley coast in late September and in southern areas such as south-eastern South Australia in October and November. Those arriving in the Kimberley Division of WA occur on passage in October. Birds begin to migrate directly without stopping northwards along the east coast of Australia in late February and March. In northern WA, they occur on passage in February and March and leave the Kimberley Division in late April. Small numbers of birds remain in the non-breeding range throughout the Australian winter, though generally not in the extreme south of the country.

Behaviour

Pacific Golden Plovers are both diurnal and nocturnal. They feed on molluscs, polychaete worms, insects and insect larvae, spiders and crustaceans in non-breeding season, using a combination of picking and run-picking based on visual stimulus. Very occasionally eat seeds, leaves, lizards, birds' eggs and small fish.

Flight behaviour

Pacific Golden Plovers can forage in flocks of 100 or more, and also occur in mixed-species shorebird flocks. Flocks are usually of 20 to 50 birds, though single birds are sometimes seen. The species is capable of swift and extended flight, and are considered the fastest flying shorebirds. Tracking records suggest an average ground speed of around 50 kph during long transoceanic flights.

Migratory shorebirds usually fly at high altitudes during migration, with flight heights of 1,000–5,000 m reported as typical. Migratory flight heights are also variable based on weather systems and time of day, and the mean ground speed of migratory bird flights in one study from a pacific island was 63 kph.

Demographic factors

The EAAF population is estimated at 120,000 and the global population is estimated at about 170,000–220,000. The number of birds recorded in Australia can vary significantly between years.

Peregrine Falcon (*Falco peregrinus*; OS BC Act)

Information gathered from BirdLife Australia (2023); Debus (2012); Department for Environment and Heritage (2024); White (2024).

Habitat

Peregrine Falcons are highly adaptable, breeding across diverse habitats from the tropics to cold deserts and high-altitude areas up to 3300 m. They have been recorded flying up to 4,000 m during long-distance flight and can be found in various habitats. Preferred nesting sites include cliffs, ledges, rocky outcrops, and occasionally tall trees. Cliff edges and wooded watercourses are particularly favoured, with nests often placed on ledges or repurposed from other large bird species.

Movement

Peregrine Falcons display site specific behaviours, mainly appearing in areas during transitory flights or while foraging. They undergo long distance natal dispersal, though once a nest is established site fidelity is high. The Australian subspecies does not migrate.

Behaviour

As diurnal hunters, Peregrine Falcons display varied flight patterns based on feeding needs and conditions. Most prey are birds (around 75–100% of all prey). Hunting behaviours include aggressive pursuits, ambushes from perches, and even occasional ground approaches. They also often feed by ambushing from low perches in the morning and late afternoon. During the breeding season, it perches on cliffs or vantage points near nests, scanning large airspaces where other birds fly. From these perches, it can dive easily onto low-flying prey or climb to intercept high-flying birds. Aerial hunting is less common in poor weather, when perching-based hunts prove more successful.

Flight behaviour

The species typically hunts from high perches or while soaring to spot prey below. Flight altitude varies with seasonal factors and during localized migrations. They are known to soar several hundred metres high, enhancing their vantage over hunting grounds. Flight types used by the species include:

- Flapping Flight - During migration or travel between hunting areas, Peregrine Falcons use a normal cruising wing beat with speeds between 40–55 km/h and can reach altitudes up to 240 m. When pursuing prey, the wing beat becomes faster and more powerful. Pursuit may include low-altitude, contour-following flights or direct tail-chasing.
- Soaring - Static soaring is observed as young individuals begin to fledge, with wings held motionless while moving parallel to a cliff face or similar terrain, often at heights of 3–100 m. As they develop, young individuals soar on thermals within weeks of fledging, occasionally joined by adults.
- Stoop - The stoop is a high-speed dive where the birds fold their wings close to their bodies to reach maximum speeds, braking abruptly by rising or leveling out before striking prey. Their speeds depend on their mass and wing structure. Typical dives are executed from heights of 215–320 m.

Demographic factors

It is estimated that there are 6,000–10,000 individuals within Australia.

Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii* subsp. *naso*; VU EPBC & BC Acts)

Information gathered from DCCEEW (2024e); DAWE (2022) and Garnett and Baker (2021) .

Habitat

Forest Red-tailed Black Cockatoos inhabit the dense Jarrah, Karri and Marri forests of South-west WA, favouring forests receiving more than 600 mm average rainfall annually in the hilly interior. Although most records are in Jarrah-Marri forests, they have been observed in a range of other forest and woodland types. These include Blackbutt, Wandoo, Tuart, Albany Blackbutt, Yate and Flooded gum. They are also now seen feeding in more open agricultural areas and in the Perth metropolitan area, where they will also breed.

Breeding habitats are generally in woodland or forest but may also breed in partially cleared woodland or forest, including isolated trees. Nest in hollows in live or dead trees (many eucalypt species may provide suitable hollows), particularly Marri, Karri, Wandoo, Bullich, Blackbutt Tuart and Jarrah.

Movement

Forest Red-tailed Black Cockatoos roost in trees at night, leaving trees at sunrise before separating in smaller groups to bask and feed for 10–12 hours. They also travel between feeding habitat and water sources to drink. They return to their roost at dusk.

Forest Red-tailed Black Cockatoos are predicted to have a breeding home range of 116-187 ha. Their movements are generally influenced by available water and foraging resources. Changes in foraging preferences due to habitat alteration have led more regular movement of birds in the northern Darling plateau area onto the Swan Coastal Plain and around the Perth metropolitan area, to feed on cape lilac. Birds on the have also been recorded moving across the wheatbelt since 2010, possibly driven by lack of resources, where previously there had not been records.

Behaviour

Forest Red-tailed Black Cockatoos roost in any tall trees, but especially on tall Jarrah, Marri, Blackbutt Tuart and introduced eucalypt trees or large trees on the edges of forests. Breeding can occur in Autumn and Spring, sometimes twice in one year, with a single chick raised per breeding event. Around 90% of their diet consists of the seeds of Marri and Jarrah, and the species relies heavily on both trees during breeding periods. However, they also consume other native trees and have been increasingly observed feeding on Cape Lilac.

Flight behaviour

They usually occur in family flocks of 10 birds, though groups of 25 or more birds occasionally occur. Flight is mainly crepuscular, with travel between foraging and roosting habitat occurring during the dawn and dusk hours. However, movement throughout foraging habitat occurs throughout the day. Flight is often observed above canopy height, with deep flapping wingbeats.

Demographic factors

The subspecies' population is estimated to be around 17,000 birds. Population trends are unclear.

Baudin's Cockatoo (*Zanda baudinii*; EN EPBC & BC Acts)

Information gathered from Department of Agriculture (2021a); (Johnstone & Kirkby 2008) and (Garnett & Baker 2021).

Habitat

Baudin's Cockatoos' breeding habitat is generally in Jarrah, Marri and Karri woodland or forest of higher rainfall areas in south-west Western Australia. However, they may also breed in partially cleared woodland or forest, including isolated trees. They nest in hollows in live or dead trees (many eucalypt species may provide suitable hollows), particularly Karri, Marri, Jarrah, Wandoo, Bullich and Tuart. Night roosting habitat includes tall trees such as Jarrah, Flooded Gum, Blackbutt, Tuart and introduced eucalypts. These roosting habitats are ideally around riparian environments, natural water sources or artificial permanent water sources.

Movement

Baudin's Cockatoos breed in spring and into summer (October - January), primarily in the south of the range. Once breeding season ends in January, many birds depart from nesting areas and move northward, forming larger foraging flocks in response to changing food resources. In early February and March, the flocks arrive at non-breeding traditional roosts in the central and northern parts of the Darling plateau (from about Collie north to Mundaring). During non-breeding season, birds in the Perth hills districts move westward onto the southern Swan Coastal Plain in mid-August just before heading south to breed. By mid-October, most birds are either back in their breeding quarters in the south or heading there. Breeding adults that migrate probably return to the same nesting areas each year, though no pairs have been observed returning hollows in successive years.

Behaviour

They mainly feed on the seeds of Marri and rarely Jarrah, as well as seeds of native proteaceous plant species such as *Banksia* spp. and *Hakea* spp.). They also consume insects and insect larvae; pith of Kangaroo Paw ; tips of *Pinus* spp., tips of *Macadamia* spp., and almonds, pecans, seeds of apples, seeds of pears and seeds of persimmons from orchards. Marri is the primary food source with the birds using its seeds, flowers, nectar and buds. A single offspring is raised per breeding event.

Flight behaviour

Although flocks of up to 900 have been recorded, they most commonly move about in small groups of 3, consisting of the adult pair and a dependent juvenile. These flocks base themselves at roost sites and use the roosts to access the local foraging resources. Numbers tend to be largest at the roost site between dusk and dawn. Movement throughout foraging habitat occurs throughout the day. Flight is often observed above canopy height, with deep flapping wingbeats, though flight over long distances between foraging and breeding parts of the range may be higher.

Demographic factors

The total population of the species is estimated to be 5,000–8,000. It was estimated as 10,000–15,000 from 1995–2004 with a declining trend.

Carnaby's Cockatoo (*Zanda latirostris*; EN EPBC & BC Acts)

Information gathered from Department of Agriculture (2021b) and Garnett and Baker (2021).

Habitat

Breeding habitat of Carnaby Cockatoos is generally in heaths, woodland or forest of south-western Western Australia. They also breed in partially cleared woodland or forest, including isolated trees. Nesting habitat is inland, though increasing numbers are breeding closer to the coast due to habitat loss in the Wheatbelt. Nesting habitat includes in hollows in live or dead Eucalypts. Night roosting habitat includes tall trees such as Salmon Gum, Wandoo, Marri, Karri, Blackbutt, Tuart, introduced eucalypts and introduced pines. Roosting habitats ideally occur around riparian environments, natural permanent water sources and artificial permanent water sources. Birds will forage in woodlands used for breeding. Outside of breeding season, Carnaby's Cockatoos will feed in Banksia woodlands on the Swan Coastal Plain, the Perth area and in Banksia heath on the southern coast.

Movement

Carnaby's Cockatoos are partly resident and partly migratory. In high rainfall areas, with high quantities of native vegetation, they are resident. However, in areas that are drier or have been cleared, they become breeding migrants. Populations that breed in drier areas of the range arrive at breeding localities in late winter and spring. Once their summer breeding is complete, they move into areas of high rainfall. For example, birds breeding in Badgingarra, Dandaragan and Moora regions tend to move west after breeding, into higher rainfall areas especially near coastal banksia scrubs (e.g. at Wanagarren Nature Reserve, Nilgen Nature Reserve and Yanchep area), then south onto the southern Swan Coastal Plan, including the Perth Metropolitan Area, Lake Clifton and Myalup.

Behaviour

Carnaby's Cockatoos feed on seeds, flowers and nectar of native proteaceous plant species as well as *Callistemon* spp. and Marri. They will also feed on seeds of introduced species including Pines, *Erodium* spp., wild radish, canola, almonds, macadamia and pecan nuts; insects and insect larvae; occasionally apples and persimmons; and liquidambar. They have been reported to feed on canola crops. One chick is raised per breeding event, from eggs laid in large eucalypt hollows.

Flight behaviour

When not breeding, Carnaby's Cockatoos tend to aggregate in large flocks and move through the landscape in search of food. These flocks base themselves at roost sites, which are usually the tallest trees in an area and often located in or near riparian environments or permanent water. Different roosts may be used by birds during the non-breeding period and by non-breeding birds during the breeding period. Numbers tend to be largest at the roost site between dusk and dawn and surveys for roosts should occur at these times, as birds are leaving or returning to roost sites, over several days. Movement throughout foraging habitat occurs throughout the day. Flight is often observed above canopy height, with deep flapping wingbeats, though flight over long distances may be higher altitude.

Demographic factors

The population is estimated at around 35,000 birds. It was estimated at 40,000 in 2013, though the species is undergoing ongoing population decline.

Common Sandpiper (*Actitis hypoleucos*; Mig. EPBC & BC Acts)

Information gathered from DCCEEW (2024c); Hansen *et al.* (2016) and Geering *et al.* (2007).

Habitat

Common Sandpipers utilise a wide range of coastal wetlands and some inland wetlands of varying salinity. The species is mostly found around muddy margins or rocky shores and rarely on mudflats. They have been recorded in estuaries, deltas of streams, as well as on banks farther upstream, around lakes, pools, billabongs, reservoirs, dams, claypans, occasionally piers and jetties. The muddy margins utilised by the species are often narrow, and may be steep.

Foraging occurs in shallow water and on bare soft mud at the edges of wetlands; often where obstacles project from substrate, e.g. rocks or mangrove roots. However, they sometimes venture into grassy areas adjoining wetlands. Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves. They are known to perch on posts, jetties, moored boats and other artificial structures, and to sometimes rest on mud or loaf on rocks.

Behaviour

They are diurnal feeding shorebirds that feed on low-flying insects and terrestrial insects. They are very active and are often observed following prey bobbing their tail. The species is solitary and is most commonly observed alone or in small flocks.

Movement

Migratory. They breed in Eurasia and move south for the boreal winter. Post-breeding, the southward migration usually begins July–November, with individuals arriving from July onwards in South Australia, WA and the Northern Territory. The non-breeding movements of the species within Australia are poorly known.

Flight behaviour

Common Sandpipers do not form large flocks like other shorebirds during migration and are often found alone or in pairs. Flight during the southern migration passage is mostly diurnal, whereas the northern passage mainly occurs by night. Migratory shorebirds usually fly at high altitudes during migration, with flight heights of 1,000–5,000 m reported as typical. Migratory flight heights are also variable based on weather systems and time of day, and the mean ground speed of migratory bird flights in one study from a pacific island was 63 kph.

When flushed, they fly low over water often in direct straight lines.

Demographic factors

The East Asian-Australasian Flyway (EAAF) population is estimated as 190,000. The global population is estimated to number 4,950,000–7,500,000 individuals.

Ruddy Turnstone (*Arenaria interpres*; VU/Mig. EPBC Act; Mig. BC Act)

Information gathered from DCCEEW (2024g); Geering *et al.* (2007); Newton (2008); Kloeckner *et al.* (1982); Hansen *et al.* (2016) and Garnett and Baker (2021).

Habitat

Ruddy Turnstones occur in a wide variety of coastal habitats, including exposed rock coastlines, coral reefs, shallow tidal pools, beaches, estuaries, harbours, bays, coastal lagoons, low saltmarsh, exposed beds of seagrass, sewage ponds and mudflats. In northern Australia they may prefer wide mudflats. In southern Australia, they prefer rockier coastlines and are less numerous on large embayments with extensive mudflats.

Movement

Ruddy Turnstones are migratory, with 6 recognised populations. They move south to non-breeding areas with a partial overlap of populations on passage. There may be 2 routes of migration to Australia, with birds occurring in east Australia and New Zealand arriving from a migration south across the Pacific from east Asia and returning north via the east coast of Asia. The birds in the western areas of Australia may come from populations migrating south from east Asia who then return north via east Asia. The species enters Australia from August onwards, and movements into and through Australia continue until at least October. When returning to breeding grounds, Ruddy Turnstones leave sites in the south of Australia from mid-March. Some birds may fly over north Australia and/or touch down in north-west or north Australia though some adults in north-west Australia are thought to be capable of flying non-stop to the south coast of China.

Behaviour

Nocturnally and diurnally feed mainly on insects, worms, crustaceans, molluscs, and spiders. They have also been occasionally recorded feeding on eggs and carrion. During the non-breeding season, their only food source is maggots and larvae obtained from picking decomposing seaweed.

Flight behaviour

They are commonly seen singly or, more usually, in loose groups of 20–100 among mixed shorebird flocks, along coasts and occasionally inland. They tend to fly in tight coordinated flocks when moving locally, but in loose lines when migrating. Migratory shorebirds typically fly at high altitudes during migration, with flight heights of 1,000–5,000 m reported as typical. Migratory flight heights are also variable based on weather systems and time of day. Migratory flight heights are also variable based on weather. The mean ground speed of migratory bird flights passing a pacific island was 63 kph.

Demographic factors

The Australasian East Asian Flyway (EAAF) population is estimated at 30,000. The Australian population is estimated at ~19,000 based on extrapolation of the EAAF estimate and other data. The population is undergoing rapid decline.

Sharp-tailed Sandpiper (*Calidris acuminata*; VU/Mig. EPBC Act; Mig. BC Act)

Information sourced from DCCEEW (2024a); Mlodinow *et al.* (2024) Geering *et al.* (2007); Newton (2008); Kloeckner *et al.* (1982); Hansen *et al.* (2016) and Garnett and Baker (2021).

Habitat

Sharp-tailed Sandpipers forage in fresh and hypersaline environments, feeding along water edges on mudflats, coastal and inland wetlands, and sewage ponds. After rainfall, they may also feed on agricultural pastures. During migration, they roost and forage on rocky and sandy beaches, freshwater habitats, and inland saltwater areas.

Movement

Sharp-tailed Sandpipers breed in northern Siberia from June to August and migrate in flocks to their non-breeding areas south of the Equator. Small numbers arrive in Australia by mid-August and the majority by September. Their northward migration for the breeding season begins by April, and they are among the first migratory shorebirds to leave Australia. In wet years in northern Australia, inland birds do not migrate to southern Australian and remain in ephemeral wetlands.

Behaviour

Sharp-tailed Sandpipers are omnivorous, primarily feeding on seeds, worms, molluscs, crustaceans, and insects, which they hunt by pecking and jabbing their beak into the muddy substrate. They often form large mixed flocks with other migratory shorebirds in suitable foraging and roosting habitats.

Flight behaviour

Birds migrating from Siberia travel in flocks of fewer than 1,000 individuals. Migratory shorebirds usually fly at high altitudes during migration, with flight heights of 1,000–5,000 m reported as typical. Migratory flight heights are also variable based on weather systems and time of day, and the mean ground speed of migratory bird flights in one study from a pacific island was 63 kph.

In Australia, they form large mixed flocks with other shorebird species at wetlands and salt lakes which can disperse rapidly when disturbed. When flushed, they exhibit rapid, zigzag flight patterns. During migration or when changing feeding locations, their flight is more leisurely with loose, measured wing beats.

Demographic factors

Their estimated population in the East Asian - Australasian Flyway (EAAF) in 2016 was 85,000 birds, all believed to migrate to Australia. By 2020, the population was estimated to have decreased to ~73,000 mature individuals, based on extrapolation from 2016 data and trends from related studies.

Sanderling (*Calidris alba*; Mig. EPBC & BC Acts)

Information gathered from DCCEEW (2024h); Geering *et al.* (2007); Newton (2008); Kloeckner *et al.* (1982); Hansen *et al.* (2016) and Garnett and Baker (2021).

Habitat

In Australia, Sanderlings are usually found on the coast, mostly on open sandy beaches exposed to open sea-swell and on exposed sandbars and spits and shingle banks, where they forage in the wave-wash zone and amongst rotting seaweed. They also occur on beaches that may contain rocky outcrops. They more rarely occur on more sheltered sandy shorelines and in near coastal wetlands, such as lagoons, hypersaline lakes, salt ponds and samphire flats. There are also rare inland records from sandy shores of ephemeral brackish lakes and brackish river pools. They will roost on or behind bare sand high on the beach, clumps of washed-up kelp, coastal dunes, and on rocky reefs and ledges.

Movement

Migratory. Sanderlings breed in the holarctic region and move south to broad non-breeding areas. They arrive in Australia during September, mostly occurring in north-western Australia. They move through the northern regions in September–November and cross the continent to the south Australia coast. Small numbers regularly arrive during late August and early September at Rottnest Island, south-west WA. Between March to May, they depart the non-breeding range in south-east Australia. They apparently move west along the south coast of Australia and across the continent before moving north, with at least some birds stopping on the north coast. A few birds, particularly young birds, remain in Australia during winter with other non-breeding areas during the breeding season, though numbers may vary at a site between days indicating birds are nomadic at this time.

Behaviour

Sanderlings are omnivorous, foraging on plants, seeds, worms, crustaceans, spiders, insects, medusae, fish, larger molluscs and crustaceans. They are very active when foraging, often in tightly synchronised flocks, darting onto moist sand between breaking waves picking up food items from the surface of the wet beach. Foraging may also occur at the edges of shallow pools on sandspits and on nearby mudflats. Individuals may also defend a feeding territory during the non-breeding period.

Flight behaviour

Sanderlings tend to migrate in long flights, overflying large areas, typically in small flocks of less than a thousand. Migratory shorebirds usually fly at high altitudes during migration, with flight heights of 1,000 – 5,000 m reported as typical. Migratory flight heights are also variable based on weather systems and time of day, and the mean ground speed of migratory bird flights in one study from a pacific island was 63 kph. Normal, non-migratory flight is rapid and low.

Demographic factors

The East Asian-Australasian Flyway (EAAF) population is estimated to be 30,000. The number during the non-breeding period in Australia is estimated to be 10,000.

Curlew Sandpiper (*Calidris ferruginea*; CR/Mig. EPBC Act; Mig (BC Act)

Information is gathered from DCCEEW (2023); Hansen *et al.* (2016); Geering *et al.* (2007); Newton (2008); Hansen *et al.* (2016); Higgins and Davies (1996) and Garnett and Baker (2021).

Habitat

Curlew Sandpipers are found in brackish lagoons, estuaries, mudflats, sandflats, saltmarshes and to a lesser extent exposed coral, rocky shores and sandy beaches. Foraging occurs in mudflats and nearby shallow water, at the edges of shallow pools, drains and along sandy shores, often following the receding tide to feed near the water's edge. They also forage on mudflats that have been exposed for longer periods, typically in small groups. At high tide, they tend to forage in areas of low, sparse emergent vegetation, such as saltmarsh, and sometimes in flooded paddocks or inundated salt flats. Roosting typically occurs around intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets, and lagoons. They also roost in non-tidal swamps, lakes, and lagoons near the coast. Occasionally, they are found near ponds in saltworks or sewage farms, and individuals are occasionally recorded inland around ephemeral and permanent water sources with bare mud or sand edges.

Movement

Curlew Sandpipers migrate from Siberia and occur in Australia from late August – April. Males arriving earlier than females to non-breeding habitat. In Australia, the first adults arrive in the northwest during mid-August and in the southeast during late August, and most adults have arrived by the end of September. The species begins its northward migration during early March, with most birds having departed by early April and nearly all migrants having left by the end of April. Many juveniles do not return to breeding territory in their first year of life, remaining in non-breeding locations. Within Australia in the non-breeding season, birds do not move long distances between habitat.

Behaviour

Curlew Sandpipers are gregarious, often found in large flocks in both fresh and brackish waters. They forage in mixed flocks with other shorebird species, pecking at invertebrates on the surface of mudflats or making shallow probes below the surface.

Flight behaviour

Curlew Sandpipers form large mixed flocks with other shorebird species, sometimes travelling in these large flocks between roosting and foraging habitats. Roosting and foraging flight activities occur during the day and night. Migratory shorebirds typically fly at high altitudes during migration, with flight heights of 1,000–5,000 m reported as typical. Migratory flight heights are also variable based on weather systems and time of day. Flight speed during migration has been estimated at 70–75 km per hour. When flushed, Curlew Sandpiper flight has been described as "swift and low".

Demographic factors

The estimated population in the East Asian-Australasian Flyway (EAAF) in 2016 was 90,000 birds, of which 45,500 were thought to come to Australia. The estimated Australian population in 2020 was ~40,000 mature individuals, with a rapidly declining population trajectory.

Pectoral Sandpiper (*Calidris melanotos*; Mig EPBC & BC Acts)

Information gathered from DCCEEW (2024c); Mlodinow *et al.* (2024); Wetlands International (2024); Geering *et al.* (2007); Newton (2008); Kloeckner *et al.* (1982); Higgins and Davies (1996) and Hansen *et al.* (2016).

Habitat

In Australasia, they forage and roosts in shallow wetlands, ranging from fresh to saline. They are typically found in coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains, and artificial wetlands. Breeding does not occur in Australia.

Movement

Migratory, present in Australia from September–June. One of the first species to depart breeding grounds, males leave before females and juveniles. Only a small proportion of the total population visits Australia, with most occurring in South America during the non-breeding season. Nearly all individuals travel north during the breeding season, with very few overwintering records.

Behaviour

Pectoral Sandpipers are omnivorous, consuming algae, seeds, crustaceans, arachnids and insects in shallow fresh to saline wetlands. While feeding, they move slowly, probing with rapid strokes. They form large mixed flocks in suitable foraging and roosting habitat with other migratory shorebirds.

Flight behaviour

Pectoral Sandpipers form large mixed flocks with other shorebird species in suitable habitats. The timing of flight between roosting and foraging areas is dependent on tides, and they roost and forage both during the day and at night. The exact timing of their migratory flight, whether diurnal or nocturnal, is unclear. Migratory shorebirds usually fly at high altitudes during migration, with flight heights of 1,000–5,000 m reported as typical. Migratory flight heights are also variable based on weather systems and time of day, and the mean ground speed of migratory bird flights in one study from a pacific island was 63 kph.

When flushed, Pectoral Sandpiper flight is rapid, characterized by many turns and a zigzag pattern, similar to snipe. However, when migrating or changing feeding locations, flight is more leisurely, with loose, measured wingbeats.

Demographic factors

The global population has been estimated to be around 25,000–100,000 individuals. Accurate population estimates do not exist for the EAAF pop.

Red-necked Stint (*Calidris ruficollis*; Mig. EPBC & BC Acts)

Information sourced from DCCEEW (2024j); (Geering *et al.* 2007); (Newton 2008); (Kloeckner *et al.* 1982); (Hansen *et al.* 2016); (Van Gils *et al.* 2020) and (Garnett & Baker 2021).

Habitat

Red-necked Stints primarily forage on bare wet mud in intertidal mudflats, sandflats, or in very shallow water, typically in areas with a thin film of surface water near the water's edge. During high tides, they may forage in non-tidal wetlands. They are also found foraging in samphire, though they tend to avoid seagrass beds, feeding along their edges instead. They sometimes forage in beach-cast seaweed on sandy ocean beaches and in flooded paddocks or freshly cropped lucerne paddocks near lagoons. For roosting, Red-necked Stints prefer sheltered beaches, spits, banks, or islets of sand, mud, coral, or shingle, and occasionally in saltmarsh or other vegetation. They may also roost on exposed reefs or shoals. Large numbers may roost on ocean beaches, although this is likely not a preferred habitat unless high numbers are present. They have also been recorded roosting up to 1.5 km from an inland lake, in close-cropped grass, and among beach-cast seaweed, clods of mud, or dried cow-pats. During very high tides, they may use sand dunes or claypans, with large groups recorded roosting at an inland claypan near Roebuck Bay in north-west Western Australia.

Movement

Present in Australia from August–April, likely moving in large flocks during migratory flight. AAustralia is reached by late August and arrivals continue until November, with departure mainly March and April. Immature birds usually remain in Australia throughout first year, often moving inland after rains fill wetlands. Adults show high fidelity between years to non-breeding sites.

Behaviour

Red-necked Stints are omnivorous and forage in intertidal and near coastal wetlands in Australia. They use their bill to jab and probe into soft mud to capture small invertebrates and gleans from plants in saltmarshes and water. They are often seen feeding in dense flocks, which spread out as the tide recedes, and frequently forage alongside other shorebird species.

Flight behaviour

Red-necked Stints travel in large flocks and has been observed feeding in dense groups. The timing of flights between roosting and foraging habitats is tide-dependent in marine environments, and the species roosts and forages both during the day and night. The exact diurnal or nocturnal timing of migratory flight is unclear, as is the size of the flocks migrating to and from Australia. Migratory shorebirds usually fly at high altitudes during migration, with flight heights of 1,000–5,000 m reported as typical. Migratory flight heights are also variable based on weather systems and time of day, and the mean ground speed of migratory bird flights in one study from a pacific island was 63 kph.

Demographic factors

Their estimated population in the East Asian-Australasian Flyway (EAAF) was 475,000 individuals as of 2016, of which 389,200 were expected to come to Australia. The estimated population as of 2020 was ~350,000 mature individuals in Australia, with a declining population trajectory.

Wood Sandpiper (*Tringa glareola*; Mig. EPBC & BC Acts)

Information gathered from DCCEEW (2024d); Hansen *et al.* (2016) and (Geering *et al.* 2007).

Habitat

Wood Sandpipers inhabit well-vegetated, shallow freshwater wetlands, swamps, billabongs, lakes, pools, and waterholes. These areas are typically associated with emergent aquatic plants or grasses and are often surrounded by tall fringing vegetation. They are also frequently found in inundated grasslands, short herbage, wooded floodplains, and irrigated crops, and are also known to appear in small wetlands as they dry out. They rarely visit brackish wetlands and dry stunted saltmarsh. They occur in artificial wetlands, such as open sewage ponds, reservoirs, large farm dams, and bore drains. In some wetlands in Western Australia, individuals are often observed near each other, concentrating at specific areas within the wetland.

Movement

Wood Sandpipers are a migratory species that breeds across Eurasia. It is likely that the Australian non-breeding population originates from eastern Siberia. Within Australia, they exhibit some dispersive movements between appropriate wetland habitat, though their movements within Australia remain largely unstudied. Although regularly observed at many sites in Australia, they also appear unpredictably in summer at inland storm pools.

Only a small portion of the Asian population reaches Australia, where most sightings occur between August and April. After arrival, some of them move southward across the continent. They are common in southwestern Western Australia, from summer to autumn.

Behaviour

Wood Sandpipers are observed either singly, in pairs, or in small flocks, and very occasionally in groups numbering in the hundreds. They often associate with other wader species and typically feed in loosely scattered groups. They tend to be wary, nervous, and excitable, especially in larger groups, although solitary individuals may sometimes allow a closer approach. They are carnivorous, feeding mainly on insects and molluscs in Australia. The species wades in shallow freshwater, often up to its belly, gleaning prey from the water's surface. They are also known to probe with their bill, sometimes submerging their head and neck, sweeping the bill side to side underwater in search of food.

Flight behaviour

When disturbed, Wood Sandpipers fly quickly in a zigzag pattern, gliding gracefully close to the ground. Their flight involves a swaying motion with rapid wingbeats, often rising high and moving at great speed when startled. Flight ecology during migration is more unclear. Migratory shorebirds usually fly at high altitudes during migration, with flight heights of 1,000–5,000 m reported as typical. Migratory flight heights are also variable based on weather systems and time of day. Migratory flight heights are also variable based on weather systems and time of day, and the mean ground speed of migratory bird flights passing a pacific island was 63 kph.

Demographic factors

The East Asian-Australasian Flyway (EAAF) population was estimated at approximately 130,000 in 2016.

Common Greenshank (*Tringa nebularia*; EN/Mig. EPBC Act; Mig. BC Act)

Information gathered from DCCEEW (2024b); Hansen *et al.* (2016); Geering *et al.* (2007); Newton (2008) and Kloeckner *et al.* (1982) .

Habitat

Common Greenshanks forage at the edges of wetlands, in soft mud on mudflats, in channels, or in shallow waters around the edges of waterbodies. These feeding areas are often located around mangroves or other sparse, emergent vegetation like sedges or saltmarsh. They may also occasionally feed in seagrass beds. They roost in a variety of coastal and inland habitats. These habitats include estuaries, mudflats, mangroves, lagoons, billabongs, swamps, sewage farms, and flooded crops.

Movement

Migratory. Common Greenshanks arrive in Australia from August, primarily passing through Western Australia and the Torres Strait. Numbers slowly increase at both inland and coastal sites between August and September. Common Greenshanks overwinter at a few selected locations, with numbers reaching expected wintering levels in late April and early May. The proportion of the population that overwinters in Australia can vary from year to year. During the non-breeding season, most of them do not appear to move long distances within Australia, although some dispersive movements may occur.

Behaviour

Common Greenshanks are carnivorous, with a diet that primarily consists of insects (such as beetles), along with crustaceans, annelids, molluscs, amphibians, small fish (such as mullet, clinids, and tilapia), and occasionally rodents. They are both diurnal and nocturnal. They feed by picking from the surface, probing, sweeping, and lunging at the edges of mudflats or shallow waters. They may also walk along shorelines and even chase small fish in shallow water. Breeding typically occurs in widely dispersed pairs. Males often build multiple nests, lining them with feathers and vegetation, from which the female will choose one.

Flight behaviour

During non-breeding season, Common Greenshanks do not seem to move long distances within Australia, although dispersive movements may occur. Normal flight when flushed is low, rapid and often zigzagging. Generally, migratory shorebirds fly at high altitudes during migration, with flight heights of 1,000–5,000 m reported as typical. Migratory flight heights are also variable based on weather systems and time of day, and the mean ground speed of migratory bird flights in one study from a pacific island was 63 kph.

Demographic factors

Their estimated population in the East Asian-Australasian Flyway (EAAF) in 2016 was 110,000 birds, of which 27,500 were thought to come to Australia. As of 2020, the total number of mature individuals is estimated to be 23,700 (range 16,300–33,400), with a declining trajectory.

Marsh Sandpiper (*Tringa stagnatilis*; Mig. EPBC Act)

Information gathered from (DCCEEW 2024i) and (Hansen *et al.* 2016).

Habitat

Marsh Sandpipers inhabit permanent and ephemeral wetlands of varying salinity. Wetlands include swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats. The species is also commonly found at sewage farms and saltworks, and is less frequently recorded at reservoirs, waterholes, soaks, bore-drain swamps, and flooded inland lakes. In northern Australia, they favour intertidal mudflats. Three of the 5 sites with the highest recorded numbers of Marsh Sandpipers are saltwater habitats, including Port Hedland saltworks in Western Australia, though generally in Western Australia they prefer freshwater environments.

Marsh Sandpipers typically forage in shallow water at the edges of wetlands, probing the wet mud of mudflats or feeding among marshy vegetation. They have also been recorded roosting or loafing on tidal mudflats, near low saltmarshes, and around inland swamps.

Movement

Migratory. Marsh Sandpipers depart from breeding grounds from the first half of July to early September. Birds arrive in Australia from September and apparently move south across the continent from September – December. In the Australian summer, some (possibly dispersive) movements have been observed. The species begins to migrate north in March–April. Within Australia, they may move away from coast after rains and, disperse among temporary inland wetlands.

Behaviour

Marsh Sandpipers are primarily carnivorous, feeding on insects, molluscs, and crustaceans. While plant material has occasionally been found in its stomach, it is likely ingested incidentally. The species typically feeds in shallow water, often wading deeper than the level of its tarsus. It walks briskly and steadily, or may dash about in half-circles, and sometimes swims. Marsh Sandpipers generally forage by picking at the surface of water or mud and may also glean food from vegetation. They feed both singly and in groups, and has been observed following ducks, egrets, and other waders to feed on prey disturbed by these birds.

Flight behaviour

Marsh Sandpipers are known to feed in groups as large as several hundreds and often flocks during migration. Migration typically occurs at high altitude to ensure energy efficiency, as they fly long distances with few stops during migration. Migratory shorebirds usually fly at high altitudes during migration, with flight heights of 1,000–5,000 m reported as typical. Migratory flight heights are also variable based on weather systems and time of day, and the mean ground speed of migratory bird flights in one study from a pacific island was 63 kph.

Demographic factors

The East Asian-Australasian Flyway (EAAF) population was estimated at around 130,000 in 2016.

Masked Owl (Southwest) (*Tyto novaehollandiae novaehollandiae*; P3 DBCA list)

Information gathered from Marks (2020).

Habitat

The Australian Masked Owl (southwest) inhabits tall open forest dominated by large trees suitable for nesting and roosting, favouring sites with access to more open areas. They occur in higher numbers where greatest local forest and woodland diversity occurs, such as forest types with dry, open understorey that provide a variety of ground cover. Smaller numbers are patchily distributed away from coastal regions in wooded farmland, riparian woodland and isolated stands of large trees. They also occur in pine plantations. In South Australia, relic populations of the species have adapted to treeless plains, using caves and rock clefts for nesting and roosting. When foraging, they are often found in and at the edge of small patches (<20 ha) of forest with little or no understorey.

Movement

Australian Masked Owls (southwest) are sedentary, with high site fidelity. Most movements may be post-breeding dispersal of juveniles, and opportunistic exploitation by adults of recently disturbed habitats or changes in prey abundance, including rodent plagues. In Southwest Australia, some records have been attributed to seasonal movements, but this is possibly due to post-breeding dispersal or unrecorded breeding. Their estimated territory size is 1,000–1,200 ha and foraging ranges have been found at 1,800–2,500 ha.

Behaviour

Australian Masked Owls generally are considered territorial and are usually observed as a single individual or occasionally in pairs. Nesting sites are large hollows 40–500 cm deep in living or dead trees, at heights of 12–25 m, usually in trunk but also in vertical branch spouts. They favour isolated trees or trees higher than surrounding ones, with same sites used for many years. They may breed at any time of year with most eggs being laid between March and July. The species is carnivorous, feeding on a wide range of prey such as large possums, mice, small to medium birds, reptiles, beetles and large moths. They prey on arboreal species, but most prey are captured on ground.

Flight behaviour

Flight is typically low and gliding above the ground or through trees. Hunting occurs both on wing and from perches. After dusk, hunting styles change from low hunting flights over open ground to perch-hunting.

Demographic factors

The population size of the subspecies is unclear.

Wedge-tailed Eagle (*Aquila audax*; not listed)

Information gathered from Cherriman (2024); Debus (2020) and (Nature Advisory 2023).

Habitat

Wedge-tailed Eagles occur over most terrestrial habitats, from sea level up to 2000 m, but avoid areas with dense human population, e.g. cities, intensive agriculture. They occupy open forest, woodland, scrub, savanna, plains and deserts, typically in rough or remote country, though avoid dense rainforest. Nesting occurs in all wooded habitats, provided sufficient distance from human activity. Roosts and nests usually are built in live or dead trees with commanding views, 2–73 m (typically 12–30 m) above ground, though often near ground in remote deserts; typically on a rise or hillside. Wedge-tailed Eagles also occasionally on cliff ledges, or among rocks, and even on ground on islands, in areas inaccessible to humans.

Movement

Most Wedge-tailed Eagles are highly faithful to their nesting sites, with high site fidelity. The same nest is often used year after year, potentially for decades. Juvenile Wedge-tailed Eagles, especially in Western Australia, can undertake long-distance dispersal to find territory, with satellite-tagged individuals travelling up to 1,200 km shortly after leaving their natal territories.

Behaviour

Wedge-tailed Eagles forage by low, slow quartering, high soaring or still-hunting from a perch. They seize prey on the ground or sometimes in tree canopies, after a swift, stealthy glide or dive which may become short chase. The species rarely takes prey in flight. Wedge-tailed Eagles occasionally remove mammals such as possums from tree hollows, and pairs or groups attack large prey cooperatively.

Flight behaviour

Wedge-tailed Eagles undertake mostly diurnal flight around peak raptor time (when reptile prey is active), at heights up to 2,000 m. They are known to fly within the Rotor Sweep Area and are hit by turbines regularly at wind farms on the eastern coast of Australia. The species is most exposed to collision risk due to a common habit of soaring and circling at height while foraging. Flight behaviour does not appear to be altered by wind farm development, with records of successful breeding as 200 m from operating wind turbines.

Demographic factors

The estimated population size varies depending on location and subspecies. However, it is one of the most widespread raptors in Australia and the national population is likely stable due to their extensive range across various habitats.

White-bellied Sea-Eagle (*Haliaeetus leucogaster*; not listed)

Information gathered from Birdlife Australia (2017); BirdLife International (2020); DCCEEW (2025); Marchant and Higgins (1993); NSW Office of Environment and Heritage (2019)

Habitat

Habitats of this species are characterised by the presence of large areas of open water, such as the ocean, larger rivers, lakes and swamps. Foraging habitat consists of coastal seas, rivers, fresh and saline lakes, lagoons and reservoirs. May also forage in adjacent terrestrial habitats such as grasslands.

Breeding habitat consists of mature open forest or woodland and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass. May also nest in cliffs.

Movement

Resident. High site fidelity to successful nesting trees. Resident pairs are territorial and occupy territories of hundreds of hectares.

Behaviour

Diurnal. Hunts mainly aquatic animals, such as fish, turtles and waterbirds. Also feeds on mammals, reptiles and carrion. Will harass smaller birds to force them to drop their prey.

May be solitary or live in pairs or small family groups consisting of a pair of adults and dependent young. Birds form permanent pairs that inhabit territories throughout the year.

Flight behaviour

Highly maneuverable in flight. Hunts prey from a perch, whilst circling slowly in flight or gliding along 10–20 m above shorelines. Often catches a fish by flying low over the water and grasping it in its talons. May also dive at a 45-degree angle from its perch and briefly submerge to catch fish near the water surface. Prey is usually carried to a feeding platform or (if small) consumed in flight, but some items are eaten on the ground.

Demographic factors

Occurs throughout coastline regions in most of southeastern and eastern Asia. Distributed around the Australian coastline. Also occurs along some inland rivers in eastern Australia.

Whistling Kite is not globally or nationally threatened, however a 16% decline in reporting rate over the past two decades has been recorded nationally.

Not threatened. Population estimated between 2,600 and 41,000 mature individuals. In Australia, based on a population density of one pair per 40 km, the population is thought to number at least 500 pairs, but this is likely to be a significant underestimate.

Western False Pipistrelle (*Falsistrellus mackenziei*; P4 DBCA list)

Information gathered from Kitchener (1986); IUCN (2024) and (Woinarski *et al.* 2014).

Habitat

The Western False Pipistrelle occurs extensively in tall woodlands and wet or dry sclerophyll forest of south-western Australia. It is associated with Karri, Jarrah and Tuart old-growth forests. The species roosts in tree hollows, branches and stumps.

Movement

Site fidelity and movement patterns are unclear.

Behaviour

It occurs in roosting colonies of up to 30 bats. The species forages between the canopy and understory of tall trees. It is mainly insectivorous.

Flight behaviour

The behaviour of the species in flight is described as quick and straight. Most flight occurs approximately 15 m above ground. Echolocation calls end at low frequencies (30 kHz), with most energy at 32 – 34 kHz, and lasting for 12 ms.

Demographic factors

The population size is unknown. There is likely enough suitable habitat remaining in the area of occupancy to support more than 10,000 individuals.

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Appendix 5 Species by site matrix

Family	Species	Common name	BUS001	BUS002	BUS003	BUS004	BUS005	BUS006	BUS007	BUS008	BUS009	BUS010	BUS011	BUS012	BUS013	BUS014	BUS015	BUS016	BUS018	BUS019	BUS020	BUS025	BUS026	BUS027	BUS030	BUS031	BUS032	BUS033	BUS034	BUS035	B & T survey sites
Birds (121)																															
Anatidae	*Anas castanea*	Chestnut Teal																													4
Anatidae	*Anas gracilis*	Grey Teal					4	4									9								50	45					422
Anatidae	*Anas superciliosa*	Pacific Black Duck	55	41	1		1			3		2		3	5	2	14	6	1		34	17			650	2					632
Anatidae	*Biziura lobata*	Musk Duck	1																												5
Anatidae	*Chenonetta jubata*	Australian Wood Duck						6				2					42					2										19
Anatidae	*Cygnus atratus*	Black Swan	56	6																					4	649					310
Anatidae	*Malacorhynchus membranaceus*	Pink-eared Duck																													1
Anatidae	*Spatula rhynchotis*	Australasian Shoveler																													7
Anatidae	*Tadorna tadornoides*	Australian Shelduck	85	14	14	6	131	5	5	124	22	132	4	2	33	3		1	27		179	18	6	7	12		12				568
Podargidae	*Podargus strigoides*	Tawny Frogmouth																													7
Charadriidae	*Anarhynchus ruficapillus*	Red-capped Plover																								6		2	83		
Charadriidae	*Charadrius melanops*	Black-fronted Dotterel																													23
Charadriidae	*Vanellus tricolor*	Banded Lapwing		1										1																2	1
Scolopacidae	*Tringa glareola*	Wood Sandpiper																													3
Haematopodidae	*Haematopus longirostris*	Pied Oystercatcher																							1	42	1	2	1		
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull																							7	70	22	5	3		
Laridae	*Hydroprogne caspia*	Caspian Tern																								49	3	9	1		
Laridae	*Larus pacificus*	Pacific Gull																							4	3	12		1		
Laridae	*Sternula nereis nereis*	Fairy Tern																								40		4	4		
Laridae	*Thalasseus bergii*	Greater Crested Tern																							1	9	14	20	2		
Scolopacidae	*Calidris acuminata*	Sharp-tailed Sandpiper																								40					
Scolopacidae	*Calidris alba*	Sanderling																								4					
Scolopacidae	*Calidris ruficollis*	Red-necked Stint																								12			60		
Scolopacidae	*Limosa lapponica*	Bar-tailed Godwit																								1					
Ardeidae	*Ardea pacifica*	White-necked Heron			1	6		1					1																		15
Ardeidae	*Bubulcus coromandus*	Cattle Egret																													10
Ardeidae	*Egretta garzetta*	Little Egret																							1						
Ardeidae	*Egretta novaehollandiae*	White-faced Heron	4	5	1	3	17	85		4	2						3	2	12	2	3	7	1	1	2						141
Threskiornithidae	*Platalea flavipes*	Yellow-billed Spoonbill		4																	4										1
Threskiornithidae	*Platalea regia*	Royal Spoonbill	1																												
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis	5	6	3	6	14	110		50		50	9					62	144		119	44			12	4	10				337
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis	268	428	1,089			5	94	1	2	73	314		2	3	16	389	53		998	4		140							1,421
Columbidae	*Ocyphaps lophotes*	Crested Pigeon	3	1	1				5		1	1	26		2			2			2	7		3						3	2
Columbidae	*Phaps chalcoptera*	Common Bronzewing	2			1					4						2														2
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra	2		2	4	7	1		1		3				1	1	1				1									9
Halcyonidae	Todiramphus sanctus	Sacred Kingfisher																													6
Meropidae	Merops ornatus	Rainbow Bee-eater																													1
Cuculidae	*Cacomantis flabelliformis*	Fan-tailed Cuckoo			1																										
Cuculidae	*Chalcites basalis*	Horsfield's Bronze Cuckoo				1																									5
Cuculidae	*Chalcites lucidus*	Shining Bronze Cuckoo	1			1		1			1					1													1	3

Family	Species	Common name	BUS001	BUS002	BUS003	BUS004	BUS005	BUS006	BUS007	BUS008	BUS009	BUS010	BUS011	BUS012	BUS013	BUS014	BUS015	BUS016	BUS018	BUS019	BUS020	BUS025	BUS026	BUS027	BUS030	BUS031	BUS032	BUS033	BUS034	BUS035	B & T survey sites
Accipitridae	*Aquila audax*	Wedge-tailed Eagle	5			3	7	2		3	2	6	5				1	3	5	2		2									4
Accipitridae	*Circus approximans*	Swamp Harrier	11	3	1	3		3		3		1	3				1	6	4	2	1	7	1	2							14
Accipitridae	*Elanus axillaris*	Black-shouldered Kite	1															1													2
Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea-Eagle																	1								1				
Accipitridae	*Haliastur sphenurus*	Whistling Kite	2	1														1			1				1						3
Accipitridae	*Hieraaetus morphnoides*	Little Eagle					1																		1						1
Accipitridae	*Pandion haliaetus*	Osprey																							2		4	2	1		1
Accipitridae	*Tachyspiza cirrocephala*	Collared Sparrowhawk					2						1								2										
Accipitridae	*Tachyspiza fasciata*	Brown Goshawk	2				2																								3
Falconidae	*Falco berigora*	Brown Falcon		1	3					8			1						1			3									4
Falconidae	*Falco cenchroides*	Australian Kestrel	4	2		1	2		1	3		7	9	1	1			5	9	2	2		1	4	1				1		2
Falconidae	*Falco longipennis*	Australian Hobby	2					2																							
Falconidae	*Falco peregrinus*	Peregrine Falcon											1																		
Phasianidae	*Coturnix pectoralis*	Stubble Quail	6	13	1	1			1	3	6	5	4				1	9	2	1	4	4	1	3							3
Rallidae	*Fulica atra*	Eurasian Coot																													3
Rallidae	*Porphyrio melanotus*	Australasian Swamphen																													3
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill	17		8	19	10	2		3	5		28		7	11	11														9
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		3	58	25	4		92		29	13	12		4	1	12	2			5			48						2	6
Acanthizidae	*Gerygone fusca*	Western Gerygone									1					1															5
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren	2			3				2	5		8		2		1														6
Acanthizidae	*Smicrornis brevirostris*	Weebill																													2
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		12	3	5				8	4	11	10					2			5	7		2							2
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		6	12			2	25		21	2				3														4	
Artamidae	*Cracticus nigrogularis*	Pied Butcherbird																													2
Artamidae	*Cracticus torquatus*	Grey Butcherbird	19	16	4	28	4	4	8	16	6	13	15	5	11	1	9	2	1	3	4	3		2							8
Artamidae	*Gymnorhina tibicen*	Australian Magpie	15	1	13	18	8	4		11	3		36	1	10	9	18	14		42	6	18	3	8							14
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	4	5	4		5	4	39	1	3	2			5		2	3		1		1		3						6	5
Campephagidae	*Lalage tricolor*	White-winged Triller			2				1																					3	1
Climacteridae	*Climacteris rufus*	Rufous Treecreeper																													2
Corvidae	*Corvus coronoides*	Australian Raven	81	66	8	31	182	16	15	48	6	65	95	4	24	32	9	77	58	69	53	30	148	18	13			1	4	5	28
Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird																													1
Dicruridae	*Grallina cyanoleuca*	Magpie-lark	5	2	23	10		2	4		15	8	6	1	8	4		6			2	7	4	4						1	6
Dicruridae	*Rhipidura albiscapa*	Grey Fantail	14		7	14	8	3		4	11		3	1		14	8														20
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail	14	25	13	24	3	9	20	6	17	8	22	4	7	6	6	9	6	9	11	4		27						3	16
Hirundinidae	*Hirundo neoxena*	Welcome Swallow	21	11	1	6	14	1			3	5		2	13		9		1	7	27	7	1	7					5		18
Hirundinidae	*Petrochelidon nigricans*	Tree Martin	201	17	4	51	41	9	3	80	19	61	70		13	11	23	86	49	35	35	66	32	6							5
Locustellidae	*Cincloramphus cruralis*	Brown Songlark		3									6	1					3				2								3
Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark			2				1			3																		3	
Maluridae	*Malurus elegans*	Red-winged Fairy-wren	2				3						8			8															6
Maluridae	*Malurus splendens*	Splendid Fairy-wren	9			33	16	11		3	14		12			6	5														5
Maluridae	*Stipiturus malachurus*	Southern Emu-wren	9																												
Meliphagidae	*Acanthorhynchus superciliosus*	Western Spinebill					3									1															2
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird	7	3	6	37	20	19	1	2	4	9	1	1	14	4	14	2		4	1	12	3	1							10

Family	Species	Common name	BUS001	BUS002	BUS003	BUS004	BUS005	BUS006	BUS007	BUS008	BUS009	BUS010	BUS011	BUS012	BUS013	BUS014	BUS015	BUS016	BUS018	BUS019	BUS020	BUS025	BUS026	BUS027	BUS030	BUS031	BUS032	BUS033	BUS034	BUS035	B & T survey sites
Meliphagidae	*Epthianura albifrons*	White-fronted Chat	38	17	1				22			84						9	8		5									8	6
Meliphagidae	*Gavicalis virescens*	Singing Honeyeater																													3
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater			1		30						4									1									3
Meliphagidae	*Manorina flavigula*	Yellow-throated Miner																													1
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater	2		1		4	8					3			2						7									4
Motacillidae	*Anthus australis*	Australian Pipit	2	15				1	5			19						1	8	2	1		3	19						1	2
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush						1																							1
Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler	5		2		4				2					1	1														8
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler																													1
Pardalotidae	Pardalotus punctatus	Spotted Pardalote																													1
Pardalotidae	*Pardalotus striatus*	Striated Pardalote													1																7
Petroicidae	*Microeca fascinans*	Jacky Winter		1																											
Petroicidae	*Petroica boodang*	Scarlet Robin														2															
Petroicidae	*Quoyornis georgianus*	White-breasted Robin																													1
Zosteropidae	*Zosterops lateralis*	Silvereye	37		2	7	17						16			5	3			2		10									13
Anhingidae	*Anhinga novaehollandiae*	Australasian Darter																							4						
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican																								124	2				
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant	2			2	1												1			2			1	3	1	1			20
Phalacrocoracidae	*Phalacrocorax carbo*	Great Cormorant																			1					8					
Phalacrocoracidae	*Phalacrocorax sulcirostris*	Little Black Cormorant						1																			26				1
Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant					2				1							1				4			2	1	8	2			
Podicipedidae	*Tachybaptus novaehollandiae*	Australasian Grebe																													2
Cacatuidae	*Cacatua sanguinea*	Little Corella																													1
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak								1					54																103
Cacatuidae	*Calyptorhynchus/Zanda* sp.	black cockatoo species	1			38				6								2		8			10				8	7	4		15
Cacatuidae	*Eolophus roseicapilla*	Galah																									5	2			1
Cacatuidae	*Zanda baudinii*	Baudin's Cockatoo														8	1			2											46
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	4			2	1					10				5		28		31	4		2	8							55
Cacatuidae	*Zanda* sp.	white-tailed black cockatoo species	3		26																										321
Psittaculidae	*Barnardius zonarius*	Australian Ringneck	13		28	65	19	11	2	7	18	15	14	2	19	9	31	3		20	4	38	10	19						2	11
Psittaculidae	*Neophema elegans*	Elegant Parrot	12	8		8	3	11	5		12	17			1			1	18		9	1								3	3
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet	2			6	10	17							8	6	61			3	16										8
Psittaculidae	*Platycercus icterotis*	Western Rosella	2				2	2			2	1			1	4				2											
Psittaculidae	*Purpureicephalus spurius*	Red-capped Parrot						1																							
Strigidae	*Ninox boobook*	Boobook Owl		1				13			1	2	1		238	1															
Tytonidae	*Tyto javanica*	Eastern barn owl																													2
Tytonidae	*Tyto novaehollandiae novaehollandiae*	Masked Owl (southwest)														1															1

Family	Species	Common name	BUS001	BUS002	BUS003	BUS004	BUS005	BUS006	BUS007	BUS008	BUS009	BUS010	BUS011	BUS012	BUS013	BUS014	BUS015	BUS016	BUS018	BUS019	BUS020	BUS025	BUS026	BUS027	BUS030	BUS031	BUS032	BUS033	BUS034	BUS035	B & T survey sites
Dromaiidae	*Dromaius novaehollandiae*	Emu	20		3		3	19		2		4	27						47	4	19										20
Bats (8)																															
Molossidae	*Austronomus australis*	White-striped Free-tailed Bat	•	•		•	•	•	•	•	•	•	•	•	•	•	•													•	•
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	•	•	•	•	•	•	•	•	•	•	•		•	•	•													•	•
Vespertilionidae	*Chalinolobus morio*	Chocolate Wattled Bat	•	•		•	•	•	•	•	•	•	•		•	•	•													•	•
Vespertilionidae	*Falsistrellus mackenziei*	Western False Pipistrelle	•			•							•		•	•	•														•
Vespertilionidae	*Nyctophilus geoffroyi*	Lesser Long-eared Bat	•	•		•	•	•		•	•		•		•	•	•													•	•
Vespertilionidae	*Nyctophilus holtorum*	Holt's Long-eared Bat									•				•	•	•														•
Vespertilionidae	*Nyctophilus major*	Greater Long-eared Bat	•	•		•	•	•		•						•	•													•	
Vespertilionidae	*Vespadelus regulus*	Southern Forest Bat	•	•	•	•	•	•		•	•	•	•		•	•	•													•	•

Number records for birds represent aggregated data, i.e. all counts across all seasons and sample events. Bats are recorded as positive detection at site.

Appendix 6 Bird flight height data

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2	1	0-24 m	W	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2	1	0-24 m	NW	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2	1	0-24 m	NE	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		1	1	0-24 m	W	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		1	1	0-24 m	NE	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		1	1	0-24 m	W	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2	2	0-24 m	NW	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2	2	0-24 m	W	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2	2	0-24 m	N	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		1	2	0-24 m	N	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		1	2	0-24 m	E	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2	2	0-24 m	W	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2	2	0-24 m	NE	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		1	2	0-24 m	NW	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2	2	0-24 m	N	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2	2	0-24 m	E	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2	2	0-24 m	E	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		1	3	0-24 m	N	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		3	3	0-24 m	NW	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		1	3	0-24 m	NW	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2	5	0-24 m	W	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2	6	0-24 m	N	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		1		0-24 m	W	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		1		0-24 m		
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	S	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		4		0-24 m	S	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	E	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	SW	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	E	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	N	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	S	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	S	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		1		0-24 m	NW	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		1		0-24 m	E	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	N	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	S	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	N	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	W	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m		
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		12		0-24 m	E	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	N	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	NE	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		5		0-24 m	W	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		1		0-24 m	NE	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		1		0-24 m	SW	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		1		0-24 m	NE	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	NE	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	SW	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		3		0-24 m		
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	S	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	NE	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	NE	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	N	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		1		0-24 m	NE	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		3		0-24 m	SE	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		3		0-24 m	SW	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	S	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	W	
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill		2		0-24 m	W	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		4	0	0-24 m	SE	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		5	0	0-24 m	W	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		5	1	0-24 m	SW	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		5	2	0-24 m	SW	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		12	2	0-24 m	NW	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		5	2	0-24 m	SW	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		12	2	0-24 m	NW	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		6	2	0-24 m	SE	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		12	3	0-24 m	SW	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		3	3	0-24 m	N	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		3	3	0-24 m	S	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		4	4	0-24 m	NW	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		4	4	0-24 m	N	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		5	4	0-24 m	W	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		2	4	0-24 m	W	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		2	5	0-24 m	NW	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		1	6	0-24 m	N	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		14		0-24 m	S	S-N
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		12		0-24 m	N	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		6		0-24 m	N	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		2		0-24 m	NE-W	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		2		0-24 m	W	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		1		0-24 m	N	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		4		0-24 m	N	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		2		0-24 m	S	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		3		0-24 m	SW	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		1		0-24 m	N	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		1		0-24 m	N	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		1		0-24 m		
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		2		0-24 m	SW	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		5		0-24 m	S	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		12		0-24 m	W	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		5		0-24 m	S	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		4		0-24 m	N-S	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		2		0-24 m	E	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		12		0-24 m	SE	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		8		0-24 m	W	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		21		0-24 m	N-W	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		6		0-24 m	SE	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		21		0-24 m	SE	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		12		0-24 m	NW	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		3		0-24 m	W	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		30		0-24 m	S	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		23		0-24 m	W	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		1		0-24 m	S	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		4		0-24 m		
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		1		0-24 m	SE	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		3		0-24 m	NW	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		1		0-24 m		
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		12		0-24 m	SW	
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		1		0-24 m		
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill		12		0-24 m	SW	
Acanthizidae	*Gerygone fusca*	Western Gerygone		1		0-24 m	N	
Acanthizidae	*Gerygone fusca*	Western Gerygone		1		0-24 m	SE	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		1	1	0-24 m	W	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		2	1	0-24 m	E	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		2	2	0-24 m	NE	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		1		0-24 m	NE	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		2		0-24 m	NE	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		2		0-24 m	N	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		1		0-24 m	S	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		1		0-24 m	W	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		1		0-24 m	W	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		1		0-24 m	NE	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		1		0-24 m	N	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		1		0-24 m	N	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		1		0-24 m	NW	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		1		0-24 m	SW	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		1		0-24 m		
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		1		0-24 m	SW	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		1		0-24 m	N	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		1		0-24 m	SW	
Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren		1		0-24 m	E	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	375	>250 m	SW	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	800	>250 m	SE	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		2	0	0-24 m	W	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	0	0-24 m	NW	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	200	151-250 m	W	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		3	200	151-250 m	S	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	200	151-250 m	SW	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	250	151-250 m	W	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		2	200	151-250m	W	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	30	25-50 m	W	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	40	25-50 m	W	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	40	25-50 m	NW	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	40	25-50 m	SW	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	50	25-50 m	S	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		2	50	25-50 m	S	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	50	25-50 m		
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1		25-50 m	S	E-W
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1		25-50 m	S	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		2		25-50 m	SE	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		2		25-50 m	E-W	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1		25-50 m		
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	60	51-75 m	SW	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	70	51-75 m	N	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1		51-75 m	S	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	80	76-150 m	N	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	100	76-150 m	SE	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		2	120	76-150 m	SW	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	120	76-150 m	NE	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	150	76-150 m	N	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	150	76-150 m	SW	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1	150	76-150 m	SE	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		2	150	76-150 m	E	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		2	150	76-150 m	E	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		3	150	76-150 m	NW	
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		2		76-150 m	S	
Accipitridae	*Circus approximans*	Swamp Harrier		1	2	0-24 m	S	
Accipitridae	*Circus approximans*	Swamp Harrier		1	2	0-24 m	S	
Accipitridae	*Circus approximans*	Swamp Harrier		1	3	0-24 m	W	
Accipitridae	*Circus approximans*	Swamp Harrier		1	3	0-24 m	E	
Accipitridae	*Circus approximans*	Swamp Harrier		1	3	0-24 m	S	
Accipitridae	*Circus approximans*	Swamp Harrier		1	3	0-24 m	NW	
Accipitridae	*Circus approximans*	Swamp Harrier		2	3	0-24 m	S	
Accipitridae	*Circus approximans*	Swamp Harrier		1	3	0-24 m	SE	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Accipitridae	*Circus approximans*	Swamp Harrier		1	3	0-24 m	N	
Accipitridae	*Circus approximans*	Swamp Harrier		1	4	0-24 m	S	
Accipitridae	*Circus approximans*	Swamp Harrier		1	4	0-24 m	N	
Accipitridae	*Circus approximans*	Swamp Harrier		1	4	0-24 m	NE	
Accipitridae	*Circus approximans*	Swamp Harrier		1	5	0-24 m	N	
Accipitridae	*Circus approximans*	Swamp Harrier		1	5	0-24 m	S	
Accipitridae	*Circus approximans*	Swamp Harrier		1	6	0-24 m	E	
Accipitridae	*Circus approximans*	Swamp Harrier		1	6	0-24 m	N	
Accipitridae	*Circus approximans*	Swamp Harrier		1	6	0-24 m	SE	
Accipitridae	*Circus approximans*	Swamp Harrier		1	15	0-24 m	NW	
Accipitridae	*Circus approximans*	Swamp Harrier		1	15	0-24 m	E	
Accipitridae	*Circus approximans*	Swamp Harrier		1	15	0-24 m	N	
Accipitridae	*Circus approximans*	Swamp Harrier		2	20	0-24 m	NW	
Accipitridae	*Circus approximans*	Swamp Harrier		1		0-24 m	NW	SW-NE
Accipitridae	*Circus approximans*	Swamp Harrier		2		0-24 m	NE	S-N
Accipitridae	*Circus approximans*	Swamp Harrier		2		0-24 m	E	S-N
Accipitridae	*Circus approximans*	Swamp Harrier		1		0-24 m	E	N-S
Accipitridae	*Circus approximans*	Swamp Harrier		1		0-24 m	N	N-S
Accipitridae	*Circus approximans*	Swamp Harrier		1		0-24 m	NE	E-W
Accipitridae	*Circus approximans*	Swamp Harrier		1		0-24 m	E	
Accipitridae	*Circus approximans*	Swamp Harrier		1		0-24 m	W-E	
Accipitridae	*Circus approximans*	Swamp Harrier		1	25	25-50 m	W	
Accipitridae	*Circus approximans*	Swamp Harrier		1	25	25-50 m	E	
Accipitridae	*Circus approximans*	Swamp Harrier		1	25	25-50 m	E	
Accipitridae	*Circus approximans*	Swamp Harrier		1	25	25-50 m	W	
Accipitridae	*Circus approximans*	Swamp Harrier		1	30	25-50 m	N	
Accipitridae	*Circus approximans*	Swamp Harrier		1	30	25-50 m	SW	
Accipitridae	*Circus approximans*	Swamp Harrier		1	30	25-50 m	E	
Accipitridae	*Circus approximans*	Swamp Harrier		1	30	25-50 m	N	
Accipitridae	*Circus approximans*	Swamp Harrier		1	40	25-50 m	W	
Accipitridae	*Circus approximans*	Swamp Harrier		1	40	25-50 m	E	
Accipitridae	*Circus approximans*	Swamp Harrier		1	40	25-50 m	N	
Accipitridae	*Circus approximans*	Swamp Harrier		1	50	25-50 m	N	
Accipitridae	*Circus approximans*	Swamp Harrier		1	50	25-50 m	NE	
Accipitridae	*Circus approximans*	Swamp Harrier		1		25-50 m	SW	N-S
Accipitridae	*Circus approximans*	Swamp Harrier		1		25-50 m	N	
Accipitridae	*Circus approximans*	Swamp Harrier		1		25-50 m	W	
Accipitridae	*Circus approximans*	Swamp Harrier		1		51-75 m	ESE	
Accipitridae	*Circus approximans*	Swamp Harrier		1		51-75 m	NE	
Accipitridae	*Circus approximans*	Swamp Harrier		2		51-75 m	S	
Accipitridae	*Circus approximans*	Swamp Harrier		2	100	76-150 m	SE	
Accipitridae	*Circus approximans*	Swamp Harrier		2	150	76-150 m	N	
Accipitridae	*Circus approximans*	Swamp Harrier		2		76-150 m	SE	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Accipitridae	*Elanus axillaris*	Black-shouldered Kite		1	20	0-24 m	NE	
Accipitridae	*Elanus axillaris*	Black-shouldered Kite		1	30	25-50 m	SW	
Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea-Eagle		1	80	76-150 m	E	
Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea-Eagle		1	150	76-150 m	N	
Accipitridae	*Haliastur sphenurus*	Whistling Kite		1	35	25-50 m	NE	
Accipitridae	*Haliastur sphenurus*	Whistling Kite		1	50	25-50 m	N	
Accipitridae	*Haliastur sphenurus*	Whistling Kite		1		25-50 m	S	W-E
Accipitridae	*Haliastur sphenurus*	Whistling Kite		1	60	51-75 m	W	
Accipitridae	*Haliastur sphenurus*	Whistling Kite		1	80	76-150 m	NW	
Accipitridae	*Haliastur sphenurus*	Whistling Kite		1	80	76-150 m	S	
Accipitridae	*Hieraaetus morphnoides*	Little Eagle		1	80	76-150 m	N	
Accipitridae	*Hieraaetus morphnoides*	Little Eagle		1		76-150 m	SE	
Accipitridae	*Pandion haliaetus*	Osprey	Mig. (EPBC & BC Acts)	1	1	0-24 m	NE	
Accipitridae	*Pandion haliaetus*	Osprey	Mig. (EPBC & BC Acts)	1	20	0-24 m	E	
Accipitridae	*Pandion haliaetus*	Osprey	Mig. (EPBC & BC Acts)	1	40	25-50 m	NE	
Accipitridae	*Pandion haliaetus*	Osprey	Mig. (EPBC & BC Acts)	1	40	25-50 m	SW	
Accipitridae	*Pandion haliaetus*	Osprey	Mig. (EPBC & BC Acts)	4	50	25-50 m	W	
Accipitridae	*Pandion haliaetus*	Osprey	Mig. (EPBC & BC Acts)	1	60	51-75 m	SE	
Accipitridae	*Tachyspiza cirrocephala*	Collared Sparrowhawk		1		0-24 m	E	
Accipitridae	*Tachyspiza cirrocephala*	Collared Sparrowhawk		1		0-24 m	N	
Accipitridae	*Tachyspiza cirrocephala*	Collared Sparrowhawk		1		25-50 m	S	W-E
Accipitridae	*Tachyspiza cirrocephala*	Collared Sparrowhawk		2	100	76-150 m	SE	
Accipitridae	*Tachyspiza fasciata*	Brown Goshawk		2		0-24 m	E-W	
Accipitridae	*Tachyspiza fasciata*	Brown Goshawk		1		51-75 m	S	
Accipitridae	*Tachyspiza fasciata*	Brown Goshawk		1	125	76-150 m	S	
Accipitridae	*Tachyspiza fasciata*	Brown Goshawk		1	150	76-150 m	SE	
Anatidae	*Anas gracilis*	Grey Teal		50	0	0-24 m	NE	
Anatidae	*Anas gracilis*	Grey Teal		4		0-24 m	E	
Anatidae	*Anas gracilis*	Grey Teal		2		0-24 m	W	
Anatidae	*Anas gracilis*	Grey Teal		9		0-24 m	N	
Anatidae	*Anas gracilis*	Grey Teal		2		0-24 m	S	
Anatidae	*Anas gracilis*	Grey Teal		5		0-24 m	S	
Anatidae	*Anas gracilis*	Grey Teal		45	30	25-50 m	N	
Anatidae	*Anas superciliosa*	Pacific Black Duck		5	0	0-24 m	E	
Anatidae	*Anas superciliosa*	Pacific Black Duck		650	0	0-24 m	NE	
Anatidae	*Anas superciliosa*	Pacific Black Duck		1	0	0-24 m	E	
Anatidae	*Anas superciliosa*	Pacific Black Duck		2	0	0-24 m	N	
Anatidae	*Anas superciliosa*	Pacific Black Duck		3	0	0-24 m	NE	
Anatidae	*Anas superciliosa*	Pacific Black Duck		3	0	0-24 m	NE	
Anatidae	*Anas superciliosa*	Pacific Black Duck		2	0	0-24 m	NW	
Anatidae	*Anas superciliosa*	Pacific Black Duck		4	0	0-24 m	NE	
Anatidae	*Anas superciliosa*	Pacific Black Duck		2	0	0-24 m	NW	
Anatidae	*Anas superciliosa*	Pacific Black Duck		16	0	0-24 m	E	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Anatidae	*Anas superciliosa*	Pacific Black Duck		30	0	0-24 m	N	
Anatidae	*Anas superciliosa*	Pacific Black Duck		8	0	0-24 m	E	
Anatidae	*Anas superciliosa*	Pacific Black Duck		2	0	0-24 m	NE	
Anatidae	*Anas superciliosa*	Pacific Black Duck		1	0	0-24 m	N	
Anatidae	*Anas superciliosa*	Pacific Black Duck		450	0	0-24 m		
Anatidae	*Anas superciliosa*	Pacific Black Duck		2	2	0-24 m	SW	
Anatidae	*Anas superciliosa*	Pacific Black Duck		2	2	0-24 m	N	
Anatidae	*Anas superciliosa*	Pacific Black Duck		2	2	0-24 m	N	
Anatidae	*Anas superciliosa*	Pacific Black Duck		1	3	0-24 m	W	
Anatidae	*Anas superciliosa*	Pacific Black Duck		2	20	0-24 m	NE	
Anatidae	*Anas superciliosa*	Pacific Black Duck		2		0-24 m	E	W-E
Anatidae	*Anas superciliosa*	Pacific Black Duck		3		0-24 m	SW	N-S
Anatidae	*Anas superciliosa*	Pacific Black Duck		3		0-24 m	E	N-S
Anatidae	*Anas superciliosa*	Pacific Black Duck		1		0-24 m	S	E-W
Anatidae	*Anas superciliosa*	Pacific Black Duck		2		0-24 m	N	
Anatidae	*Anas superciliosa*	Pacific Black Duck		2		0-24 m	NE	
Anatidae	*Anas superciliosa*	Pacific Black Duck		4		0-24 m	E	
Anatidae	*Anas superciliosa*	Pacific Black Duck		13		0-24 m	E	
Anatidae	*Anas superciliosa*	Pacific Black Duck		5		0-24 m	S	
Anatidae	*Anas superciliosa*	Pacific Black Duck		5		0-24 m	E	
Anatidae	*Anas superciliosa*	Pacific Black Duck		3		0-24 m	N	
Anatidae	*Anas superciliosa*	Pacific Black Duck		2		0-24 m	W	
Anatidae	*Anas superciliosa*	Pacific Black Duck		3		0-24 m	N	
Anatidae	*Anas superciliosa*	Pacific Black Duck		2		0-24 m	W	
Anatidae	*Anas superciliosa*	Pacific Black Duck		1		0-24 m	E	
Anatidae	*Anas superciliosa*	Pacific Black Duck		1		0-24 m	E	
Anatidae	*Anas superciliosa*	Pacific Black Duck		1		0-24 m	S	
Anatidae	*Anas superciliosa*	Pacific Black Duck		5		0-24 m	E	
Anatidae	*Anas superciliosa*	Pacific Black Duck		14	25	25-50 m	S	
Anatidae	*Anas superciliosa*	Pacific Black Duck		5		25-50 m	E	S-N
Anatidae	*Anas superciliosa*	Pacific Black Duck		26		25-50 m	E-W	
Anatidae	*Anas superciliosa*	Pacific Black Duck		1		25-50 m	E-W	
Anatidae	*Biziura lobata*	Musk Duck		1		0-24 m	W	
Anatidae	*Biziura lobata*	Musk Duck		1		0-24 m		
Anatidae	*Chenonetta jubata*	Australian Wood Duck		2	15	0-24 m	N	
Anatidae	*Chenonetta jubata*	Australian Wood Duck		2		0-24 m	N	E-W
Anatidae	*Chenonetta jubata*	Australian Wood Duck		6		0-24 m	S	
Anatidae	*Chenonetta jubata*	Australian Wood Duck		1		0-24 m	E	
Anatidae	*Chenonetta jubata*	Australian Wood Duck		4		0-24 m	NE	
Anatidae	*Chenonetta jubata*	Australian Wood Duck		3		0-24 m	E	
Anatidae	*Chenonetta jubata*	Australian Wood Duck		2		0-24 m	S	
Anatidae	*Chenonetta jubata*	Australian Wood Duck		1		0-24 m	N	
Anatidae	*Chenonetta jubata*	Australian Wood Duck		27		0-24 m	N	
Anatidae	*Chenonetta jubata*	Australian Wood Duck		6		0-24 m	W	
Anatidae	*Chenonetta jubata*	Australian Wood Duck		4		0-24 m	NE	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Anatidae	*Cygnus atratus*	Black Swan		60	0	0-24 m		
Anatidae	*Cygnus atratus*	Black Swan		370	0	0-24 m	NW	
Anatidae	*Cygnus atratus*	Black Swan		279	0	0-24 m	W	
Anatidae	*Cygnus atratus*	Black Swan		4	0	0-24 m	NE	
Anatidae	*Cygnus atratus*	Black Swan		1	15	0-24 m	N	
Anatidae	*Cygnus atratus*	Black Swan		1	20	0-24 m	NE	
Anatidae	*Cygnus atratus*	Black Swan		2		0-24 m	S	W-E
Anatidae	*Cygnus atratus*	Black Swan		6		0-24 m	E	
Anatidae	*Cygnus atratus*	Black Swan		3		0-24 m	SE	
Anatidae	*Cygnus atratus*	Black Swan		1		0-24 m	SE	
Anatidae	*Cygnus atratus*	Black Swan		2		0-24 m	N	
Anatidae	*Cygnus atratus*	Black Swan		2		0-24 m	N	
Anatidae	*Cygnus atratus*	Black Swan		20		0-24 m	E	
Anatidae	*Cygnus atratus*	Black Swan		4		0-24 m	SE	
Anatidae	*Cygnus atratus*	Black Swan		1		0-24 m	S	
Anatidae	*Cygnus atratus*	Black Swan		6		0-24 m	E	
Anatidae	*Cygnus atratus*	Black Swan		2		0-24 m	S	
Anatidae	*Cygnus atratus*	Black Swan		9	30	25-50 m	S	
Anatidae	*Cygnus atratus*	Black Swan		2		25-50 m	S	W-E
Anatidae	*Cygnus atratus*	Black Swan		1		25-50 m	E-W	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		4	0	0-24 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1	0	0-24 m	NW	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		4	0	0-24 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		6	0	0-24 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		8	0	0-24 m	SE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1	0	0-24 m	N	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1	0	0-24 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		150	0	0-24 m		
Anatidae	*Tadorna tadornoides*	Australian Shelduck		30	0	0-24 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		5	0	0-24 m	NE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		20	0	0-24 m	SE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		12	0	0-24 m	NE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2	0	0-24 m	NW	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		4	0	0-24 m	NE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2	0	0-24 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2	0	0-24 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		13	0	0-24 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		12	0	0-24 m	N	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1	0	0-24 m	N	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1	0	0-24 m	W	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1	0	0-24 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		5	0	0-24 m	N	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2	0	0-24 m	E	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Anatidae	*Tadorna tadornoides*	Australian Shelduck		18	0	0-24 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		4	1	0-24 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		12	2	0-24 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2	2	0-24 m	NW	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		5	2	0-24 m	SE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1	3	0-24 m	NW	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2	3	0-24 m	W	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2	3	0-24 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2	5	0-24 m	NW	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2	6	0-24 m	W	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2	8	0-24 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2	10	0-24 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		3	10	0-24 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2	12	0-24 m	N	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		5	15	0-24 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		7	15	0-24 m	SE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1	20	0-24 m	SE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2	20	0-24 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1	20	0-24 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2	20	0-24 m	W	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1	20	0-24 m	N	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		3	20	0-24 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1		0-24 m	S	W-W
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	N	SW-S
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	N	S-N
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	E	N-S
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1		0-24 m	W	N-S
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	NW	N-S
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1		0-24 m	E	N-S
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	E	N-S
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1		0-24 m	S	E-W
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	S	E-W
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1		0-24 m	N	E-W
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1		0-24 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	SE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	SE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		20		0-24 m	SW	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	N	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	SW	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1		0-24 m	SE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	SE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	NW	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		9		0-24 m	W	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Anatidae	*Tadorna tadornoides*	Australian Shelduck		31		0-24 m	NW	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	SE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		16		0-24 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		4		0-24 m	N	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	SE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		40		0-24 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1		0-24 m	W	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		16		0-24 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	SE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	N-E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		54		0-24 m	NW	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	N	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	N	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		0-24 m	N	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		29		0-24 m	NE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		16	25	25-50 m	W	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		3	25	25-50 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2	25	25-50 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		7	25	25-50 m	NW	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		70	30	25-50 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1	30	25-50 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		5	30	25-50 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2	30	25-50 m	N	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		4	35	25-50 m	SE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1	40	25-50 m	SW	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		4	40	25-50 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		4	40	25-50 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		6	40	25-50 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		100	50	25-50 m	W	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		3	50	25-50 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		25-50 m	N	W-E
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1		25-50 m	SE	W-E
Anatidae	*Tadorna tadornoides*	Australian Shelduck		5		25-50 m	N	W-E
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1		25-50 m	W	W-E
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		25-50 m	N	W-E
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		25-50 m	N	S-N
Anatidae	*Tadorna tadornoides*	Australian Shelduck		20		25-50 m	W	S-N
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		25-50 m	SW	N-S
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1		25-50 m	E	N-S
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		25-50 m	E	N-S
Anatidae	*Tadorna tadornoides*	Australian Shelduck		8		25-50 m	W	N-S

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1		25-50 m	E	E-W
Anatidae	*Tadorna tadornoides*	Australian Shelduck		4		25-50 m	N	E-W
Anatidae	*Tadorna tadornoides*	Australian Shelduck		4		25-50 m	NW	E-W
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		25-50 m	NE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		25-50 m	E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1		25-50 m	S-N	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		25-50 m	NW	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		54		25-50 m	NW	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		25-50 m	E-W	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		25-50 m	SE	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		25-50 m	N-S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		18		25-50 m	W	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		1		25-50 m	S	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		7		25-50 m	W-E	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		3		51-75 m	NW	E-W
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		51-75 m	S	E-W
Anatidae	*Tadorna tadornoides*	Australian Shelduck		2		51-75 m	E-W	
Anatidae	*Tadorna tadornoides*	Australian Shelduck		14		51-75 m	E-W	
Anhingidae	*Anhinga novaehollandiae*	Australasian Darter		3	0	0-24 m	NE	
Anhingidae	*Anhinga novaehollandiae*	Australasian Darter		1	20	0-24 m	NE	
Ardeidae	*Ardea pacifica*	White-necked Heron		6		0-24 m	S	
Ardeidae	*Ardea pacifica*	White-necked Heron		1		0-24 m	SE	
Ardeidae	*Ardea pacifica*	White-necked Heron		1		25-50 m	W	
Ardeidae	*Ardea pacifica*	White-necked Heron		1		25-50 m	W	
Ardeidae	*Egretta garzetta*	Little Egret		1	0	0-24 m		
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		4	0	0-24 m	SW	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	0	0-24 m	N	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	0	0-24 m	NE	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	0	0-24 m	NE	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		2	0	0-24 m	NE	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		8	0	0-24 m	S	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		2	0	0-24 m	N	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		2	0	0-24 m	N	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	0	0-24 m	NE	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	0	0-24 m	E	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	0	0-24 m	S	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		2	2	0-24 m	E	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	10	0-24 m	NE	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	10	0-24 m	S	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	10	0-24 m	N	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	15	0-24 m	SW	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	15	0-24 m	E	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	15	0-24 m	N	

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Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	15	0-24 m	E	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	20	0-24 m	W	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		4	20	0-24 m	W	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		3	20	0-24 m	E	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	20	0-24 m	NE	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	20	0-24 m	S	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	20	0-24 m	NE	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	20	0-24 m	E	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1		0-24 m	W	N-S
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1		0-24 m	S	E-W
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1		0-24 m	N	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1		0-24 m	S	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1		0-24 m	W-E	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1		0-24 m	NE	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		2		0-24 m	N	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		8		0-24 m	SW	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		20		0-24 m	W	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1		0-24 m	W	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1		0-24 m	N	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1		0-24 m	SW	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	25	25-50 m	NW	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	30	25-50 m	S	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		6	30	25-50 m	NE	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	30	25-50 m	S	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	35	25-50 m	NW	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	35	25-50 m	E	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		2	40	25-50 m	NE	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	50	25-50 m	N	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		1	50	25-50 m	SE	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron		55		51-75 m	S	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		5	1	0-24 m	W	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		3	1	0-24 m	E	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		5	1	0-24 m		
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		2	1	0-24 m	SW	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		2	1	0-24 m	W	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		1	2	0-24 m	S	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		1	2	0-24 m	N	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		2	2	0-24 m	N	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		1	3	0-24 m	NE	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		2	3	0-24 m	S	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		2	3	0-24 m	W	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		3	3	0-24 m	W	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		2	3	0-24 m	W	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		5	3	0-24 m	E	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		2	4	0-24 m	S	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		1	4	0-24 m	W	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		2	4	0-24 m	SW	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		6	4	0-24 m	SE	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		1	5	0-24 m	NW	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		5	10	0-24 m	E	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		2	15	0-24 m	E	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		3		0-24 m	N	E-W
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		2		0-24 m	W	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		2		0-24 m	W	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		2	25	25-50 m	W	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		5	30	25-50 m	NE	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		6		0-24 m	N	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		7		0-24 m	W	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		1		0-24 m		
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		1		0-24 m	W	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		2		0-24 m	W	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		2		0-24 m	SW	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		2		0-24 m	SW	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		4		0-24 m	E	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		2		0-24 m	SW	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		20		0-24 m	W	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		1		0-24 m	W	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		6		0-24 m	N	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		2		0-24 m	W	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		1		0-24 m	NW	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		5		0-24 m	N	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		3		0-24 m	NW	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		5		0-24 m	N	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		2		0-24 m	E	
Artamidae	*Artamus cyanopterus*	Dusky Woodswallow		3		25-50 m	W	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	0	0-24 m	W	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	1	0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	1	0-24 m	SW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	1	0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	1	0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	1	0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	1	0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2	1	0-24 m	SW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	1	0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	1	0-24 m	SW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		3	1	0-24 m	S	

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Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	1	0-24 m	NW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	1	0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	1	0-24 m	SW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	1	0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	1	0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	1	0-24 m	W	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	1	0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	2	0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2	2	0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2	2	0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2	2	0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	2	0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	3	0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	3	0-24 m	NE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2	3	0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	3	0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	3	0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	3	0-24 m	NE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	3	0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	3	0-24 m	NE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	3	0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	3	0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	3	0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	3	0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	3	0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		4	3	0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2	3	0-24 m	NE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	3	0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	4	0-24 m	W	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		3	4	0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	4	0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2	4	0-24 m	NW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2	4	0-24 m	NW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2	5	0-24 m	SW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	5	0-24 m	NW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2	5	0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	6	0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	6	0-24 m	NW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	8	0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	8	0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	8	0-24 m	NE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2	8	0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2	8	0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	8	0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	10	0-24 m	W	

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Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	10	0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2	12	0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	12	0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2	12	0-24 m	NW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	12	0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	12	0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	15	0-24 m	W	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2		0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	SW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	NE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	W	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	W	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	SW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	NE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m		
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	SW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2		0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m		
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	NE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2		0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	SW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2		0-24 m	NE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		3		0-24 m	W	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	W	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2		0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2		0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	NW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	NE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2		0-24 m	W	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	N	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	SW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		4		0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	W	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	NW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m		
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	NE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2		0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	W	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	NW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		3		0-24 m	SE	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2		0-24 m	NW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2		0-24 m	NW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2		0-24 m		
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	NW	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	S	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	W	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1		0-24 m	E	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		2		0-24 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	25	25-50 m	N	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		1	25	25-50 m	W	
Artamidae	*Cracticus torquatus*	Grey Butcherbird		7		25-50 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3	0	0-24 m	S	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		4	0	0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2	0	0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	0	0-24 m	NW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	0	0-24 m	SE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	0	0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	0	0-24 m	SW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	0	0-24 m	E	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	0	0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	0	0-24 m	S	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2	0	0-24 m	SE	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3	0	0-24 m	E	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		4	0	0-24 m	S	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3	0	0-24 m	SE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2	0	0-24 m	W	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2	0	0-24 m	SW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3	0	0-24 m	W	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2	0	0-24 m	SW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2	0	0-24 m	NW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	0	0-24 m	SE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	1	0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	1	0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2	1	0-24 m	E	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	1	0-24 m	NW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	1	0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	2	0-24 m	S	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2	2	0-24 m	SE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3	2	0-24 m	S	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	2	0-24 m	E	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2	3	0-24 m	NE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	3	0-24 m	E	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	3	0-24 m	S	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	3	0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	3	0-24 m	S	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	3	0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	3	0-24 m	NE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	3	0-24 m	SW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	3	0-24 m	NE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		4	3	0-24 m	E	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2	3	0-24 m	E	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3	3	0-24 m	NE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3	3	0-24 m	S	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2	3	0-24 m	E	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3	3	0-24 m	W	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	4	0-24 m	S	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	4	0-24 m	NW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2	4	0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2	4	0-24 m	E	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	4	0-24 m	NE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	5	0-24 m	NE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	5	0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3	5	0-24 m	SW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2	5	0-24 m	E	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3	5	0-24 m	SE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3	6	0-24 m	W	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	8	0-24 m	SW	

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Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	8	0-24 m	SE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2	8	0-24 m	W	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2	15	0-24 m	E	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	15	0-24 m	NE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3	15	0-24 m	S	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	15	0-24 m	NW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1	20	0-24 m	E	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2		0-24 m	S	S-N
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2		0-24 m	SE	S-N
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	W	N-S
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	SE	E-W
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2		0-24 m		
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3		0-24 m	NE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	SW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		4		0-24 m	S	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		9		0-24 m	W	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	W	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	W	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	S	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2		0-24 m	W	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	S	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2		0-24 m	W	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		7		0-24 m	NW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	E	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	SE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	SE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2		0-24 m	SW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	SW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m		
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2		0-24 m	W	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		4		0-24 m	NE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2		0-24 m	W	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3		0-24 m	W	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2		0-24 m	W	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		4		0-24 m	NE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2		0-24 m	S	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		6		0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		4		0-24 m	NW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	SW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2		0-24 m	NW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3		0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	S	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m		
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3		0-24 m	E	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2		0-24 m	W	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	E	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	E	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3		0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3		0-24 m	NE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3		0-24 m	S	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3		0-24 m	NE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m		
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	N	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2		0-24 m	S	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	SE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		1		0-24 m	SW	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2		25-50 m	SW	S-N
Artamidae	*Gymnorhina tibicen*	Australian Magpie		3		25-50 m	W	N-S
Artamidae	*Gymnorhina tibicen*	Australian Magpie		10		25-50 m	SE	
Artamidae	*Gymnorhina tibicen*	Australian Magpie		2		51-75 m	NE	
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1	0	0-24 m		
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	2	20	0-24 m		
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	53		0-24 m	S-N	
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1		25-50 m	N-S	
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	10		25-50 m	N-S	
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)	1				
Cacatuidae	*Calyptorhynchus/Zanda sp.*	black cockatoo species	EN-VU (EPBC & BC Acts)	6	1	0-24 m	NW	
Cacatuidae	*Calyptorhynchus/Zanda sp.*	black cockatoo species	EN-VU (EPBC & BC Acts)	6	2	0-24 m	W	
Cacatuidae	*Calyptorhynchus/Zanda sp.*	black cockatoo species	EN-VU (EPBC & BC Acts)	38	4	0-24 m	N	
Cacatuidae	*Calyptorhynchus/Zanda sp.*	black cockatoo species	EN-VU (EPBC & BC Acts)	10	5	0-24 m	E	
Cacatuidae	*Calyptorhynchus/Zanda sp.*	black cockatoo species	EN-VU (EPBC & BC Acts)	7	8	0-24 m	NE	
Cacatuidae	*Calyptorhynchus/Zanda sp.*	black cockatoo species	EN-VU (EPBC & BC Acts)	2	8	0-24 m	E	
Cacatuidae	*Calyptorhynchus/Zanda sp.*	black cockatoo species	EN-VU (EPBC & BC Acts)	6	8	0-24 m		
Cacatuidae	*Calyptorhynchus/Zanda sp.*	black cockatoo species	EN-VU (EPBC & BC Acts)	4	10	0-24 m	SE	
Cacatuidae	*Calyptorhynchus/Zanda sp.*	black cockatoo species	EN-VU (EPBC & BC Acts)	4	12	0-24 m		
Cacatuidae	*Calyptorhynchus/Zanda sp.*	black cockatoo species	EN-VU (EPBC & BC Acts)	2	15	0-24 m	S	
Cacatuidae	*Calyptorhynchus/Zanda sp.*	black cockatoo species	EN-VU (EPBC & BC Acts)	2	15	0-24 m	S	
Cacatuidae	*Calyptorhynchus/Zanda sp.*	black cockatoo species	EN-VU (EPBC & BC Acts)	2	15	0-24 m		
Cacatuidae	*Calyptorhynchus/Zanda sp.*	black cockatoo species	EN-VU (EPBC & BC Acts)	4	30	25-50 m	S	
Cacatuidae	*Calyptorhynchus/Zanda sp.*	black cockatoo species	EN-VU (EPBC & BC Acts)	1	30	25-50 m	S	
Cacatuidae	*Calyptorhynchus/Zanda sp.*	black cockatoo species	EN-VU (EPBC & BC Acts)	2	40	25-50 m	S	
Cacatuidae	*Eolophus roseicapilla*	Galah		2	3	0-24 m	N	
Cacatuidae	*Eolophus roseicapilla*	Galah		5	35	25-50 m	W	
Cacatuidae	*Zanda baudinii*	Baudin's Cockatoo	EN (EPBC & BC Acts)	2	20	0-24 m	N	
Cacatuidae	*Zanda baudinii*	Baudin's Cockatoo	EN (EPBC & BC Acts)	8		0-24 m	NE-SW	
Cacatuidae	*Zanda baudinii*	Baudin's Cockatoo	EN (EPBC & BC Acts)	1		0-24 m	N-SW	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	12		0-24 m	SW	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	2		0-24 m	W	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	6	2	0-24 m	W	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	6	3	0-24 m	W	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	2	4	0-24 m	E	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	3	4	0-24 m	N	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	2	5	0-24 m	SW	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	9	5	0-24 m	S	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	1	6	0-24 m	E	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	2	6	0-24 m	N	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	6	7	0-24 m	SW	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	4	12	0-24 m	SW	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	1	15	0-24 m	E	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	4	18	0-24 m	W	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	2	18	0-24 m	W	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	2	18	0-24 m	W	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	2	20	0-24 m		
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	2	20	0-24 m	W	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	20	20	0-24 m	W	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	5		0-24 m		
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	2	25	25-50 m		
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	2	25	25-50 m	E	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	1	30	25-50 m	SW	
Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)	1	30	25-50 m	SE	
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	3		0-24 m	S	E-W
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	26		0-24 m	NE-SW	
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)	1				
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1	1	0-24 m	NW	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1	4	0-24 m	N	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1	5	0-24 m	SE	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1	6	0-24 m	W	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1	10	0-24 m	NW	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		2	15	0-24 m	E	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1	15	0-24 m	NW	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1	15	0-24 m	E	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		2	20	0-24 m	W	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1	20	0-24 m	E	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1	20	0-24 m	NW	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1	20	0-24 m	SE	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	W	S-N
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		3		0-24 m	W	S-N
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	W	N-S
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		2		0-24 m	N	E-W
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	N	E-W
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	E	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	W	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		2		0-24 m	W-E	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		12		0-24 m	E	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		2		0-24 m	S	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	W	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		4		0-24 m	W	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	SW	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	SW	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		2		0-24 m	NE	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		2		0-24 m	E-W	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	S	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	W	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	S-N	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		22		0-24 m	W	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	E	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	E	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	S	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	N	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	NW	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1		0-24 m	E	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		3	25	25-50 m	S	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1	25	25-50 m	S	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1	30	25-50 m	N	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1	30	25-50 m	SE	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		1	30	25-50 m	S	
Campephagidae	*Lalage tricolor*	White-winged Triller		2		0-24 m	E	
Campephagidae	*Lalage tricolor*	White-winged Triller		1		0-24 m	SW	
Campephagidae	*Lalage tricolor*	White-winged Triller		2		0-24 m	W	
Campephagidae	*Lalage tricolor*	White-winged Triller		1		0-24 m	S	
Charadriidae	*Anarhynchus ruficapillus*	Red-capped Plover		2	0	0-24 m	SW	
Charadriidae	*Anarhynchus ruficapillus*	Red-capped Plover		70	0	0-24 m	E	
Charadriidae	*Anarhynchus ruficapillus*	Red-capped Plover		13	0	0-24 m	E	
Charadriidae	*Anarhynchus ruficapillus*	Red-capped Plover		6	0	0-24 m	N	
Charadriidae	*Vanellus tricolor*	Banded Lapwing		2		0-24 m	S	
Charadriidae	*Vanellus tricolor*	Banded Lapwing		1		25-50 m	NE	
Charadriidae	*Vanellus tricolor*	Banded Lapwing		1		25-50 m	N	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	0	0-24 m	W	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		2	0	0-24 m	SE	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		2	0	0-24 m	N	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	2	0-24 m	NE	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	3	0-24 m	N	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	3	0-24 m	SE	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	3	0-24 m	NE	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	3	0-24 m	E	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	4	0-24 m	N	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		2	4	0-24 m	NE	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		2	5	0-24 m	N	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	5	0-24 m	S	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	6	0-24 m	E	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	8	0-24 m	S	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	8	0-24 m	W	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	8	0-24 m	E	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		2	8	0-24 m	N	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		2	10	0-24 m	NE	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		2	10	0-24 m	W	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		2	10	0-24 m	E	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		2	12	0-24 m	W	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	12	0-24 m	NE	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	12	0-24 m	NW	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	12	0-24 m	NE	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	12	0-24 m	NW	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	12	0-24 m	E	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		2	12	0-24 m	E	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	12	0-24 m	E	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		2	15	0-24 m	SW	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	15	0-24 m	E	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1	15	0-24 m	NW	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		2		0-24 m	N	W-E
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		2		0-24 m	W	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1		0-24 m	N-E	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		2		0-24 m	E	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		5		0-24 m	S	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1		0-24 m	S	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1		0-24 m	NE	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		1		0-24 m	NE	
Columbidae	*Ocyphaps lophotes*	Crested Pigeon		2		0-24 m	N	
Columbidae	*Phaps chalcoptera*	Common Bronzewing		1	15	0-24 m	W	
Columbidae	*Phaps chalcoptera*	Common Bronzewing		1		0-24 m	E-W	
Columbidae	*Phaps chalcoptera*	Common Bronzewing		1		0-24 m	E-W	
Columbidae	*Phaps chalcoptera*	Common Bronzewing		2		0-24 m	N	
Columbidae	*Phaps chalcoptera*	Common Bronzewing		1		0-24 m	NE	
Columbidae	*Phaps chalcoptera*	Common Bronzewing		1		0-24 m	N	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Columbidae	*Phaps chalcoptera*	Common Bronzewing		1		0-24 m	NW	
Columbidae	*Phaps chalcoptera*	Common Bronzewing		1		0-24 m	N-S	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		5	0	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		4	0	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		15	0	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		6	0	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		4	0	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		4	0	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		5	0	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		8	0	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		10	0	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		3	0	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		20	0	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		5	0	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		14	0	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		7	0	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		9	0	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		6	0	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		5	0	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	E	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		6	0	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		3	0	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		38	0	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		9	0	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		10	0	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	0	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	0	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	1	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		2	1	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		1	1	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		1	1	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1	1	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	1	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		1	1	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		9	1	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		3	1	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		4	1	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		3	1	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		2	1	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		1	2	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	2	0-24 m	S	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Corvidae	*Corvus coronoides*	Australian Raven		3	2	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		2	2	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		2	2	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2	2	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		2	2	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	2	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	2	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		3	2	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	2	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2	2	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1	2	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		1	2	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		1	2	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	2	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	2	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	2	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	2	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2	2	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	2	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	2	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	2	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		2	3	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		2	3	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		1	3	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		1	3	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		1	3	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2	3	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	3	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	3	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		5	3	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		2	3	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	3	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		1	3	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		1	3	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	3	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1	3	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		1	3	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	3	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	3	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		1	3	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		3	3	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		3	3	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	3	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		3	3	0-24 m	SE	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Corvidae	*Corvus coronoides*	Australian Raven		2	4	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		1	4	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	4	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1	4	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	4	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		4	4	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		2	4	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2	4	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	4	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	4	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	4	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		4	4	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		1	4	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	4	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1	4	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1	4	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	4	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		4	4	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2	4	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		2	4	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2	4	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	4	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		2	4	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	4	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		2	4	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	4	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	5	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		1	5	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		4	5	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		6	5	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	5	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	5	0-24 m		
Corvidae	*Corvus coronoides*	Australian Raven		1	5	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	5	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	5	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		3	5	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	5	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2	6	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2	6	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		1	6	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1	6	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	6	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		100	6	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2	6	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		1	7	0-24 m	NE	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Corvidae	*Corvus coronoides*	Australian Raven		2	7	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	8	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		4	8	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	8	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		1	8	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		30	8	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		1	9	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		1	9	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	10	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		6	10	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		1	10	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		20	10	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		1	10	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	10	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		1	10	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		4	10	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	10	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1	10	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		1	10	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		3	10	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		2	10	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		3	10	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	10	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		3	10	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1	12	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		2	12	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		1	12	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	12	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		1	15	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		2	15	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		2	15	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	15	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	15	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	15	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	15	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	15	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	15	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		1	15	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		2	15	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	15	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		2	15	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	15	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	15	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		10	15	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	15	0-24 m	SE	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Corvidae	*Corvus coronoides*	Australian Raven		1	15	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	15	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		5	15	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	15	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		2	20	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		1	20	0-24 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		5	20	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	20	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		3	20	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		1	20	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		2	20	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	20	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	20	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	20	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		3	20	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		1	20	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	20	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		1	20	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	20	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	20	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		8	20	0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		1	20	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	20	0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		16	20	0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	20	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	20	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	20	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	20	0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	20	0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	20	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		4	20	0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		1	24	0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		3		0-24 m	N	W-S
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	SE	W-E
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	S	W-E
Corvidae	*Corvus coronoides*	Australian Raven		4		0-24 m	N	W-E
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	E	SW-SE
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	S	S-N
Corvidae	*Corvus coronoides*	Australian Raven		9		0-24 m	E	S-N
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	E	S-N
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	W	N-S
Corvidae	*Corvus coronoides*	Australian Raven		5		0-24 m	W	N-S
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	W	N-S

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	E	N-S
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	W	N-S
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	N	N-E
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	S	E-W
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	N	E-W
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	S	E-W
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	N	E-W
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		54		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		5		0-24 m		
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m		
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	E-W	
Corvidae	*Corvus coronoides*	Australian Raven		8		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		3		0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		3		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		4		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		3		0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		3		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		3		0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		3		0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		3		0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	N	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		14		0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	NW-SE	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m		
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	S-N	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	W-E	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m		
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m		
Corvidae	*Corvus coronoides*	Australian Raven		3		0-24 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		3		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		3		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		1		0-24 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		2		0-24 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	25	25-50 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	25	25-50 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		3	25	25-50 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2	25	25-50 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		16	25	25-50 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	25	25-50 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		2	25	25-50 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		4	25	25-50 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		1	25	25-50 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	25	25-50 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	25	25-50 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		1	25	25-50 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		3	25	25-50 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		24	25	25-50 m	N	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Corvidae	*Corvus coronoides*	Australian Raven		2	26	25-50 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		3	30	25-50 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	30	25-50 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		2	30	25-50 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	30	25-50 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	30	25-50 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		4	30	25-50 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	30	25-50 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		1	30	25-50 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		2	30	25-50 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		3	30	25-50 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		3	30	25-50 m	E	
Corvidae	*Corvus coronoides*	Australian Raven		2	30	25-50 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		7	30	25-50 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		4	40	25-50 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	40	25-50 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		2	40	25-50 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		3	40	25-50 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		2	40	25-50 m	NW	
Corvidae	*Corvus coronoides*	Australian Raven		5	40	25-50 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		1	45	25-50 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		12	45	25-50 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		2	50	25-50 m	SW	
Corvidae	*Corvus coronoides*	Australian Raven		3		25-50 m	W	S-N
Corvidae	*Corvus coronoides*	Australian Raven		5		25-50 m	W	S-N
Corvidae	*Corvus coronoides*	Australian Raven		1		25-50 m	E	N-S
Corvidae	*Corvus coronoides*	Australian Raven		3		25-50 m	W	N-S
Corvidae	*Corvus coronoides*	Australian Raven		2		25-50 m	S	E-W
Corvidae	*Corvus coronoides*	Australian Raven		1		25-50 m	NW	E-W
Corvidae	*Corvus coronoides*	Australian Raven		2		25-50 m	N	E-W
Corvidae	*Corvus coronoides*	Australian Raven		2		25-50 m	SE	
Corvidae	*Corvus coronoides*	Australian Raven		2		25-50 m	NE	
Corvidae	*Corvus coronoides*	Australian Raven		3		25-50 m		
Corvidae	*Corvus coronoides*	Australian Raven		5		25-50 m	W	
Corvidae	*Corvus coronoides*	Australian Raven		3		25-50 m	S	
Corvidae	*Corvus coronoides*	Australian Raven		1		25-50 m	N	
Corvidae	*Corvus coronoides*	Australian Raven		4		25-50 m	S-N	
Cuculidae	*Cacomantis flabelliformis*	Fan-tailed Cuckoo		1		0-24 m	SE	
Cuculidae	*Chalcites basalis*	Horsfield's Bronze Cuckoo		1	8	0-24 m	W	
Cuculidae	*Chalcites lucidus*	Shining Bronze Cuckoo		1		0-24 m	E	
Cuculidae	*Chalcites lucidus*	Shining Bronze Cuckoo		1		0-24 m	W	
Cuculidae	*Chalcites lucidus*	Shining Bronze Cuckoo		1		0-24 m	NW	
Cuculidae	*Chalcites lucidus*	Shining Bronze Cuckoo		1		0-24 m	W	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Cuculidae	*Chalcites lucidus*	Shining Bronze Cuckoo		1		0-24 m	S	
Cuculidae	*Chalcites lucidus*	Shining Bronze Cuckoo		1		0-24 m	SE	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	0	0-24 m	NW	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2	0	0-24 m	E	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	0	0-24 m	SW	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		4	0	0-24 m	W	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	1	0-24 m	NE	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		3	1	0-24 m	SW	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	2	0-24 m	N	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	2	0-24 m	SE	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	2	0-24 m	W	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	3	0-24 m	W	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2	3	0-24 m	W	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	4	0-24 m	N	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	4	0-24 m	SW	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	5	0-24 m	W	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2	5	0-24 m	SW	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	6	0-24 m	N	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2	6	0-24 m	NW	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	10	0-24 m	NW	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	10	0-24 m	E	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	12	0-24 m	N	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	15	0-24 m	S	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	15	0-24 m	NE	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2	15	0-24 m	S	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2	15	0-24 m	W	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1	15	0-24 m	N	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	N	E-W
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	S	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	NE	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		3		0-24 m	SE	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	SE-NW	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	SW-NW	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1		0-24 m	SE	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	W	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1		0-24 m	SW	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1		0-24 m	SE	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		3		0-24 m	NW	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	S	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	S	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	S	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1		0-24 m	NE	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	W	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	SW	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	SE	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	E-W	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1		0-24 m	SE	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1		0-24 m	W	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		7		0-24 m	N	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1		0-24 m	NE	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1		0-24 m	S	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	W	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1		0-24 m	S	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1		0-24 m		
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		10		0-24 m	N	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		1		0-24 m		
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	N	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	W	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2		0-24 m	NE	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		6		0-24 m	NE	
Dicruridae	*Grallina cyanoleuca*	Magpie-lark		2	25	25-50 m	N	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1	1	0-24 m	NW	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1	1	0-24 m	E	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1	1	0-24 m	NW	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1	1	0-24 m	NE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1	1	0-24 m	NE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1	2	0-24 m	N	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1	2	0-24 m	NE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1	3	0-24 m	NW	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1	3	0-24 m	SW	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1	3	0-24 m	W	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		2	3	0-24 m	E	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		2	3	0-24 m	W	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1	4	0-24 m	N	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1	4	0-24 m	N	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		2	5	0-24 m	NW	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		2	5	0-24 m	NW	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1	12	0-24 m	W	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1	15	0-24 m	E	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	S	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	S	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	E	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		2		0-24 m	S	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	SE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		2		0-24 m	NE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	W	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	NW	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	E	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	NW	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	NE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		2		0-24 m	SE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	S	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	NW	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	NW	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	SE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	SE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	SW-NE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	NW	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	NE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	NW	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		2		0-24 m	NE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	NE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		2		0-24 m	NE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		2		0-24 m	S	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		2		0-24 m		
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	N	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	SW	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	W	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	S	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	W	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	S	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	SE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	N	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	NW	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	W	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	W	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	NE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		2		0-24 m	N	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	E	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	S	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	E	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	E	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		2		0-24 m	S	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		2		0-24 m	N	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	E	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		2		0-24 m	SW	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	NW	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	S	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	W	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m		
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	W	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	W	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	SE	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		1		0-24 m	SW	
Dicruridae	*Rhipidura albiscapa*	Grey Fantail		2		51-75 m		
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		10	0	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	0	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	0	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	0	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	0	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	0	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	1	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		3	1	0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	1	0-24 m	SW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	SW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	1	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	NW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	1	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	1	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	1	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	SE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	SE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	SW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	NE	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	1	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	2	0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	2	0-24 m	SW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	2	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	2	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	2	0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	2	0-24 m	SW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	2	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	2	0-24 m	SW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	2	0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	2	0-24 m	SE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	2	0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	2	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	2	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	2	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	2	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	2	0-24 m	SE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	2	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	2	0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	2	0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	2	0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	2	0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	3	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	3	0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	3	0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	3	0-24 m	NW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	3	0-24 m	NW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	3	0-24 m	NW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	3	0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	3	0-24 m	NW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	3	0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	3	0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	3	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	3	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	3	0-24 m	SW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	3	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	3	0-24 m	NW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	3	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	4	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	4	0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	4	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	4	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	4	0-24 m	W	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	4	0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	4	0-24 m	NW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	5	0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	5	0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	6	0-24 m	NW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	6	0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	8	0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	8	0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2	15	0-24 m	SW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1	15	0-24 m	NW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	NW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		4		0-24 m	SE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		3		0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	S	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	NW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	SW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	NW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	SW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	NW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		3		0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	SW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		4		0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		4		0-24 m	SW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	SE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m		
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	SW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	SE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	E	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	SW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		6		0-24 m	NE	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		4		0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m		
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	W	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	N	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m		
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	NW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		4		0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	SW	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	N	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		1		0-24 m	S	
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail		2		0-24 m	W	
Dromaiidae	*Dromaius novaehollandiae*	Emu		5	0	0-24 m	NW	
Dromaiidae	*Dromaius novaehollandiae*	Emu		1	0	0-24 m	NW	
Dromaiidae	*Dromaius novaehollandiae*	Emu		4	0	0-24 m	SE	
Dromaiidae	*Dromaius novaehollandiae*	Emu		4	0	0-24 m	SE	
Dromaiidae	*Dromaius novaehollandiae*	Emu		1	0	0-24 m	S	
Dromaiidae	*Dromaius novaehollandiae*	Emu		17	0	0-24 m	S	
Dromaiidae	*Dromaius novaehollandiae*	Emu		12	0	0-24 m	W	
Dromaiidae	*Dromaius novaehollandiae*	Emu		2	0	0-24 m	S	
Dromaiidae	*Dromaius novaehollandiae*	Emu		9	0	0-24 m	SE	
Dromaiidae	*Dromaius novaehollandiae*	Emu		2	0	0-24 m	N	
Dromaiidae	*Dromaius novaehollandiae*	Emu		6	0	0-24 m	NE	
Dromaiidae	*Dromaius novaehollandiae*	Emu		8	0	0-24 m	W	
Dromaiidae	*Dromaius novaehollandiae*	Emu		4	0	0-24 m	NW	
Dromaiidae	*Dromaius novaehollandiae*	Emu		5	0	0-24 m	SE	
Dromaiidae	*Dromaius novaehollandiae*	Emu		14	0	0-24 m	N	
Dromaiidae	*Dromaius novaehollandiae*	Emu		4	0	0-24 m	S	
Dromaiidae	*Dromaius novaehollandiae*	Emu		2	0	0-24 m	W	
Dromaiidae	*Dromaius novaehollandiae*	Emu		2	0	0-24 m	E	
Dromaiidae	*Dromaius novaehollandiae*	Emu		3	0	0-24 m	NE	
Dromaiidae	*Dromaius novaehollandiae*	Emu		6	0	0-24 m	E	
Dromaiidae	*Dromaius novaehollandiae*	Emu		15	0	0-24 m	E	
Dromaiidae	*Dromaius novaehollandiae*	Emu		1	0	0-24 m	S	
Dromaiidae	*Dromaius novaehollandiae*	Emu		4	0	0-24 m	NW	
Dromaiidae	*Dromaius novaehollandiae*	Emu		7	0	0-24 m	SW	
Dromaiidae	*Dromaius novaehollandiae*	Emu		8	0	0-24 m	E	
Dromaiidae	*Dromaius novaehollandiae*	Emu		2		0-24 m	N	
Falconidae	*Falco berigora*	Brown Falcon		2	2	0-24 m	NE	
Falconidae	*Falco berigora*	Brown Falcon		1	4	0-24 m	NW	
Falconidae	*Falco berigora*	Brown Falcon		1	8	0-24 m	NW	
Falconidae	*Falco berigora*	Brown Falcon		1	10	0-24 m	W	
Falconidae	*Falco berigora*	Brown Falcon		1	10	0-24 m	W	
Falconidae	*Falco berigora*	Brown Falcon		1	15	0-24 m	W	
Falconidae	*Falco berigora*	Brown Falcon		1		0-24 m	N	W-E
Falconidae	*Falco berigora*	Brown Falcon		1		0-24 m	NW	
Falconidae	*Falco berigora*	Brown Falcon		1	30	25-50 m	N	
Falconidae	*Falco berigora*	Brown Falcon		1		25-50 m	S	
Falconidae	*Falco berigora*	Brown Falcon		2		25-50 m	EW	
Falconidae	*Falco berigora*	Brown Falcon		2		25-50 m	W	
Falconidae	*Falco berigora*	Brown Falcon		1		51-75 m	N	E-W
Falconidae	*Falco berigora*	Brown Falcon		1	100	76-150 m	NW	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	1	0-24 m	E	

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Falconidae	*Falco cenchroides*	Australian Kestrel		3	1	0-24 m	E	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	2	0-24 m	N	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	3	0-24 m	W	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	3	0-24 m	N	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	4	0-24 m	W	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	4	0-24 m	N	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	5	0-24 m	W	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	5	0-24 m	S	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	5	0-24 m	E	
Falconidae	*Falco cenchroides*	Australian Kestrel		2	10	0-24 m	SW	
Falconidae	*Falco cenchroides*	Australian Kestrel		3	10	0-24 m	S	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	10	0-24 m	N	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	15	0-24 m	S	
Falconidae	*Falco cenchroides*	Australian Kestrel		2	15	0-24 m	W	
Falconidae	*Falco cenchroides*	Australian Kestrel		2	15	0-24 m	S	
Falconidae	*Falco cenchroides*	Australian Kestrel		2	15	0-24 m	NE	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	15	0-24 m	SW	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	20	0-24 m	W	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	20	0-24 m	SW	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	20	0-24 m	S	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	20	0-24 m	SW	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	20	0-24 m	N	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	20	0-24 m	SW	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	20	0-24 m	N	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	20	0-24 m		
Falconidae	*Falco cenchroides*	Australian Kestrel		1		0-24 m	S	W-E
Falconidae	*Falco cenchroides*	Australian Kestrel		1		0-24 m	NW	
Falconidae	*Falco cenchroides*	Australian Kestrel		1		0-24 m	SE	
Falconidae	*Falco cenchroides*	Australian Kestrel		1		0-24 m	N	
Falconidae	*Falco cenchroides*	Australian Kestrel		1		0-24 m	E	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	25	25-50 m	W	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	25	25-50 m	NE	
Falconidae	*Falco cenchroides*	Australian Kestrel		2	25	25-50 m	E	
Falconidae	*Falco cenchroides*	Australian Kestrel		2	25	25-50 m	W	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	25	25-50 m	N	
Falconidae	*Falco cenchroides*	Australian Kestrel		2	30	25-50 m	SW	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	30	25-50 m	W	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	40	25-50 m	W	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	40	25-50 m	E	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	50	25-50 m	W	
Falconidae	*Falco cenchroides*	Australian Kestrel		1		25-50 m	E	S-N
Falconidae	*Falco cenchroides*	Australian Kestrel		1		25-50 m	N	
Falconidae	*Falco cenchroides*	Australian Kestrel		1		25-50 m	E	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	80	76-150 m	N	
Falconidae	*Falco cenchroides*	Australian Kestrel		1	80	76-150 m	SE	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Falconidae	*Falco cenchroides*	Australian Kestrel		1	150	76-150 m	NW	
Falconidae	*Falco longipennis*	Australian Hobby		1	15	0-24 m	SE	
Falconidae	*Falco longipennis*	Australian Hobby		1		0-24 m	E	N-S
Falconidae	*Falco longipennis*	Australian Hobby		2		51-75 m		
Falconidae	*Falco peregrinus*	Peregrine Falcon	OS (BC Act)	1		25-50 m	SW	N-S
Haematopodidae	*Haematopus longirostris*	Pied Oystercatcher		2	0	0-24 m	SW	
Haematopodidae	*Haematopus longirostris*	Pied Oystercatcher		1	0	0-24 m	SE	
Haematopodidae	*Haematopus longirostris*	Pied Oystercatcher		1	0	0-24 m	E	
Haematopodidae	*Haematopus longirostris*	Pied Oystercatcher		18	0	0-24 m	N	
Haematopodidae	*Haematopus longirostris*	Pied Oystercatcher		1	0	0-24 m	NE	
Haematopodidae	*Haematopus longirostris*	Pied Oystercatcher		24	0	0-24 m	W	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		1	0	0-24 m	NW	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		1	3	0-24 m	E	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		1	3	0-24 m	E	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		2	3	0-24 m	E	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		2	4	0-24 m	W	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		1	5	0-24 m	W	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		1	7	0-24 m	NW	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		1	8	0-24 m	E	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		1	8	0-24 m	W	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		2	10	0-24 m	W	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		1	12	0-24 m	N	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		2	15	0-24 m	W	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		1		0-24 m	S	E-W
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		1		0-24 m	SE	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		1		0-24 m	SE	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		1		0-24 m	W	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		1		0-24 m		
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		2		0-24 m	S	
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		1		0-24 m	NW	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		4	1	0-24 m	S	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		2	1	0-24 m	W	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		3	1	0-24 m		
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		2	1	0-24 m	W	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		2	1	0-24 m	S	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		3	2	0-24 m	NE	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		2	2	0-24 m	S	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		2	2	0-24 m	E	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		4	2	0-24 m	W	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		1	2	0-24 m	E	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		2	3	0-24 m	S	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		2	3	0-24 m	S	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		10	3	0-24 m	SE	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		1	3	0-24 m	N	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		5	4	0-24 m	SE	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		2	5	0-24 m	S	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		1	6	0-24 m	S	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		2	6	0-24 m		
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		4	8	0-24 m	W	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		4	8	0-24 m	W	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		4	8	0-24 m	N	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		1	12	0-24 m	SW	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		5	15	0-24 m	N	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		1	15	0-24 m	SE	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		5	15	0-24 m	E	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		1		0-24 m	E	N-S
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		2		0-24 m	N	E-W
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		1		0-24 m	E	E-W
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		12		0-24 m	SE	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		3		0-24 m		
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		2		0-24 m	E-W	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		1		0-24 m		
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		3		0-24 m	N	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		2		0-24 m	W	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		1		0-24 m	SW	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		1		0-24 m	NW	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		21		0-24 m	E	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		2		0-24 m		
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		2		0-24 m	W	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		2		0-24 m	N	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		2		0-24 m	W-E	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		1		0-24 m		
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		1		0-24 m	N	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		1		0-24 m	N	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		3	25	25-50 m	SW	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow		3	30	25-50 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1	1	0-24 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		3	1	0-24 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	1	0-24 m	SE	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		8	2	0-24 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		12	4	0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		3	5	0-24 m	NW	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1	5	0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		10	5	0-24 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	5	0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		9	5	0-24 m	N	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		3	6	0-24 m	SW	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		5	6	0-24 m	N	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		5	8	0-24 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		4	8	0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		6	8	0-24 m	NW	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		30	8	0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		4	8	0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	8	0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	8	0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	10	0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1	10	0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	10	0-24 m	SE	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	10	0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		4	10	0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		25	10	0-24 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		22	10	0-24 m	SE	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1	10	0-24 m	N	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		5	10	0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		19	10	0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		8	10	0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		32	12	0-24 m	N	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		4	12	0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		3	12	0-24 m	SW	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		7	12	0-24 m	NE	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	15	0-24 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	15	0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1	15	0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		12	15	0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		5	15	0-24 m	NE	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		3	15	0-24 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		12	15	0-24 m	SE	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	15	0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		5	15	0-24 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		6	15	0-24 m	SE	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	15	0-24 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	15	0-24 m	N	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		13	15	0-24 m	N	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		4	20	0-24 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1	20	0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1	20	0-24 m	N	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		20	20	0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1	20	0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	20	0-24 m	NW	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		30	20	0-24 m	N	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		3	20	0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		10	20	0-24 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		5	20	0-24 m	NE	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		20	20	0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		5	20	0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	20	0-24 m	NE	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		8	20	0-24 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		20	20	0-24 m	NE	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		22	20	0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		5	20	0-24 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		8	20	0-24 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		5	20	0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		3		0-24 m	N	W-E
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		16		0-24 m	N	W-E
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		18		0-24 m	E	N-S
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1		0-24 m	N	E-W
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2		0-24 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		12		0-24 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1		0-24 m	N-S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		7		0-24 m	N-S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2		0-24 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		6		0-24 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2		0-24 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		6		0-24 m	N-S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1		0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		5		0-24 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		16		0-24 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1		0-24 m	S-N	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		9		0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		3		0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2		0-24 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		4		0-24 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		15		0-24 m	NW	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		3		0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		8		0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		4		0-24 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1		0-24 m	E-W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		5		0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1		0-24 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		6	25	25-50 m	NW	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		5	25	25-50 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		7	25	25-50 m	E	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	25	25-50 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		3	25	25-50 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		33	25	25-50 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	30	25-50 m	N	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		10	30	25-50 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		4	30	25-50 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		21	30	25-50 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		12	30	25-50 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		4	30	25-50 m	NW	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1	30	25-50 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		7	30	25-50 m	N	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		3	30	25-50 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1	35	25-50 m	SW	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	40	25-50 m	N	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		4	40	25-50 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	40	25-50 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		15	40	25-50 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		18	40	25-50 m	S	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		3	40	25-50 m	NE	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		6	45	25-50 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2	45	25-50 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		3	50	25-50 m	SW	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		16	50	25-50 m	NW	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1		25-50 m	S	N-S
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		15		25-50 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2		25-50 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		26		25-50 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1		25-50 m	W	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		11		25-50 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1		25-50 m		
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		15	70	51-75 m	NE	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		5	70	51-75 m	E	
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		1		51-75 m	N	E-W
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull		1	0	0-24 m	SE	
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull		5	0	0-24 m	SW	
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull		1	0	0-24 m	NE	
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull		4	0	0-24 m	NE	
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull		1	0	0-24 m	E	
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull		1	0	0-24 m	SE	
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull		2	0	0-24 m		
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull		4	0	0-24 m	SE	
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull		20	0	0-24 m	W	
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull		50	0	0-24 m	N	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull		4	5	0-24 m	E	
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull		6	5	0-24 m	E	
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull		1	20	0-24 m	S	
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull		4	20	0-24 m	SW	
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull		3	25	25-50 m	E	
Laridae	*Hydroprogne caspia*	Caspian Tern	Mig. (EPBC & BC Acts)	9	0	0-24 m	SW	
Laridae	*Hydroprogne caspia*	Caspian Tern	Mig. (EPBC & BC Acts)	27	0	0-24 m	N	
Laridae	*Hydroprogne caspia*	Caspian Tern	Mig. (EPBC & BC Acts)	22	0	0-24 m	W	
Laridae	*Hydroprogne caspia*	Caspian Tern	Mig. (EPBC & BC Acts)	1	5	0-24 m	N	
Laridae	*Hydroprogne caspia*	Caspian Tern	Mig. (EPBC & BC Acts)	1	30	25-50 m	E	
Laridae	*Hydroprogne caspia*	Caspian Tern	Mig. (EPBC & BC Acts)	2	40	25-50 m	SW	
Laridae	*Larus pacificus*	Pacific Gull		1	0	0-24 m	NE	
Laridae	*Larus pacificus*	Pacific Gull		2	0	0-24 m		
Laridae	*Larus pacificus*	Pacific Gull		1	0	0-24 m	E	
Laridae	*Larus pacificus*	Pacific Gull		1	0	0-24 m	NE	
Laridae	*Larus pacificus*	Pacific Gull		7	0	0-24 m	SE	
Laridae	*Larus pacificus*	Pacific Gull		2	15	0-24 m	S	
Laridae	*Larus pacificus*	Pacific Gull		3	20	0-24 m	N	
Laridae	*Larus pacificus*	Pacific Gull		3	40	25-50 m	SE	
Laridae	*Sternula nereis nereis*	Fairy Tern	VU (EPBC & BC Acts)	4	0	0-24 m	SW	
Laridae	*Sternula nereis nereis*	Fairy Tern	VU (EPBC & BC Acts)	40	0	0-24 m	N	
Laridae	*Sternula nereis nereis*	Fairy Tern	VU (EPBC & BC Acts)	4	30	25-50 m	NW	
Laridae	*Thalasseus bergii*	Greater Crested Tern	Mig. (EPBC & BC Acts)	20	0	0-24 m	SW	
Laridae	*Thalasseus bergii*	Greater Crested Tern	Mig. (EPBC & BC Acts)	6	0	0-24 m	SE	
Laridae	*Thalasseus bergii*	Greater Crested Tern	Mig. (EPBC & BC Acts)	6	0	0-24 m	N	
Laridae	*Thalasseus bergii*	Greater Crested Tern	Mig. (EPBC & BC Acts)	3	0	0-24 m	N	
Laridae	*Thalasseus bergii*	Greater Crested Tern	Mig. (EPBC & BC Acts)	1	5	0-24 m	E	
Laridae	*Thalasseus bergii*	Greater Crested Tern	Mig. (EPBC & BC Acts)	1	10	0-24 m		
Laridae	*Thalasseus bergii*	Greater Crested Tern	Mig. (EPBC & BC Acts)	1	10	0-24 m	SE	
Laridae	*Thalasseus bergii*	Greater Crested Tern	Mig. (EPBC & BC Acts)	1	25	25-50 m	E	
Laridae	*Thalasseus bergii*	Greater Crested Tern	Mig. (EPBC & BC Acts)	6	30	25-50 m	E	
Laridae	*Thalasseus bergii*	Greater Crested Tern	Mig. (EPBC & BC Acts)	1	40	25-50 m	W	
Locustellidae	*Cincloramphus cruralis*	Brown Songlark		1	0	0-24 m	NW	
Locustellidae	*Cincloramphus cruralis*	Brown Songlark		2	1	0-24 m	W	
Locustellidae	*Cincloramphus cruralis*	Brown Songlark		1	15	0-24 m	S	
Locustellidae	*Cincloramphus cruralis*	Brown Songlark		1	15	0-24 m	NE	
Locustellidae	*Cincloramphus cruralis*	Brown Songlark		1	15	0-24 m	S	
Locustellidae	*Cincloramphus cruralis*	Brown Songlark		1		0-24 m		
Locustellidae	*Cincloramphus cruralis*	Brown Songlark		1		0-24 m	N	
Locustellidae	*Cincloramphus cruralis*	Brown Songlark		3		0-24 m	W	
Locustellidae	*Cincloramphus cruralis*	Brown Songlark		1		25-50 m	S	
Locustellidae	*Cincloramphus cruralis*	Brown Songlark		1		25-50 m	N	
Locustellidae	*Cincloramphus cruralis*	Brown Songlark		1		25-50 m	S	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Locustellidae	*Cincloramphus cruralis*	Brown Songlark		1		25-50 m	S	
Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark		2		0-24 m	N	
Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark		1		0-24 m	E	
Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark		1		0-24 m	S	
Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark		1		0-24 m	NE	
Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark		2		0-24 m	S	
Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark		1		0-24 m	W	
Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark		1		0-24 m	W	
Maluridae	*Malurus elegans*	Red-winged Fairy-wren		1	1	0-24 m	NE	
Maluridae	*Malurus elegans*	Red-winged Fairy-wren		4	1	0-24 m	NE	
Maluridae	*Malurus elegans*	Red-winged Fairy-wren		1		0-24 m		
Maluridae	*Malurus elegans*	Red-winged Fairy-wren		2		0-24 m	W	
Maluridae	*Malurus elegans*	Red-winged Fairy-wren		3		0-24 m		
Maluridae	*Malurus elegans*	Red-winged Fairy-wren		2		0-24 m	N	
Maluridae	*Malurus elegans*	Red-winged Fairy-wren		6		0-24 m	E	
Maluridae	*Malurus elegans*	Red-winged Fairy-wren		2		0-24 m	NW	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		4	0	0-24 m	SE	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		3	0	0-24 m	E	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		3	0	0-24 m	E	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		1	1	0-24 m	N	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		3	1	0-24 m	W	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2	1	0-24 m	SW	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		3	1	0-24 m	W	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2	1	0-24 m	SW	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2	1	0-24 m	E	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2	1	0-24 m	W	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		1	1	0-24 m	W	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2	1	0-24 m	SW	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2	1	0-24 m	W	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		3	1	0-24 m	NW	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		1	1	0-24 m	N	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2	1	0-24 m	NE	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		1	1	0-24 m	W	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		4	1	0-24 m	NW	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		3	1	0-24 m	W	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		1	2	0-24 m	W	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		3		0-24 m	SE	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		3		0-24 m	E	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2		0-24 m	W	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		5		0-24 m	SW	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		1		0-24 m	N	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		1		0-24 m	W	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		3		0-24 m	N	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		3		0-24 m	NE	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		3		0-24 m	N	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2		0-24 m	N	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		3		0-24 m	NE	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2		0-24 m	W	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		3		0-24 m	W	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		5		0-24 m	E	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2		0-24 m	NW	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2		0-24 m	W	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2		0-24 m	NE	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		1		0-24 m		
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2		0-24 m	NE	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2		0-24 m	W	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		4		0-24 m	SE	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		1		0-24 m	NE	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		3		0-24 m	N	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2		0-24 m	SW	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2		0-24 m	E	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		1		0-24 m	SW	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2		0-24 m	N	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2		0-24 m	NE	
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2		0-24 m	N	
Maluridae	*Stipiturus malachurus*	Southern Emu-wren		2	1	0-24 m	SW	
Maluridae	*Stipiturus malachurus*	Southern Emu-wren		2	1	0-24 m	S	
Maluridae	*Stipiturus malachurus*	Southern Emu-wren		3	1	0-24 m	W	
Maluridae	*Stipiturus malachurus*	Southern Emu-wren		2	1	0-24 m	SW	
Meliphagidae	*Acanthorhynchus superciliosus*	Western Spinebill		1	1	0-24 m	S	
Meliphagidae	*Acanthorhynchus superciliosus*	Western Spinebill		1	1	0-24 m	E	
Meliphagidae	*Acanthorhynchus superciliosus*	Western Spinebill		1		0-24 m	N	
Meliphagidae	*Acanthorhynchus superciliosus*	Western Spinebill		1		0-24 m	N	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	2	0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	3	0-24 m	SW	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	3	0-24 m	E	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	3	0-24 m	N	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2	3	0-24 m	SW	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		3	4	0-24 m	NW	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		3	4	0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	4	0-24 m	S	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		3	4	0-24 m	E	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	4	0-24 m	SW	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	5	0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		3	5	0-24 m	N	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2	5	0-24 m	E	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	6	0-24 m	E	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	8	0-24 m	S	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	8	0-24 m	E	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	8	0-24 m	E	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		3	8	0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		4	10	0-24 m	N	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	10	0-24 m	NW	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	12	0-24 m	N	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	12	0-24 m	S	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2	12	0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	15	0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	15	0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		3	15	0-24 m	N	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	15	0-24 m	E	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	15	0-24 m	S	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	15	0-24 m	N	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	15	0-24 m	SE	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		5	15	0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2	15	0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	20	0-24 m	SE	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2	20	0-24 m	NE	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	20	0-24 m	NE	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2	20	0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1	20	0-24 m	NE	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2	20	0-24 m	N	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	N	W-E
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	S	W-E
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	S	W-E
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	W	S-N
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	NW	N-S
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	N	E-W
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	N	E-W
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	N	E-W
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	E	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	N	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	E	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		6		0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		3		0-24 m	N	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	SW	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	E	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		3		0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		8		0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	E	

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Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	N	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	N	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		4		0-24 m	S	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	N	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	E	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	NE	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	W-E	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	S	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	NW	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	NW	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	E	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m		
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	NE	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		3		0-24 m	SE	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	N	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	NW	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	SE	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	NW	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	SE	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	S-N	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	NW	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	E-W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	S	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	SE	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		0-24 m	E	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		0-24 m	E	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2	25	25-50 m	N	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2	25	25-50 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		4	30	25-50 m	W	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		3		25-50 m	NW	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2		25-50 m	SW	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		1		25-50 m	SE	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		2	0	0-24 m	W	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		4	0	0-24 m	NW	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		1	1	0-24 m	NE	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		3	1	0-24 m	E	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		1	2	0-24 m	NW	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		2	3	0-24 m	S	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		7	3	0-24 m	S	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		1	4	0-24 m	SE	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		6	7	0-24 m	W	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		2	8	0-24 m	E	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		2	10	0-24 m	N	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		30	10	0-24 m	N	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		1	15	0-24 m	NE	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		3	15	0-24 m	S	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		2	15	0-24 m	W	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		9	15	0-24 m	W	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		2	20	0-24 m	W	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		2		0-24 m	S	E-W
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		1		0-24 m	S	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		2		0-24 m	W	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		4		0-24 m		
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		10		0-24 m	NW	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		2		0-24 m	W	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		4		0-24 m	SE	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		20		0-24 m	E	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		4		0-24 m	N	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		20		0-24 m	S	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		20		0-24 m	SE	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		5		0-24 m		
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		1		0-24 m	S	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		6		0-24 m	S	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		2		0-24 m	W	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		1	30	25-50 m	E	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		1		25-50 m	S	W-E
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		8		25-50 m	E-W	
Meliphagidae	*Epthianura albifrons*	White-fronted Chat		1		25-50 m	S-W	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		3	2	0-24 m	NE	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		2	3	0-24 m	E	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		2	3	0-24 m	NE	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		3	3	0-24 m	N	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		2	3	0-24 m	NE	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		2	3	0-24 m	E	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		2	3	0-24 m	NE	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		2	4	0-24 m	N	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		2	4	0-24 m	E	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		1	4	0-24 m	SE	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		2	5	0-24 m	E	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		2	5	0-24 m	E	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		2	5	0-24 m	N	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		1	5	0-24 m	E	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		5		0-24 m	NE	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		1		0-24 m	N	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		1		0-24 m	SW	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		1		0-24 m	NW	
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater		2	3	0-24 m	NE	
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater		3	3	0-24 m	N	
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater		7	4	0-24 m	NE	
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater		1	10	0-24 m	NE	
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater		1		0-24 m	W	
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater		2		0-24 m	N	
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater		1		0-24 m	SE	
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater		8		0-24 m	W	
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater		2		0-24 m	N	
Motacillidae	*Anthus australis*	Australian Pipit		1	0	0-24 m	N	
Motacillidae	*Anthus australis*	Australian Pipit		3	0	0-24 m	S	
Motacillidae	*Anthus australis*	Australian Pipit		2	0	0-24 m	NW	
Motacillidae	*Anthus australis*	Australian Pipit		2	0	0-24 m	SW	
Motacillidae	*Anthus australis*	Australian Pipit		1	0	0-24 m	N	
Motacillidae	*Anthus australis*	Australian Pipit		1	0	0-24 m	W	
Motacillidae	*Anthus australis*	Australian Pipit		3	0	0-24 m	S	
Motacillidae	*Anthus australis*	Australian Pipit		2	0	0-24 m	E	
Motacillidae	*Anthus australis*	Australian Pipit		1	0	0-24 m	W	
Motacillidae	*Anthus australis*	Australian Pipit		1	0	0-24 m	W	
Motacillidae	*Anthus australis*	Australian Pipit		2	0	0-24 m	W	
Motacillidae	*Anthus australis*	Australian Pipit		1	1	0-24 m	W	
Motacillidae	*Anthus australis*	Australian Pipit		1	1	0-24 m	SW	
Motacillidae	*Anthus australis*	Australian Pipit		1	1	0-24 m	S	
Motacillidae	*Anthus australis*	Australian Pipit		1	1	0-24 m	W	
Motacillidae	*Anthus australis*	Australian Pipit		2	1	0-24 m	NW	
Motacillidae	*Anthus australis*	Australian Pipit		1	1	0-24 m	W	
Motacillidae	*Anthus australis*	Australian Pipit		1	1	0-24 m	N	
Motacillidae	*Anthus australis*	Australian Pipit		1	1	0-24 m	E	
Motacillidae	*Anthus australis*	Australian Pipit		1	1	0-24 m	W	
Motacillidae	*Anthus australis*	Australian Pipit		2	1	0-24 m	W	
Motacillidae	*Anthus australis*	Australian Pipit		2	3	0-24 m	NE	
Motacillidae	*Anthus australis*	Australian Pipit		2	4	0-24 m	W	
Motacillidae	*Anthus australis*	Australian Pipit		1	5	0-24 m	W	
Motacillidae	*Anthus australis*	Australian Pipit		1	5	0-24 m	W	
Motacillidae	*Anthus australis*	Australian Pipit		1	5	0-24 m	N	
Motacillidae	*Anthus australis*	Australian Pipit		1	6	0-24 m	SW	
Motacillidae	*Anthus australis*	Australian Pipit		1	10	0-24 m	W	
Motacillidae	*Anthus australis*	Australian Pipit		1	10	0-24 m	N	
Motacillidae	*Anthus australis*	Australian Pipit		2	10	0-24 m	NW	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Motacillidae	*Anthus australis*	Australian Pipit		1	10	0-24 m	SW	
Motacillidae	*Anthus australis*	Australian Pipit		1	12	0-24 m	NE	
Motacillidae	*Anthus australis*	Australian Pipit		1	15	0-24 m	E	
Motacillidae	*Anthus australis*	Australian Pipit		1	18	0-24 m	NE	
Motacillidae	*Anthus australis*	Australian Pipit		1	20	0-24 m	S	
Motacillidae	*Anthus australis*	Australian Pipit		1	20	0-24 m	NE	
Motacillidae	*Anthus australis*	Australian Pipit		3		0-24 m	SW	
Motacillidae	*Anthus australis*	Australian Pipit		1		0-24 m	N	
Motacillidae	*Anthus australis*	Australian Pipit		1		0-24 m	N	
Motacillidae	*Anthus australis*	Australian Pipit		1		0-24 m	S	
Motacillidae	*Anthus australis*	Australian Pipit		1		0-24 m	NE	
Motacillidae	*Anthus australis*	Australian Pipit		2		0-24 m		
Motacillidae	*Anthus australis*	Australian Pipit		1		0-24 m	SW	
Motacillidae	*Anthus australis*	Australian Pipit		1		0-24 m	S	
Motacillidae	*Anthus australis*	Australian Pipit		2		0-24 m	S	
Motacillidae	*Anthus australis*	Australian Pipit		6		0-24 m	W	
Motacillidae	*Anthus australis*	Australian Pipit		1		0-24 m	S-N	
Motacillidae	*Anthus australis*	Australian Pipit		1		0-24 m	S	
Motacillidae	*Anthus australis*	Australian Pipit		2		0-24 m	W	
Motacillidae	*Anthus australis*	Australian Pipit		1		0-24 m	W	
Motacillidae	*Anthus australis*	Australian Pipit		1	25	25-50 m	E	
Motacillidae	*Anthus australis*	Australian Pipit		1	25	25-50 m	SW	
Motacillidae	*Anthus australis*	Australian Pipit		1	30	25-50 m	NW	
Motacillidae	*Anthus australis*	Australian Pipit		1	40	25-50 m	NW	
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush		1		0-24 m	NW	
Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler		1	3	0-24 m	W	
Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler		1	15	0-24 m	SE	
Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler		1		0-24 m	W	
Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler		1		0-24 m	SW	
Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler		1		0-24 m	W	
Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler		1		0-24 m	E	
Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler		1		0-24 m	W	
Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler		2		0-24 m	SW	
Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler		1		0-24 m	SW	
Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler		1		0-24 m	S	
Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler		1		0-24 m	SW	
Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler		1		0-24 m	SW	
Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler		1		0-24 m	NE	
Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler		1		0-24 m	SE	
Pardalotidae	*Pardalotus striatus*	Striated Pardalote		1		0-24 m	E	
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican		32	0	0-24 m	W	
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican		50	0	0-24 m	NE	
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican		42	1	0-24 m	NE	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican		1	3	0-24 m	E	
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican		1	8	0-24 m	N	
Petroicidae	*Microeca fascinans*	Jacky Winter		1		0-24 m	W	
Petroicidae	*Petroica boodang*	Scarlet Robin		1		0-24 m	N	
Petroicidae	*Petroica boodang*	Scarlet Robin		1		0-24 m	S	
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant		2	0	0-24 m	N	
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant		1	0	0-24 m		
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant		1	1	0-24 m	SE	
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant		1	2	0-24 m	W	
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant		1	20	0-24 m	N	
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant		1	30	25-50 m	W	
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant		1	40	25-50 m	S	
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant		1	45	25-50 m	S	
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant		1	50	25-50 m	W	
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant		2	60	51-75 m	N	
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant		1	70	51-75 m	W	
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant		1	80	76-150 m	N	
Phalacrocoracidae	*Phalacrocorax carbo*	Great Cormorant		7	10	0-24 m	N	
Phalacrocoracidae	*Phalacrocorax carbo*	Great Cormorant		1	30	25-50 m	W	
Phalacrocoracidae	*Phalacrocorax carbo*	Great Cormorant		1	80	76-150 m	S	
Phalacrocoracidae	*Phalacrocorax sulcirostris*	Little Black Cormorant		26	10	0-24 m	NW	
Phalacrocoracidae	*Phalacrocorax sulcirostris*	Little Black Cormorant		1		25-50 m	E	N-S
Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant		1	1	0-24 m	SE	
Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant		1	2	0-24 m	SW	
Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant		1	3	0-24 m	W	
Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant		1	4	0-24 m	E	
Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant		5	4	0-24 m	E	
Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant		1	5	0-24 m	W	
Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant		2	10	0-24 m		
Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant		1	10	0-24 m	W	
Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant		1		0-24 m	E-W	
Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant		1	25	25-50 m	W	
Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant		1	25	25-50 m	W	
Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant		4	30	25-50 m	W	
Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant		1		51-75 m	W	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		2	0	0-24 m	SE	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1	0	0-24 m	W	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		3	0	0-24 m	W	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1	0	0-24 m	W	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1	0	0-24 m	E	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1	0	0-24 m	E	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1	0	0-24 m	E	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1	0	0-24 m	NE	

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Phasianidae	*Coturnix pectoralis*	Stubble Quail		2	0	0-24 m	E	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		2	0	0-24 m	SW	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		4	0	0-24 m	S	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		4	0	0-24 m	N	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		2	0	0-24 m	SE	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		2	0	0-24 m	SE	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1	0	0-24 m	W	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		4	0	0-24 m	W	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1	0	0-24 m	SE	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1	0	0-24 m	E	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1	0	0-24 m	S	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1	0	0-24 m	SW	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1	0	0-24 m	NW	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1	0	0-24 m	S	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		2	0	0-24 m	SE	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		2	0	0-24 m	S	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1	1	0-24 m	W	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1	1	0-24 m	S	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		2	2	0-24 m	SW	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1		0-24 m		
Phasianidae	*Coturnix pectoralis*	Stubble Quail		3		0-24 m	E	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		2		0-24 m	S	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		6		0-24 m	NE	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1		0-24 m		
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1		0-24 m	S	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1		0-24 m	E	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1		0-24 m	SW	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1		0-24 m	SW	
Phasianidae	*Coturnix pectoralis*	Stubble Quail		1		0-24 m	N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1	0	0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1	0	0-24 m	SE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1	0	0-24 m	N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1	0	0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		4	0	0-24 m	E	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		3	0	0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		6	0	0-24 m	NW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		6	0	0-24 m	NE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	0.5	0-24 m	E	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		3	1	0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	1	0-24 m	NE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		4	2	0-24 m	SE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	2	0-24 m	N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	2	0-24 m	E	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	2	0-24 m	SE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	2	0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		5	2	0-24 m	N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	3	0-24 m	SE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	3	0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		3	3	0-24 m	N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	3	0-24 m	SE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	3	0-24 m	SW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	3	0-24 m	NE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	3	0-24 m	NW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	3	0-24 m	N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1	3	0-24 m	N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	3	0-24 m	E	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	3	0-24 m	N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		25	4	0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	4	0-24 m	N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		3	4	0-24 m	E	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	4	0-24 m	NW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		4	4	0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		3	4	0-24 m	NW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	4	0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1	4	0-24 m	E	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	4	0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	5	0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		3	5	0-24 m	SE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1	5	0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		3	5	0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1	5	0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		6	5	0-24 m	NW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1	5	0-24 m	N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		4	5	0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		3	6	0-24 m	E	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	6	0-24 m	NW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	6	0-24 m	SW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	6	0-24 m	NE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	7	0-24 m	E	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1	8	0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		4	8	0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	8	0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	10	0-24 m	N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	10	0-24 m	E	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	10	0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2	10	0-24 m	N	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		3	15	0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	W	W-E
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m	N	W-E
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		4		0-24 m	N	W-E
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		9		0-24 m	N	N-S
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		4		0-24 m	W	N-S
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		5		0-24 m	N	E-W
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	S	E-W
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m		
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m	NE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		4		0-24 m	NW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m	SE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m	SE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m	NW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		7		0-24 m	SW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m		
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	E	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	SW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	NW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	NW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		3		0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		3		0-24 m	S-N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		6		0-24 m	NW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		6		0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m	NE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	NW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		15		0-24 m	N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		5		0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		4		0-24 m	E	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m	N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m		
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m		
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		10		0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m		
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m	SE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m		
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		3		0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	NE	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		5		0-24 m	SE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m	N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	S-N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	E	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	NW	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	E-W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		1		0-24 m	SE	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		10		0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		7		0-24 m	S	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		3		0-24 m	N	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	E-W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		6		0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		2		0-24 m	W	
Psittaculidae	*Barnardius zonarius*	Australian Ringneck		4		0-24 m	W	
Psittaculidae	*Neophema elegans*	Elegant Parrot		18	0	0-24 m	W	
Psittaculidae	*Neophema elegans*	Elegant Parrot		2	8	0-24 m	N	
Psittaculidae	*Neophema elegans*	Elegant Parrot		2	20	0-24 m	E	
Psittaculidae	*Neophema elegans*	Elegant Parrot		9		0-24 m	SW	S-W
Psittaculidae	*Neophema elegans*	Elegant Parrot		2		0-24 m	N	S-N
Psittaculidae	*Neophema elegans*	Elegant Parrot		3		0-24 m	N	
Psittaculidae	*Neophema elegans*	Elegant Parrot		5		0-24 m	W-E	
Psittaculidae	*Neophema elegans*	Elegant Parrot		4		0-24 m	E	
Psittaculidae	*Neophema elegans*	Elegant Parrot		4		0-24 m	W	
Psittaculidae	*Neophema elegans*	Elegant Parrot		7		0-24 m	W	
Psittaculidae	*Neophema elegans*	Elegant Parrot		2		0-24 m	S	
Psittaculidae	*Neophema elegans*	Elegant Parrot		1		0-24 m	S	
Psittaculidae	*Neophema elegans*	Elegant Parrot		4		0-24 m	N	
Psittaculidae	*Neophema elegans*	Elegant Parrot		3		0-24 m	S	
Psittaculidae	*Neophema elegans*	Elegant Parrot		12		0-24 m	NW	
Psittaculidae	*Neophema elegans*	Elegant Parrot		3	25	25-50 m	N	
Psittaculidae	*Neophema elegans*	Elegant Parrot		1	30	25-50 m	N	
Psittaculidae	*Neophema elegans*	Elegant Parrot		3	30	25-50 m	E	
Psittaculidae	*Neophema elegans*	Elegant Parrot		2	30	25-50 m	NE	
Psittaculidae	*Neophema elegans*	Elegant Parrot		2	40	25-50 m	SE	
Psittaculidae	*Neophema elegans*	Elegant Parrot		4	40	25-50 m	E	
Psittaculidae	*Neophema elegans*	Elegant Parrot		3	40	25-50 m	E	
Psittaculidae	*Neophema elegans*	Elegant Parrot		1	50	25-50 m	E	
Psittaculidae	*Neophema elegans*	Elegant Parrot		1	50	25-50 m	E	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Psittaculidae	*Neophema elegans*	Elegant Parrot		2		25-50 m	N	W-E
Psittaculidae	*Neophema elegans*	Elegant Parrot		1		25-50 m	E	S-N
Psittaculidae	*Neophema elegans*	Elegant Parrot		5		25-50 m		
Psittaculidae	*Neophema elegans*	Elegant Parrot		3		25-50 m	E-W	
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		6	10	0-24 m	NW	
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		3	20	0-24 m	NE	
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		10	20	0-24 m	N	
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		8		0-24 m	S	E-W
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		1		0-24 m	E	
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		3		0-24 m	N	
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		2		0-24 m	S-N	
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		10	30	25-50 m	S	
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		6	30	25-50 m	S	
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		18		25-50 m	S	W-E
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		2		25-50 m	W	S-N
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		8		25-50 m	N	E-W
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		2		25-50 m	W	
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		7		25-50 m	N-S	
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		27		51-75 m	S	E-W
Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet		16		51-75 m	EW	
Psittaculidae	*Platycercus icterotis*	Western Rosella		2	3	0-24 m	NE	
Psittaculidae	*Platycercus icterotis*	Western Rosella		1	4	0-24 m	SW	
Psittaculidae	*Platycercus icterotis*	Western Rosella		2	8	0-24 m	S	
Psittaculidae	*Platycercus icterotis*	Western Rosella		2		0-24 m	E	S-N
Psittaculidae	*Platycercus icterotis*	Western Rosella		1		0-24 m	S	S-N
Psittaculidae	*Platycercus icterotis*	Western Rosella		2		0-24 m	E	
Psittaculidae	*Platycercus icterotis*	Western Rosella		2		0-24 m	SW	
Psittaculidae	*Platycercus icterotis*	Western Rosella		1		0-24 m	NE	
Psittaculidae	*Platycercus icterotis*	Western Rosella		2		0-24 m	W	
Psittaculidae	*Platycercus icterotis*	Western Rosella		1		0-24 m	SW	
Psittaculidae	*Purpureicephalus spurius*	Red-capped Parrot		1		0-24 m	N	E-W
Scolopacidae	*Calidris acuminata*	Sharp-tailed Sandpiper	VU/Mig. (EPBC Act); Mig. (BC Act)	40	0	0-24 m	N	
Scolopacidae	*Calidris alba*	Sanderling	Mig. (EPBC & BC Acts)	4	0	0-24 m	N	
Scolopacidae	*Calidris ruficollis*	Red-necked Stint	Mig. (EPBC & BC Acts)	60	0	0-24 m	E	
Scolopacidae	*Calidris ruficollis*	Red-necked Stint	Mig. (EPBC & BC Acts)	12	0	0-24 m	N	
Scolopacidae	*Limosa lapponica*	Bar-tailed Godwit	Mig. (EPBC & BC Acts)	1	20	0-24 m	N	
Threskiornithidae	*Platalea flavipes*	Yellow-billed Spoonbill		2	0	0-24 m	NE	
Threskiornithidae	*Platalea flavipes*	Yellow-billed Spoonbill		2	15	0-24 m	N	
Threskiornithidae	*Platalea flavipes*	Yellow-billed Spoonbill		1		0-24 m	N	
Threskiornithidae	*Platalea flavipes*	Yellow-billed Spoonbill		3		0-24 m	N	
Threskiornithidae	*Platalea regia*	Royal Spoonbill		1	40	25-50 m	S	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		1	0	0-24 m	NW	

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Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		10	0	0-24 m	SW	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		4	0	0-24 m	N	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		10	0	0-24 m	S	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		3	0	0-24 m	SE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		24	0	0-24 m	E	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		12	0	0-24 m	NE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		22	0	0-24 m	NW	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		20	0	0-24 m	SW	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		7	0	0-24 m	NE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		60	0	0-24 m	NE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		3	0	0-24 m	E	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		2	0	0-24 m	SE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		3	0	0-24 m	N	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		1	0	0-24 m	NE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		9	0	0-24 m	SW	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		5	1	0-24 m	E	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		5	1	0-24 m	E	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		41	4	0-24 m	SE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		4	4	0-24 m	E	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		3	5	0-24 m	E	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		16	5	0-24 m	NE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		30	6	0-24 m	W	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		2	8	0-24 m	E	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		1	10	0-24 m	SE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		2	10	0-24 m	E	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		3	10	0-24 m	SW	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		15	10	0-24 m	N	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		1	12	0-24 m	N	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		3	15	0-24 m	NE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		6	20	0-24 m	E	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		2	20	0-24 m	N	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		4	20	0-24 m	E	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		4	20	0-24 m	W	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		3	20	0-24 m	S	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		3		0-24 m		
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		70		0-24 m	E	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		3		0-24 m	SE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		1		0-24 m	SE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		110		0-24 m	S	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		9	170	151-250 m	SE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		1	25	25-50 m	SW	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		1	25	25-50 m	W	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		1	25	25-50 m	N	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		18	25	25-50 m	E	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		3	30	25-50 m	SW	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		3	30	25-50 m	SE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		6	35	25-50 m	SW	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		3	35	25-50 m	S	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		3	35	25-50 m	SW	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		18	40	25-50 m	NW	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		1	40	25-50 m	S	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		1	40	25-50 m	NE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		14	40	25-50 m	SE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		4	50	25-50 m	NW	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		4	50	25-50 m	N	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		4	50	25-50 m	SE	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		4	50	25-50 m	NW	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		50	50	25-50 m	W	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		3	80	76-150 m	NW	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis		39	120	76-150 m	SW	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		20	0	0-24 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		8	0	0-24 m	SE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		1	0	0-24 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		2	0	0-24 m	NW	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		5	0	0-24 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		2	0	0-24 m	NW	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		5	0	0-24 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		60	0	0-24 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		30	0	0-24 m	SE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		200	0	0-24 m	S	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		2	0	0-24 m	NE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		1	0	0-24 m	SW	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		60	0	0-24 m	W	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		2	0	0-24 m	SE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		50	0	0-24 m	NE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		25	0	0-24 m	SW	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		200	0	0-24 m	NE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		400	0	0-24 m		
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		40	0	0-24 m	NE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		6	4	0-24 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		20	6	0-24 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		2	7	0-24 m	NE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		1	10	0-24 m	S	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		2	10	0-24 m	S	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		1	15	0-24 m	N	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		10	15	0-24 m	SW	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		2	15	0-24 m	S	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		1	20	0-24 m	S	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		150	20	0-24 m	SW	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		7	20	0-24 m	N	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		15	20	0-24 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		3	20	0-24 m	SW	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		2		0-24 m	S	W-E
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		16		0-24 m	N	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		24		0-24 m	N	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		7		0-24 m	N	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		240		0-24 m		
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		2		0-24 m	NE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		208		0-24 m	SE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		1		0-24 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		120		0-24 m	SE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		34		0-24 m	W-E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		125		0-24 m	N	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		3		0-24 m	W	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		120		0-24 m	SE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		1	200	151-250 m	S	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		16	250	151-250 m	NW	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		8	25	25-50 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		200	25	25-50 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		150	25	25-50 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		200	25	25-50 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		150	25	25-50 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		30	25	25-50 m	W	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		7	25	25-50 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		10	25	25-50 m	W	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		8	30	25-50 m	NW	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		8	30	25-50 m	W	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		35	30	25-50 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		2	30	25-50 m	SE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		18	30	25-50 m	NW	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		2	30	25-50 m	SE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		26	30	25-50 m	SW	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		1	40	25-50 m	SE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		4	40	25-50 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		1	40	25-50 m	W	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		10	40	25-50 m	N	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		6	40	25-50 m	N	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		1	50	25-50 m	SW	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		1	50	25-50 m	S	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		10	50	25-50 m	W	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		1		25-50 m	S	W-E
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		60		25-50 m	W	N-S
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		100		25-50 m	N	N-E

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		3		25-50 m	W-E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		1		25-50 m	N-S	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		700		25-50 m	N	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		13	55	51-75 m	SE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		11	60	51-75 m	W	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		1	70	51-75 m	SW	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		3	70	51-75 m	N	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		2		51-75 m	NW	N-S
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		28		51-75 m	SW	N-S
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		43		51-75 m	E	E-W
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		2		51-75 m		
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		1		51-75 m	W	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		30		51-75 m	SW	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		120		76-150 m	S	S-N
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		60		76-150 m	N	E-W
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		14		76-150 m	S	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		18		76-150 m	W	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		382		76-150 m	W	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		80	80	76-150 m	S	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		1	80	76-150 m	N	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		33	80	76-150 m	W	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		3	100	76-150 m	E	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		7	120	76-150 m	S	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		14	120	76-150 m	NE	
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		17	150	76-150 m	NW	
Zosteropidae	*Zosterops lateralis*	Silvereye		8	0	0-24 m	E	
Zosteropidae	*Zosterops lateralis*	Silvereye		10	1	0-24 m	N	
Zosteropidae	*Zosterops lateralis*	Silvereye		4	1	0-24 m	SE	
Zosteropidae	*Zosterops lateralis*	Silvereye		10	1	0-24 m	E	
Zosteropidae	*Zosterops lateralis*	Silvereye		6	1	0-24 m	NW	
Zosteropidae	*Zosterops lateralis*	Silvereye		2	2	0-24 m	E	
Zosteropidae	*Zosterops lateralis*	Silvereye		10	3	0-24 m	SE	
Zosteropidae	*Zosterops lateralis*	Silvereye		4	3	0-24 m	W	
Zosteropidae	*Zosterops lateralis*	Silvereye		2	3	0-24 m	E	
Zosteropidae	*Zosterops lateralis*	Silvereye		6	4	0-24 m	E	
Zosteropidae	*Zosterops lateralis*	Silvereye		5	4	0-24 m	W	
Zosteropidae	*Zosterops lateralis*	Silvereye		2	4	0-24 m	SE	
Zosteropidae	*Zosterops lateralis*	Silvereye		2	5	0-24 m	N	
Zosteropidae	*Zosterops lateralis*	Silvereye		2	8	0-24 m	NW	
Zosteropidae	*Zosterops lateralis*	Silvereye		4		0-24 m	N	
Zosteropidae	*Zosterops lateralis*	Silvereye		3		0-24 m	E	
Zosteropidae	*Zosterops lateralis*	Silvereye		1		0-24 m	NE	
Zosteropidae	*Zosterops lateralis*	Silvereye		3		0-24 m	W	

Family	Species name	Vernacular	Conservation status	Abundance	Height (Yr1)	Height range	Obs. direction	Movement
Zosteropidae	*Zosterops lateralis*	Silvereye		1		0-24 m	SW	
Zosteropidae	*Zosterops lateralis*	Silvereye		2		0-24 m	S	
Zosteropidae	*Zosterops lateralis*	Silvereye		2		0-24 m	N	
Zosteropidae	*Zosterops lateralis*	Silvereye		2		0-24 m		
Zosteropidae	*Zosterops lateralis*	Silvereye		2		0-24 m	SW	
Zosteropidae	*Zosterops lateralis*	Silvereye		3		0-24 m		
Zosteropidae	*Zosterops lateralis*	Silvereye		3		0-24 m	NW	

Appendix 7 Mean number of calls of each recorded bat species per 30-minute time interval

Start time[1]	Chocolate Wattled Bat	Gould's Wattled Bat	Greater Long-eared Bat	Holt's Long-eared Bat	Lesser Long-eared Bat	Southern Forest Bat	Western False Pipistrelle	White-striped Free-tailed Bat
17:30	1.00	1.50	-	-	1.50	23.33	-	-
18:00	1.25	1.50	1.00	-	38.25	227.00	-	1.00
18:30	1.75	4.00	1.00	-	1.75	22.58	1.00	2.00
19:00	1.75	2.00	-	-	7.00	49.83	-	2.00
19:30	2.25	1.00	1.00	-	1.80	8.24	1.00	2.25
20:00	1.40	1.67	1.00	-	1.00	7.24	1.00	13.86
20:30	1.92	1.92	3.67	-	1.67	5.71	-	12.80
21:00	2.38	1.50	1.25	-	1.60	6.17	-	11.13
21:30	3.18	2.22	-	1.00	1.33	6.40	-	11.40
22:00	2.50	1.75	1.50	1.00	1.25	5.23	-	11.28
22:30	2.09	1.29	1.00	2.00	1.75	8.10	1.00	11.83
23:00	2.44	1.78	1.00	1.00	1.00	7.84	1.00	15.50
23:30	2.56	1.56	2.00	-	1.13	6.55	-	12.94
0:00	4.17	1.88	-	-	1.80	7.62	-	11.47
0:30	5.70	1.67	-	-	1.25	6.58	1.00	11.06
1:00	5.00	1.78	-	-	1.17	5.38	1.00	12.40
1:30	4.86	2.17	1.00	1.00	1.27	5.95	-	14.25
2:00	5.07	2.18	1.00	1.00	1.67	4.78	-	13.38
2:30	6.09	1.30	1.00	-	1.43	4.46	-	17.89
3:00	4.00	2.70	1.00	-	1.00	4.91	-	23.13
3:30	2.08	5.50	-	1.00	1.00	5.04	-	30.14
4:00	4.33	2.00	-	-	2.25	5.84	1.00	5.00
4:30	1.00	1.00	-	-	1.50	7.75	-	1.00
5:00	5.00	-	-	-	2.00	1.00	-	-
Total	**3.45**	**2.00**	**1.40**	**1.11**	**2.82**	**11.37**	**1.00**	**12.95**

[1]Aggregated data across all seasons and sample events.

Appendix 8 Bat species by site per time interval mean and maximum detections

Site and time	Chocolate Wattled Bat		Gould's Wattled Bat		Greater Long-eared Bat		Holt's Long-eared Bat		Lesser Long-eared Bat		Southern Forest Bat		Western False Pipistrelle		White-striped Free-tailed Bat		Total mean	Max.# calls detected
	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.		
BUS035	**1.00**	**1.00**	**1.50**	**3.00**	**2.00**	**2.00**			**1.00**	**1.00**	**2.17**	**6.00**			**11.00**	**25.00**	**6.00**	**25.00**
1:00:00											1.00	1.00			23.00	23.00	12.00	23.00
Wh1:30:00															6.00	6.00	6.00	6.00
2:00:00															1.00	1.00	1.00	1.00
2:30:00											2.00	2.00			2.00	2.00	2.00	2.00
3:00:00			1.00	1.00											1.00	1.00	1.00	1.00
20:30:00			1.00	1.00							1.00	1.00					1.00	1.00
21:00:00															10.00	10.00	10.00	10.00
21:30:00			3.00	3.00							6.00	6.00			18.00	18.00	9.00	18.00
22:00:00	1.00	1.00									2.00	2.00			8.00	8.00	3.67	8.00
22:30:00	1.00	1.00													5.00	5.00	3.00	5.00
23:00:00									1.00	1.00					25.00	25.00	13.00	25.00
23:30:00					2.00	2.00			1.00	1.00	1.00	1.00			21.00	21.00	6.25	21.00
0:00:00			1.00	1.00											11.00	11.00	6.00	11.00
0:30:00															12.00	12.00	12.00	12.00
BUS013	**7.45**	**23.00**	**1.81**	**5.00**			**1.00**	**1.00**	**6.41**	**150.00**	**31.90**	**2000.00**	**1.00**	**1.00**	**5.41**	**30.00**	**15.62**	**2000.00**
1:00:00	6.33	10.00	1.00	1.00			1.00	1.00	1.00	1.00	3.00	9.00			2.00	2.00	3.08	10.00
1:30:00	9.67	20.00							2.50	3.00	3.50	9.00			1.00	1.00	4.90	20.00
2:00:00	15.00	23.00							1.50	2.00	3.25	9.00			1.00	1.00	5.22	23.00
2:30:00	15.00	23.00	2.00	2.00					1.00	1.00	4.00	9.00					5.56	23.00
3:00:00	8.33	16.00	1.00	1.00					1.00	1.00	4.67	9.00					5.13	16.00
3:30:00	7.00	7.00							1.00	1.00	5.67	9.00			1.00	1.00	4.33	9.00
4:00:00	7.00	7.00							1.00	1.00	5.00	9.00					4.50	9.00
4:30:00									1.00	1.00	5.00	9.00					3.67	9.00
5:00:00									1.00	1.00	1.00	1.00					1.00	1.00
17:30:00									1.00	1.00	1.00	1.00					1.00	1.00
18:00:00	1.00	1.00	2.00	2.00					150.00	150.00	1,000.50	2,000.00					430.80	2000.00
18:30:00	2.00	2.00	2.00	3.00							23.00	23.00					7.25	23.00
19:00:00	1.00	1.00							4.00	4.00	33.00	33.00					12.67	33.00
19:30:00			1.00	1.00					1.00	1.00	2.00	4.00	1.00	1.00			1.43	4.00
20:00:00			1.00	1.00							2.00	2.00			1.00	1.00	1.40	2.00
20:30:00	4.50	7.00	2.00	2.00					1.00	1.00	4.00	9.00					3.25	9.00
21:00:00	5.00	7.00	3.00	3.00							4.00	9.00			3.00	3.00	4.00	9.00
21:30:00	11.00	15.00							1.00	1.00	2.80	9.00			3.67	5.00	4.36	15.00
22:00:00	5.67	7.00	2.33	5.00					1.00	1.00	3.67	9.00			7.67	20.00	4.29	20.00
22:30:00	6.00	7.00							1.00	1.00	3.00	9.00			9.33	25.00	5.30	25.00
22:00:00	4.00	7.00	2.33	4.00					1.00	1.00	4.00	9.00			8.25	30.00	4.64	30.00
22:30:00	5.50	7.00	1.00	1.00					1.00	1.00	4.33	9.00			14.00	27.00	5.09	27.00
0:00:00	8.00	9.00	2.00	2.00					1.50	2.00	3.67	9.00			3.33	7.00	3.79	9.00
0:30:00	11.50	16.00	1.00	1.00					1.00	1.00	2.80	9.00			1.50	2.00	3.82	16.00
BUS014	**5.24**	**20.00**	**3.19**	**26.00**	**1.00**	**1.00**	**1.20**	**2.00**	**1.63**	**4.00**	**14.07**	**65.00**	**1.00**	**1.00**	**5.84**	**61.00**	**8.00**	**65.00**

Site and time	Chocolate Wattled Bat		Gould's Wattled Bat		Greater Long-eared Bat		Holt's Long-eared Bat		Lesser Long-eared Bat		Southern Forest Bat		Western False Pipistrelle		White-striped Free-tailed Bat		Total mean	Max.# calls detected
	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.		
1:00:00	7.33	20.00	2.00	3.00					1.00	1.00	16.25	27.00			1.00	1.00	7.31	27.00
1:30:00	7.67	20.00	3.50	5.00			1.00	1.00	1.00	1.00	14.20	31.00			3.00	5.00	7.33	31.00
2:00:00	20.00	20.00	3.75	10.00			1.00	1.00	2.00	2.00	9.75	27.00			14.00	14.00	7.58	27.00
2:30:00	10.50	20.00	1.33	2.00					1.00	1.00	11.75	27.00			3.33	6.00	6.00	27.00
3:00:00	4.00	6.00	4.75	14.00					1.00	1.00	7.80	27.00			17.50	34.00	7.29	34.00
3:30:00	1.00	1.00	9.67	26.00	1.00	1.00			1.00	1.00	9.00	27.00			61.00	61.00	9.40	61.00
4:00:00	6.00	8.00	2.50	4.00					2.67	4.00	10.50	27.00	1.00	1.00	5.00	5.00	5.62	27.00
4:30:00			1.00	1.00					1.00	1.00	12.00	27.00			1.00	1.00	5.71	27.00
17:30:00			1.00	1.00													1.00	1.00
18:00:00	1.00	1.00	2.00	2.00							5.00	8.00					2.80	8.00
18:30:00	2.00	2.00	13.00	13.00	1.00	1.00			2.00	3.00	13.00	22.00					6.57	22.00
19:00:00	2.00	2.00									15.50	19.00			1.00	1.00	8.50	19.00
19:30:00	2.00	2.00	1.00	1.00					1.00	1.00	19.00	53.00			2.00	2.00	9.00	53.00
20:00:00	1.50	2.00	1.00	1.00							15.80	27.00					10.38	27.00
20:30:00	1.00	1.00	1.00	1.00					1.00	1.00	14.50	27.00			2.00	2.00	9.20	27.00
21:00:00	3.00	3.00	2.00	2.00					2.00	2.00	17.83	50.00			7.00	12.00	10.83	50.00
21:30:00	4.00	4.00	4.00	4.00			1.00	1.00	1.50	2.00	18.33	50.00			2.00	2.00	9.62	50.00
22:00:00			1.00	1.00					1.00	1.00	13.20	27.00			1.00	1.00	7.10	27.00
22:30:00			1.00	1.00			2.00	2.00	3.00	3.00	18.75	27.00	1.00	1.00	4.00	7.00	8.27	27.00
23:00:00			1.50	2.00							13.83	30.00					10.75	30.00
23:30:00	1.00	1.00	2.00	3.00					1.50	2.00	19.67	65.00			1.50	2.00	9.36	65.00
0:00:00			3.00	3.00					4.00	4.00	13.60	27.00			2.67	5.00	7.82	27.00
0:30:00	11.50	20.00	3.00	5.00					1.00	1.00	12.80	27.00	1.00	1.00	3.00	3.00	8.17	27.00
BUS015	**2.22**	**6.00**	**1.20**	**2.00**	**1.25**	**2.00**	**1.00**	**1.00**	**1.17**	**2.00**	**5.46**	**14.00**	**1.00**	**1.00**	**2.94**	**10.00**	**3.45**	**14.00**
1:00:00	6.00	6.00	1.00	1.00							6.50	8.00			2.00	2.00	4.40	8.00
1:30:00	5.00	5.00							1.00	1.00	6.50	8.00					4.00	8.00
2:00:00	3.00	3.00	1.00	1.00							6.50	8.00			2.00	3.00	3.14	8.00
2:30:00	2.00	3.00	1.00	1.00							6.50	8.00					3.33	8.00
3:00:00	2.00	2.00			1.00	1.00					6.50	8.00					4.00	8.00
3:30:00							1.00	1.00	1.00	1.00	6.50	8.00					3.75	8.00
4:00:00	1.00	1.00			1.00	1.00					6.50	8.00					3.75	8.00
4:30:00											6.50	8.00					6.50	8.00
17:30:00											14.00	14.00					14.00	14.00
18:00:00									1.00	1.00	3.00	3.00					2.00	3.00
18:30:00	1.00	1.00									4.50	7.00	1.00	1.00			2.75	7.00
19:30:00	2.00	2.00									1.00	1.00					1.50	2.00
20:00	1.00	1.00	1.00	1.00	1.00	1.00					4.25	8.00			1.00	1.00	2.63	8.00
20:30:00			1.50	2.00					2.00	2.00	6.00	8.00			4.00	6.00	3.88	8.00
21:00:00	1.00	1.00							1.00	1.00	3.75	8.00			2.00	2.00	2.71	8.00
21:30:00									1.00	1.00	3.75	8.00			2.00	3.00	2.86	8.00
22:00:00					2.00	2.00			1.00	1.00	5.25	8.00					3.57	8.00
22:30:00	1.00	1.00									6.50	8.00			3.00	3.00	3.60	8.00

Site and time	Chocolate Wattled Bat		Gould's Wattled Bat		Greater Long-eared Bat		Holt's Long-eared Bat		Lesser Long-eared Bat		Southern Forest Bat		Western False Pipistrelle		White-striped Free-tailed Bat		Total mean	Max.# calls detected
	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.		
23:00:00			2.00	2.00	1.00	1.00			1.00	1.00	4.67	8.00	1.00	1.00	3.00	3.00	2.75	8.00
23:30:00	1.00	1.00	1.00	1.00	2.00	2.00					4.67	8.00			5.50	10.00	3.63	10.00
0:00:00	3.50	4.00			1.00	1.00			1.00	1.00	6.50	8.00			7.00	7.00	4.14	8.00
0:30:00	2.00	2.00	1.00	1.00	1.00	1.00			2.00	2.00	6.50	8.00			1.00	1.00	2.63	8.00
BUS001	**1.96**	**6.00**	**1.67**	**3.00**	**1.00**	**1.00**			**1.33**	**3.00**	**12.18**	**210.00**	**1.00**	**1.00**	**4.78**	**22.00**	**7.69**	**210.00**
1:00:00	4.50	6.00							1.00	1.00	4.67	10.00			2.50	4.00	3.63	10.00
1:30:00	1.50	2.00							1.00	1.00	4.33	8.00					2.83	8.00
2:00:00	2.67	4.00									5.25	11.00			1.00	1.00	3.75	11.00
2:30:00	3.50	6.00									3.40	8.00			1.00	1.00	3.13	8.00
3:00:00	2.50	4.00									4.00	7.00			1.00	1.00	3.00	7.00
3:30:00	1.00	1.00	1.00	1.00							3.75	7.00					2.83	7.00
4:00:00			1.00	1.00							3.33	8.00					2.75	8.00
18:00:00											8.00	8.00					8.00	8.00
18:30:00									1.00	1.00	75.50	150.00			3.00	3.00	38.75	150.00
19:00:00			3.00	3.00							210.00	210.00					106.50	210.00
19:30:00	2.00	2.00							3.00	3.00	53.00	53.00					19.33	53.00
20:00:00											4.00	4.00					4.00	4.00
20:30:00	1.00	1.00									2.75	4.00			3.00	5.00	2.38	5.00
21:00:00											4.75	6.00			22.00	22.00	8.20	22.00
21:30:00	1.00	1.00									4.50	11.00			10.50	18.00	5.71	18.00
22:00:00	1.00	1.00							2.00	2.00	3.00	8.00			2.67	6.00	2.60	8.00
22:30:00	1.00	1.00			1.00	1.00			1.00	1.00	13.25	39.00			5.50	6.00	7.44	39.00
23:00:00	1.00	1.00							1.00	1.00	17.25	49.00	1.00	1.00	2.50	4.00	7.18	49.00
23:30:00	1.67	3.00							1.00	1.00	6.00	9.00			3.50	6.00	3.70	9.00
0:00:00											11.75	26.00			8.00	14.00	10.50	26.00
0:30:00	1.50	2.00							1.00	1.00	11.00	36.00			3.00	3.00	6.38	36.00
BUS002	**1.00**	**1.00**	**1.25**	**2.00**	**1.00**	**1.00**			**1.50**	**2.00**	**3.95**	**17.00**			**41.98**	**45.00**	**25.73**	**45.00**
1:00:00											1.00	1.00			32.25	45.00	26.00	45.00
1:30:00			1.00	1.00											42.67	45.00	32.25	45.00
2:00:00			2.00	2.00							6.00	6.00			42.67	45.00	27.20	45.00
2:30:00											1.00	1.00			42.67	45.00	32.25	45.00
3:00:00											4.00	4.00			42.67	45.00	33.00	45.00
3:30:00	1.00	1.00									12.00	12.00			42.67	45.00	28.20	45.00
4:00:00											17.00	17.00					17.00	17.00
4:30:00									1.00	1.00							1.00	1.00
18:00:00											5.00	5.00					5.00	5.00
18:30:00											14.00	14.00					14.00	14.00
19:00:00									1.00	1.00							1.00	1.00
19:30:00			1.00	1.00	1.00	1.00					1.00	1.00					1.00	1.00
20:00:00											3.00	3.00			44.00	45.00	30.33	45.00
20:30:00											1.00	1.00			44.00	45.00	22.50	45.00
21:00:00											1.50	2.00			44.00	45.00	22.75	45.00

Site and time	Chocolate Wattled Bat		Gould's Wattled Bat		Greater Long-eared Bat		Holt's Long-eared Bat		Lesser Long-eared Bat		Southern Forest Bat		Western False Pipistrelle		White-striped Free-tailed Bat		Total mean	Max.# calls detected
	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.		
21:30:00			1.00	1.00					1.50	2.00					44.00	45.00	18.40	45.00
22:00:00									2.00	2.00	1.50	2.00			42.67	45.00	22.17	45.00
22:30:00					1.00	1.00			2.00	2.00					42.67	45.00	26.20	45.00
23:00:00															42.67	45.00	42.67	45.00
23:30:00											1.00	1.00			42.67	45.00	26.00	45.00
0:00:00															42.67	45.00	42.67	45.00
0:30:00											1.00	1.00			42.67	45.00	32.25	45.00
BUS003			**1.25**	**2.00**							**1.00**	**1.00**					**1.20**	**2.00**
18:00:00			2.00	2.00													2.00	2.00
18:30:00			1.00	1.00													1.00	1.00
20:00:00											1.00	1.00					1.00	1.00
21:00:00			1.00	1.00													1.00	1.00
23:00:00			1.00	1.00													1.00	1.00
BUS004	**1.50**	**2.00**	**1.71**	**4.00**	**1.33**	**2.00**			**1.00**	**1.00**	**4.39**	**15.00**	**1.00**	**1.00**	**2.50**	**5.00**	**3.00**	**15.00**
1:00:00			2.00	2.00							3.00	3.00	1.00	1.00			2.00	3.00
1:30:00	2.00	2.00	2.00	2.00							4.00	4.00					2.67	4.00
2:00:00	1.00	1.00															1.00	1.00
2:30:00					1.00	1.00			1.00	1.00	2.00	2.00					1.33	2.00
3:00:00			1.00	1.00							2.00	2.00					1.50	2.00
3:30:00											3.00	3.00					3.00	3.00
4:00:00											3.00	3.00					3.00	3.00
18:00:00			1.00	1.00													1.00	1.00
19:00:00															2.00	2.00	2.00	2.00
19:30:00			1.00	1.00							4.50	8.00			2.00	2.00	3.00	8.00
20:00:00			4.00	4.00	1.00	1.00			1.00	1.00	15.00	15.00					5.25	15.00
20:30:00					2.00	2.00					1.00	1.00					1.50	2.00
21:00:00											3.00	3.00					3.00	3.00
21:30:00											4.00	4.00					4.00	4.00
22:00:00			1.00	1.00							15.00	15.00			1.00	1.00	5.67	15.00
22:30:00											3.00	3.00					3.00	3.00
23:00											2.00	2.00					2.00	2.00
23:30:00											4.00	4.00					4.00	4.00
0:00:00											3.00	3.00			5.00	5.00	4.00	5.00
0:30:00											3.00	3.00					3.00	3.00
BUS005	**1.60**	**5.00**	**1.00**	**1.00**	**1.00**	**1.00**			**1.33**	**2.00**	**3.94**	**10.00**			**1.50**	**3.00**	**2.50**	**10.00**
1:00:00	1.00	1.00									2.00	2.00					1.50	2.00
1:30:00	1.00	1.00							1.00	1.00	3.00	3.00					1.67	3.00
2:00:00	1.00	1.00									6.00	6.00					2.67	6.00
2:30:00	1.00	1.00							2.00	2.00	3.00	3.00					2.00	3.00
3:00:00			1.00	1.00							10.00	10.00					5.50	10.00
3:30:00											1.00	1.00			1.00	1.00	1.00	1.00
19:30:00											2.00	2.00			1.00	1.00	1.50	2.00

Site and time	Chocolate Wattled Bat		Gould's Wattled Bat		Greater Long-eared Bat		Holt's Long-eared Bat		Lesser Long-eared Bat		Southern Forest Bat		Western False Pipistrelle		White-striped Free-tailed Bat		Total mean	Max.# calls detected
	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.		
20:00:00									1.00	1.00	8.00	8.00					4.50	8.00
20:30:00	1.00	1.00									3.00	3.00					2.00	3.00
21:00:00	1.00	1.00			1.00	1.00					2.00	3.00			1.00	1.00	1.33	3.00
21:30:00											8.00	8.00					8.00	8.00
22:00:00	1.00	1.00									4.00	4.00			2.00	2.00	2.33	4.00
22:30:00			1.00	1.00							4.00	4.00					2.50	4.00
23:00:00	5.00	5.00									5.00	5.00					5.00	5.00
23:30:00											2.00	2.00			3.00	3.00	2.50	3.00
0:00:00															1.00	1.00	1.00	1.00
0:30:00	3.00	3.00									2.00	2.00					2.50	3.00
BUS006	**1.95**	**5.00**	**1.60**	**4.00**	**2.14**	**8.00**			**2.37**	**16.00**	**4.44**	**55.00**			**12.80**	**20.00**	**4.27**	**55.00**
1:00:00	1.50	2.00	3.00	4.00					2.00	2.00	2.25	3.00			10.50	20.00	3.73	20.00
1:30:00	1.50	2.00	2.00	2.00					1.00	1.00	2.25	4.00			20.00	20.00	3.89	20.00
2:00:00	1.50	2.00	1.33	2.00							2.00	3.00			20.00	20.00	3.50	20.00
2:30:00	2.00	2.00	1.50	2.00							1.75	3.00			20.00	20.00	4.00	20.00
3:00:00	2.00	3.00	2.00	2.00							1.67	3.00			20.00	20.00	3.89	20.00
3:30:00	2.75	5.00	2.00	2.00					1.00	1.00	2.33	3.00			20.00	20.00	3.82	20.00
4:00:00	3.00	5.00									3.00	4.00					3.00	5.00
4:30:00	1.00	1.00							3.00	3.00	3.00	3.00					2.33	3.00
5:00:00	5.00	5.00							3.00	3.00							4.00	5.00
17:30:00			2.00	2.00					2.00	2.00	55.00	55.00					19.67	55.00
18:00:00			1.00	1.00	1.00	1.00			1.00	1.00	15.00	15.00					3.33	15.00
18:30:00	2.00	2.00			1.00	1.00			2.00	2.00	22.50	28.00					8.50	28.00
19:00:00	2.00	3.00	1.00	1.00					16.00	16.00	21.00	21.00					8.40	21.00
19:30:00	3.00	3.00			1.00	1.00			3.00	3.00	2.50	4.00					2.43	4.00
20:00:00	2.00	2.00							1.00	1.00	5.25	13.00			3.00	5.00	3.75	13.00
20:30:00	2.33	4.00	2.00	2.00	8.00	8.00			1.50	2.00	7.00	16.00			11.50	20.00	5.46	20.00
21:00:00	2.00	2.00	1.00	1.00	2.00	2.00			1.50	2.00	3.25	7.00			11.00	20.00	3.67	20.00
21:30:00	1.20	2.00	1.00	1.00							2.50	5.00			11.50	20.00	3.15	20.00
22:00:00	1.50	2.00	1.50	2.00	1.00	1.00			1.00	1.00	3.20	5.00			7.67	20.00	3.36	20.00
22:30:00	2.00	3.00	1.50	2.00							1.67	3.00			20.00	20.00	4.00	20.00
23:00:00	1.00	1.00	2.00	2.00							1.50	3.00			10.50	20.00	3.75	20.00
23:30:00	2.00	2.00	2.00	2.00							1.80	3.00			10.50	20.00	3.60	20.00
0:00:00	1.00	1.00	1.50	2.00					1.00	1.00	2.33	3.00			20.00	20.00	3.67	20.00
0:30:00			1.50	2.00							3.75	7.00			20.00	20.00	5.43	20.00
BUS007	1.25	2.00	1.50	4.00											2.67	4.00	1.69	4.00
19:00:00															3.00	3.00	3.00	3.00
19:30:00			1.00	1.00											4.00	4.00	2.50	4.00
20:30:00			1.00	1.00													1.00	1.00
21:00																		
21:00:00			1.00	1.00													1.00	1.00
21:30:00			4.00	4.00													4.00	4.00

Site and time	Chocolate Wattled Bat		Gould's Wattled Bat		Greater Long-eared Bat		Holt's Long-eared Bat		Lesser Long-eared Bat		Southern Forest Bat		Western False Pipistrelle		White-striped Free-tailed Bat		Total mean	Max.# calls detected
	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.		
22:00:00	1.00	1.00	1.00	1.00													1.00	1.00
22:30:00	1.00	1.00															1.00	1.00
23:30:00			1.00	1.00													1.00	1.00
0:30:00	2.00	2.00													1.00	1.00	1.50	2.00
BUS008	**1.13**	**2.00**	**1.60**	**7.00**	**1.00**	**1.00**			**1.00**	**1.00**	**2.44**	**10.00**			**2.21**	**9.00**	**1.84**	**10.00**
1:00:00			1.00	1.00					1.00	1.00	6.00	6.00					2.25	6.00
1:30:00									1.00	1.00	2.00	3.00			2.00	2.00	1.60	3.00
2:00:00	1.00	1.00									1.00	1.00			3.00	3.00	1.67	3.00
2:30:00			1.00	1.00							1.00	1.00					1.00	1.00
3:00:00											6.00	6.00					6.00	6.00
3:30:00	1.00	1.00	1.00	1.00	1.00	1.00					1.50	2.00					1.17	2.00
4:00:00			2.00	2.00							1.00	1.00					1.33	2.00
17:30:00	1.00	1.00															1.00	1.00
18:00:00	2.00	2.00															2.00	2.00
18:30:00											1.00	1.00					1.00	1.00
20:00:00			1.00	1.00							10.00	10.00					5.50	10.00
20:30:00	1.00	1.00	4.00	7.00	1.00	1.00					2.00	2.00			1.00	1.00	2.00	7.00
21:00:00			1.00	1.00	1.00	1.00					2.00	2.00			1.00	1.00	1.20	2.00
21:30:00			1.00	1.00							1.00	1.00			1.00	1.00	1.00	1.00
22:00:00											2.00	2.00					2.00	2.00
22:30:00			1.00	1.00											1.00	1.00	1.00	1.00
23:00:00															2.00	2.00	2.00	2.00
23:30:00			1.00	1.00							1.00	1.00			2.50	4.00	1.75	4.00
0:00:00			1.50	2.00											5.50	9.00	3.50	9.00
0:30:00	1.00	1.00	2.00	2.00	1.00	1.00									1.50	2.00	1.40	2.00
BUS009	**1.43**	**3.00**	**2.00**	**4.00**			**1.00**	**1.00**	**3.00**	**3.00**	**1.50**	**3.00**			**1.60**	**3.00**	**1.66**	**4.00**
1:00											2.00	2.00					2.00	2.00
1:30:00	2.00	2.00													2.50	3.00	2.33	3.00
2:00:00	3.00	3.00													1.00	1.00	2.00	3.00
2:30:00									3.00	3.00							3.00	3.00
3:00:00			2.00	2.00							1.00	1.00					1.50	2.00
18:00:00											1.00	1.00					1.00	1.00
18:30:00			2.00	2.00													2.00	2.00
19:30:00			1.00	1.00													1.00	1.00
20:00:00											1.00	1.00					1.00	1.00
20:30:00			1.00	1.00													1.00	1.00
21:00:00	1.00	1.00															1.00	1.00
21:30:00	1.00	1.00	4.00	4.00							3.00	3.00					2.67	4.00
22:00:00	1.00	1.00	2.50	4.00			1.00	1.00			1.00	1.00					1.60	4.00
22:30:00	1.00	1.00													1.00	1.00	1.00	1.00
23:00:00	1.00	1.00					1.00	1.00									1.00	1.00
0:30:00			1.00	1.00											1.00	1.00	1.00	1.00

Site and time	Chocolate Wattled Bat		Gould's Wattled Bat		Greater Long-eared Bat		Holt's Long-eared Bat		Lesser Long-eared Bat		Southern Forest Bat		Western False Pipistrelle		White-striped Free-tailed Bat		Total mean	Max.# calls detected
	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.	Mean	Max.		
BUS010	**1.67**	**3.00**	**1.33**	**2.00**							**1.00**	**1.00**			**1.00**	**1.00**	**1.31**	**3.00**
1:00:00															1.00	1.00	1.00	1.00
1:30:00			1.00	1.00													1.00	1.00
2:00:00			1.00	1.00							1.00	1.00					1.00	1.00
20:30:00	1.00	1.00	2.00	2.00							1.00	1.00					1.33	2.00
21:00:00	1.00	1.00															1.00	1.00
22:00:00			2.00	2.00													2.00	2.00
23:00:00			1.00	1.00													1.00	1.00
23:30:00	3.00	3.00															3.00	3.00
0:00:00															1.00	1.00	1.00	1.00
0:30:00			1.00	1.00													1.00	1.00
BUS011	**1.00**	**1.00**	**2.00**	**4.00**					**1.67**	**3.00**	**2.61**	**11.00**	**1.00**	**1.00**	**2.83**	**8.00**	**2.45**	**11.00**
1:00:00											1.00	1.00					1.00	1.00
1:30:00															3.00	3.00	3.00	3.00
2:00:00											2.00	2.00			1.00	1.00	1.50	2.00
2:30:00			1.00	1.00							3.50	6.00					2.67	6.00
3:00:00											2.00	2.00					2.00	2.00
3:30:00											2.50	4.00					2.50	4.00
4:00:00											5.00	5.00					5.00	5.00
18:00:00															1.00	1.00	1.00	1.00
18:30:00			4.00	4.00							2.00	2.00					3.00	4.00
19:00:00											4.00	4.00					4.00	4.00
19:30:00											1.00	1.00					1.00	1.00
20:00:00	1.00	1.00	2.00	2.00							6.00	11.00	1.00	1.00			3.67	11.00
20:30:00									3.00	3.00	3.00	5.00					3.00	5.00
21:00:00			2.00	2.00							2.33	5.00			1.50	2.00	2.00	5.00
21:30:00	1.00	1.00	1.00	1.00							1.50	2.00			3.00	3.00	1.60	3.00
22:00:00											1.00	1.00			8.00	8.00	4.50	8.00
22:30:00			2.00	2.00							2.50	4.00			2.67	5.00	2.50	5.00
23:00:00									1.00	1.00	1.67	3.00					1.50	3.00
23:30:00									1.00	1.00	1.00	1.00			6.00	6.00	2.25	6.00
0:20:00											2.00	2.00			1.00	1.00	1.50	2.00
BUS012															**1.00**	**1.00**	**1.00**	**1.00**
18:30:00															1.00	1.00	1.00	1.00
Grand Total	**3.45**	**23.00**	**2.00**	**26.00**	**1.40**	**8.00**	**1.11**	**2.00**	**2.82**	**150.00**	**11.37**	**2000.00**	**1.00**	**1.00**	**12.95**	**61.00**	**7.95**	**2000.00**

