Detailed Fauna and Fauna Assemblages Survey of Manning Park – Hamilton Hill

November 2023

Prepared for the City of Cockburn by

FAUNATRACK

February 2024

Disclaimer

While the information contained in this report has been prepared with all reasonable care from sources which FaunaTrack believes are reliable, the information is general in nature and there is no guarantee that the information is accurate or complete. Any opinions, forecasts or recommendations reflects the judgment and assumptions of FaunaTrack as at the date of this publication and may change without notice.

Cover Photo: Carnaby's cockatoo (*Zanda latirostris*) © Ray Lloyd / FaunaTrack

Executive Summary

FaunaTrack was engaged by the City of Cockburn to undertake a Detailed Fauna and Fauna Assemblages Survey of Manning Park.

The objectives of the survey were to:

- Compile a list of all vertebrate fauna occurring or likely to occur within the study area (desktop assessment).
- Identify species of conservation significance likely to occur within the study area.
- Determine fauna habitats present within the study area.
- Report on the likelihood of occurrence of terrestrial vertebrate fauna, particularly those of conservation significance, based on location, habitats present and vegetation condition.
- Undertake a comprehensive trapping survey to detect vertebrate fauna (including those of conservation significance) occurring in the study area.
- Document any fauna recorded during trapping surveys, targeted searches or opportunistically carried out during the survey period, and
- Obtain baseline data for future monitoring programs and management actions, including the potential establishment of mountain bike trails throughout the reserve, and to detect any threats potentially impacting on species.

Surveys were undertaken from late August through to late November 2023 and consisted of the following methods:

- Comprehensive trapping survey
- Bat detection
- Bird census
- Frog census
- Motion sensor camera deployment
- Nocturnal spotlighting
- Fauna habitat assessment
- Targeted searches for vertebrate fauna, particularly those of conservation significance, including a visual assessment of Black cockatoo habitat (nesting, foraging and roosting potential), and
- Opportunistic observations

Six fauna trapping sites were established in the reserve, incorporating 1650 trapping nights, 224 motion camera nights, six bat detector nights, 14 hours of bird surveys, eight person hours of nocturnal spotlighting, two hours of frog surveys, and 26 person hours of targeted searches. This resulted in the detection of four species of amphibian, 23 species of reptile, 12 species of mammal and 69 species of bird.

The survey area however has the potential to support up to nine amphibian species, 44 species of reptile (including four of conservation significance), 22 species of mammal (including up to four of conservation significance) and 173 species of bird (including up to 28 species of conservation significance).

Of these the following species of conservation significance were detected:

- The EPBC and BC Act listed Endangered Carnaby's cockatoo (*Zanda latirostris*)
- The EPBC and BC Act listed Vulnerable Forest red-tailed black-cockatoo (*Calyptorhynchus banksia naso)*
- The EPBC Act Migratory/Marine Pied Stilt (*Himantopus himantopus leucocephalus*)
- The EPBC Act Marine listed Rainbow Bee-eater (*Merops ornatus*)
- The EPBC Act Marine listed White-bellied sea-eagle (*Haliaeetus leucogaster*)
- The Priority 4 listed Quenda (*Isoodon fusciventer*), and
- The Priority 3 listed Perth-lined Slider (*Lerista lineata*)

Additionally, a single reptile and 14 bird species of local significance were also detected:

- Western bluetounge (*Tiliqua occipitalis*)
- Australasian shoveler
- Hardhead
- Pink-eared duck
- Dusky moorhen
- Painted button-quail
- White-browed scrub-wren
- New-holland honeyeater
- White-cheeked honeyeater
- Square-tailed kite
- Brown goshawk
- Splendid fairy-wren
- Variegated fairy-wren
- Weebill, and
- Yellow-rumped thornbill

The reserve is also known to support a further six species of conservation significance:

- The EPBC and BC Act listed Endangered Baudin's cockatoo (*Zanda baudini*)
- The BC Act Specially Protected Peregrine falcon (*Falco peregrinus*)
- The Priority 4 Blue-billed duck (*Oxyura australis*)
- The EPBC Act Migratory listed Common greenshank (*Tringa nebularia*)
- The EPBC Act Marine listed Greater crested tern (*Thalasseus bergii*)

An additional 11 species of local significant birds are also known from the reserve including:

- Musk duck
- Nankeen night-heron
- Little eagle
- Collared sparrowhawk
- Whistling kite
- Western rosella
- Western wattlebird
- Inland thornbill
- Western golden whistler
- Grey shrike-thrush, and
- Dusky woodswallow

Several threats currently exist, including:

- Weed infestations
- Habitat loss and fragmentation (including dissection and degradation of habitat through track establishment)
- Fire
- Dieback
- Erosion
- Potential road mortality of some species, and
- Feral animals (particularly cats, rabbits and foxes, and hollow competitors such as bees).

In protecting, managing, enhancing and connecting existing habitats within the reserve, the following recommendations may help to guide management:

- The protection of proteaceous shrublands and heath on the limestone ridge, and the tall woodlands on the lower slopes and surrounding the lake
- Enhancement and revegetation of degraded landscapes, and creation of additional habitat corridors
- Weed management
- Designated recreational areas, including walking and/or mountain bike trails of exclusive use
- Dieback management
- Feral animal management, and
- Education and community involvement

In addition, future follow-up and targeted surveys will also be an important aspect. High species diversity was detected during the current survey, helping to understand the fauna assemblage occurring in and around the reserve. Future motion camera surveys of longer duration will help to detect and monitor Quenda populations, and may help to detect elusive species such as the Brush-tailed phascogale and/or possums, and also provide data on the presence and potentially abundance of feral predators such as feral cats and foxes, which may also provide insights into the effectiveness of management programs. Targeted surveys in late summer to early winter may also help to detect species such as the Graceful sun-moth and/or Swan Coastal Plain Sheild-backed trapdoor spider.

Contents

List of Tables

List of Figures

Figure 9 (a) A Brush-footed trapdoor spider (*Idiomata* sp.) detected at Site 2 on the limestone ridge; b) Shrubland on the limestone ridge containing *Lomandra maritima*, and potentially the Graceful sun-moth.

List of Maps

1. Introduction

1.1 Site location and overview

FaunaTrack was engaged by the City of Cockburn to undertake a Detailed Fauna and Fauna Assemblages survey of Manning Park. Reserved for 'Parks and Recreation' under the City of Cockburn's Town Planning Scheme no. 3 and managed according to the Beeliar Regional Park Management Plan and the Manning Park Masterplan, the City required a Detailed Fauna and Fauna Assemblages survey to inform the development of a potential mountain bike trail, as well as practices to protect and enhance the biodiversity values of the reserve. Totalling approximately 110 hectares in size and reserved as Bush Forever Site 247 (Government of Western Australia, 2000), Manning Park is situated north of Azelia Road in Hamilton Hill, and considered part of the larger Beeliar Regional Park that encompasses Manning Lake and the limestone ridge to the west of the wetland (City of Cockburn, 2023). The current survey area covered approximately 100 hectares, which focused predominantly on the bushland area, encompassing 95 hectares, including the lake (10ha) as well as some smaller areas of surrounding parkland habitats.

The area is located within the Swan Coastal Plain 2 subregion (SWA2) of Swan Coastal Plain Bioregion, the area experiences a Mediterranean climate and rainfall range of 600-1000mm (Mitchell et. al. 2002). It is bordered in the east by the Darling Scarp and the west by the Indian Ocean and is characterised by a series of parallel dune systems from west to east, known as the Quindalup, Spearwood, and Bassendean dune systems, with the Pinjarra Plain separating the dunes from the scarp. The region (1,333,901ha in total) comprises of predominantly Tuart woodlands and/or heath on limestone, Jarrah and/or *Banksia* woodlands on dunes, Marri on colluvial and alluvial sands, as well as a series of seasonal wetlands and offshore islands (Mitchell et. al. 2002). The dominant land uses in the region consist of agriculture, horticulture and plantations, conservation and crown land reserves (including unallocated), urban and rural-residential, road infrastructure and easements, pasture improvement/grazing, as well as small areas of mining and defence (Mitchell et. al. 2002).

The study area lies within the Spearwood Dune System. The Spearwood dunes are comprised of sand dunes and plains with deep yellow and pale sands and shallower yellow to brown sands supporting woodland, open forest and closed heath. The vegetation (Cottesloe Complex – Central and South) consists of a mosaic of woodland Tuart (*Eucalyptus gomphocephala*) woodland and open forest with Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) and closed heath on the limestone outcrops.

Manning Park consists predominantly of vegetated uplands and limestone ridge supporting mixed low shrublands, scrubs and heaths, and vegetated wetlands and open water habitats supporting open forests and woodlands (Government of Australia, 2000), with the lake forming part of the western chain of Cockburn wetlands which lies in a depression between two limestone ridges, immediately to the east of the most western limestone ridge. The reserve consists of many tracks and pathways, including management/vehicle access tracks, narrower walking tracks and pathways, and many 'unsanctioned' tracks and trails snaking through the reserve, which are currently used as unofficial mountain bike trails. The reserve also contains significant heritage areas and structures remaining as part of the former Davilak House and associated ruins and also contains museum facilities showcasing this history. The wetland is also fringed by large, cleared parkland areas containing playground, picnic and ablution facilities, and supports significant stands of very large Tuarts (*Eucalyptus gomphocephala*), while degraded landscapes also occur throughout the reserve, including areas of severe localised disturbance.

Due to the location and habitats present, the reserve is known, or has the potential, to support a range of conservation significant species. These include:

- Carnaby's, Baudin's and Forest red-tailed black cockatoos
- Osprey, White-bellied sea-eagle, Fork-tailed swift, Rainbow bee-eater and Peregrine falcon
- Perth-lined slider and Black-striped snake
- Quenda and Brush-tailed phascogale, and
- Potential significant invertebrate species

As well as a range of conservation significant wetland, coastal and migratory shorebird species, and significant local fauna species (Tables 2, 3, 4 and 7).

1.2 Survey objectives

The objectives of the survey were as follows:

- Compile a list of all vertebrate fauna occurring or likely to occur within the study area (desktop assessment).
- Identify species of conservation significance likely to occur within the study area.
- Determine fauna habitats present within the study area.
- Report on the likelihood of occurrence of terrestrial vertebrate fauna, particularly those of conservation significance, based on location, habitats present and vegetation condition.
- Undertake a comprehensive trapping survey to detect vertebrate fauna (including those of conservation significance) occurring in the study area.
- Document any fauna recorded during trapping surveys, targeted searches, or opportunistically carried out during the survey period, and
- Obtain baseline data for future monitoring programs and management actions and to detect any threats potentially impacting on species, and
- Provide a discussion on potential locations for a mountain bike trail network that will not impact upon priority habitat values.

2. Methods

2.1 Database searches

Searches for fauna incorporated a 5km radius centred on the following co-ordinates:

-32.092641°/115.768056°

The following sources were consulted in the formulation of potential fauna lists:

- Atlas of Living Australia (ALA, 2023). Accessed 4th September 2023.
- Department of Biodiversity, Conservation and Attractions (DBCA) and Western Australian Museum NatureMap Species Database (DBCA, 2023a). Requested 4th September 2023.
- DBCA Threatened and Priority Fauna Database (DBCA, 2023b). Requested 4th September 2023
- EPBC Act Protected Matters Search Tool (DAWE, 2023). Accessed 20th September 2023.
- BirdLife Australia's BirdData Database (BirdLife, 2023a). Accessed 18th September 2023.
- DBCA's Dandjoo Biodiversity Data Repository (DBCA, 2023c), and
- Results of previous fauna surveys conducted in the reserve(s) and/or local area.

Previous fauna survey undertaken within the reserve include:

- FVC (2021) Biological survey of Manning Park. Unpublished report to the City of Cockburn
- FaunaTrack (2018) Amphibians, reptiles, and mammals of Manning Park. Unpublished report to the City of Cockburn
- Western Wildlife (2010) Roe Highway Extension: Wetland and Migratory Bird Study, 2009-2010. Unpublished report to South Metro Connect
- WASAH (1999) Herpetofauna survey of Manning Park bushland
- BirdLife (2023b) Numerous bird surveys undertaken throughout the reserve from 1994 to 2023.

Forming part of the Desktop Assessment, these searches help to identify several species that may potentially occur or have previously been recorded within the study area. Species were then assigned to a likelihood presence category based on habitats present and distributional range. Categories were defined as follows:

- **Known:** Records previously confirmed within the reserve.
- **Likely:** Both suitable habitat present and local records exist within a radius of 5 km.
- **Possible:** Either suitable habitat present or local records exist within a radius of 5 km.
- **Unlikely:** Area contains no suitable habitat or local records, and/ or locally extinct.

These searches often comprise a large percentage of wetland, migratory or marine bird species that either infrequently visit the local coastline and/or the broader area, or are inhabitants of offshore coastal islands, near coastal or inland wetlands and are of low likelihood to use the reserve on a regular basis or even at all. Due to the presence of a moderate-sized, semi-permanent waterbody within the study area, some of these species have previously been identified in the reserve including the Blue-billed duck and Common greenshank (Birdlife, 2023a; DBCA, 2023b; see Map 2). Most species however are associated with significant coastal areas such as Woodman Point and Fremantle ports or nearby, larger waterbodies such as Bibra Lake, or large, saline lakes such as Lake Coogee, with many species unlikely to occur in or regularly frequent the study area besides a potential flyover. Brief descriptions of all conservation significant and locally significant species (including nearby wetland, coastal and/or migratory birds) that exist within 5km of the reserve have been included in Appendix 11, however many of these species have been excluded from putative species tables.

In addition, all pelagic bird species (i.e. albatross and petrels), marine mammals (i.e. whales and seals), fish (i.e. sharks) and marine reptiles (i.e. sea turtles and sea snakes) have been completely excluded from searches as these are unlikely to occur within the study area.

Subsequently, desktop assessments resulted in the identification of ten species of conservation significance that have previously been confirmed within the reserve (Maps 1 and 2), including:

- Carnaby's and Baudin's cockatoo
- Forest red-tailed black cockatoo
- Peregrine falcon
- Rainbow bee-eater
- Perth-lined slider
- Pied stilt
- Blue-billed duck
- Greater crested tern, and
- Common greenshank

While the following 14 conservation significant species are likely to occur, or known to occur close by to the study area including:

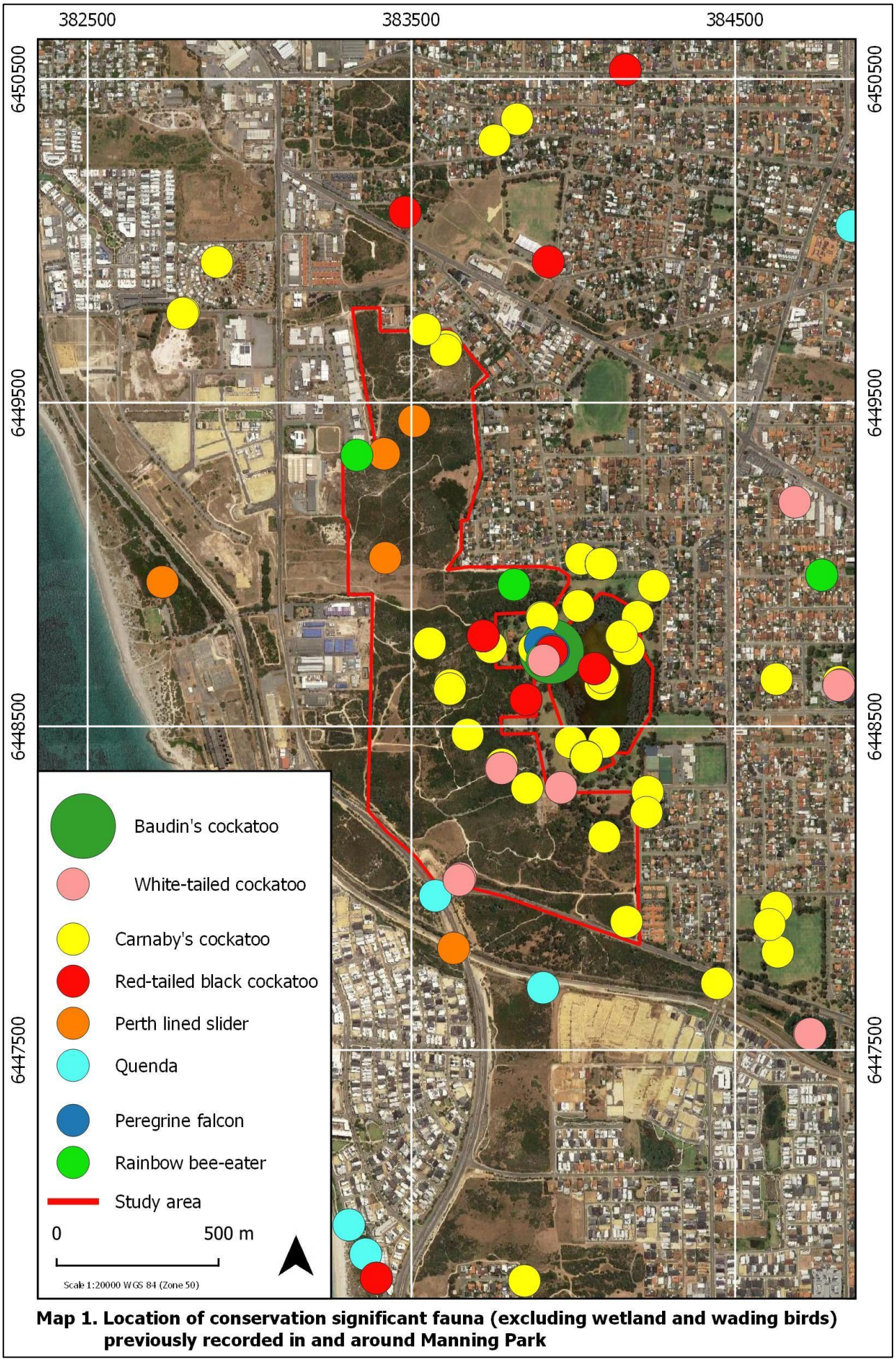
- Black-striped snake
- Quenda and Brush-tailed phascogale
- Fork-tailed swift, Osprey and White-bellied sea-eagle
- Migratory and marine bird species such as Bar-tailed godwit, Caspian tern, Common sandpiper, Red-necked avocet, Red-necked stint and Great knot, and
- Invertebrate species including the Swan Coastal Plain Shield-back trapdoor and Graceful sun-moth

Additionally, search results of the DBCA Threatened Fauna Database also identified the Fork-tailed Swift from bird surveys undertaken in the late 1970's and early 1980's from a nearby location just over 1km to the north-west of the reserve in North Coogee. These surveys also recorded a range of coastal, marine and wetland bird species from the same survey location, including:

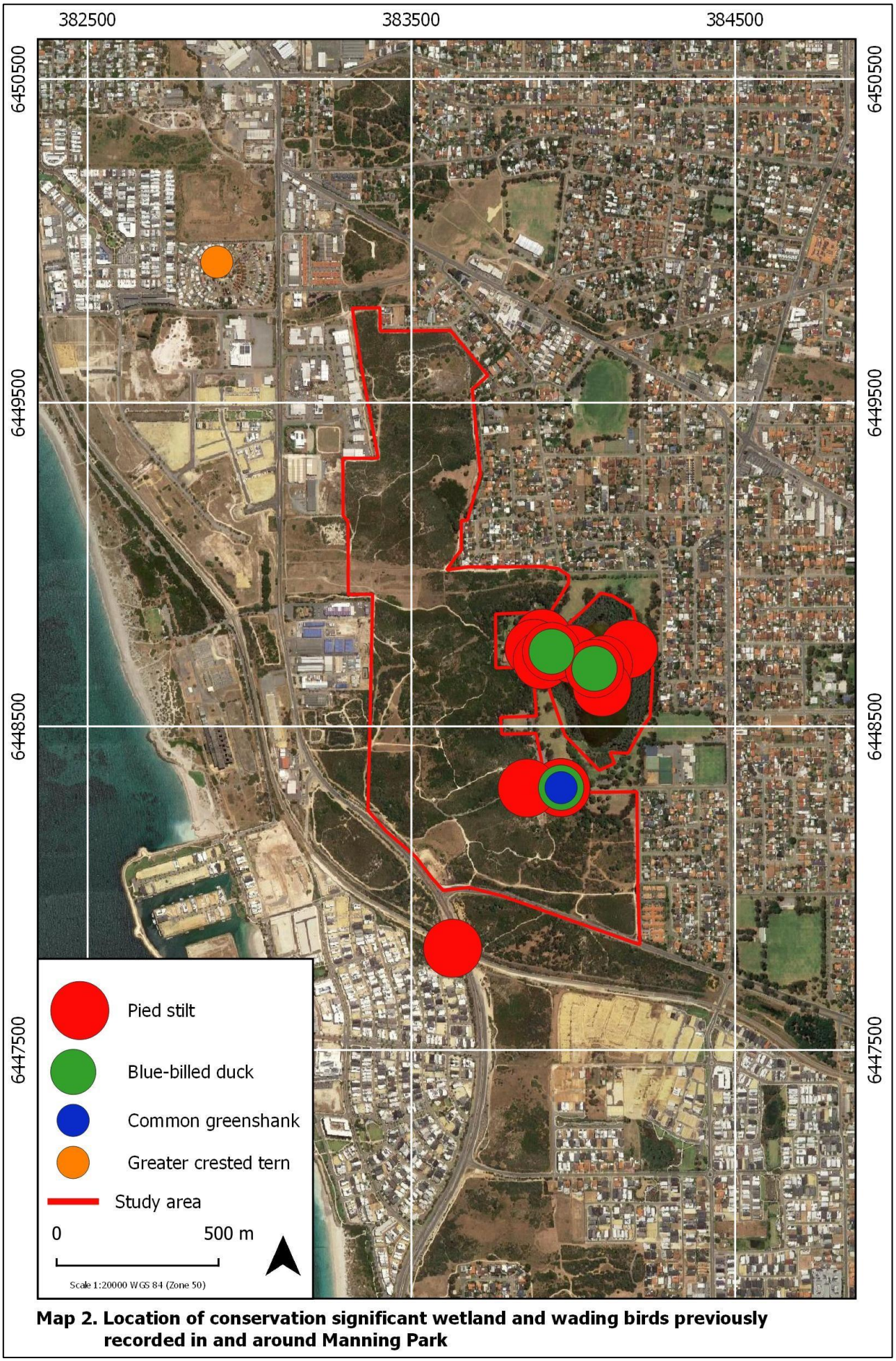
- Australasian Bittern, Blue-billed Duck, Glossy Ibis, and
- Bar-tailed Godwit, Black-tailed Godwit, Broad-billed Sandpiper, Common Greenshank, Curlew Sandpiper, Eastern Curlew, Great Knot, Greater Sand Plover, Grey Plover, Lesser Sand Plover, Long-toed Stint, Marsh Sandpiper, Oriental Pratincole, Pacific Golden Plover, Pectoral Sandpiper, Red Knot, Red-necked Stint, Roseate Tern, Ruddy Turnstone, Ruff, Sanderling, Sharp-tailed Sandpiper, Whimbrel, Wilson's Storm-petrel and Wood sandpiper.

Many of these species are known to frequent the broader area, with several known records from the coastline, ocean, offshore islands, and nearby lakes and wetlands (DBCA 2023b; Birdlife, 2023a), however due to the age of the records, the exact location of these cannot be certain, with these same records not appearing on the Birdlife Australia database search. These records however are assumed to be valid and potentially near to the reserve, which may have included brief flyovers and/or sightings offshore.

A single Quokka record also exists from approximately 1.1km northwest of the reserve, which represents a moderately certain observation of dead specimen on South Beach in 2009 (DBCA, 2023b). This may potentially be a beach-washed animal; however, the Quokka is assumed to be locally extinct in the immediate mainland area and highly unlikely to be present within the reserve and/or the local area.



Map 1. Location of conservation significant fauna (excluding wetland and wading birds) previously recorded in and around Manning Park



Map 2. Location of conservation significant wetland and wading birds previously recorded in and around Manning Park

2.2 Survey timing

Surveys were conducted over a single season (spring) during 2023, whereby the full spectrum of trapping and survey techniques were employed.

2.3 Personnel

Field surveys were undertaken by Mr Ray Lloyd and Mr Jeff Turpin. Bat call analysis and identification was undertaken by Mr Bob Bullen (Bat Call WA). This report was prepared by Ray Lloyd. Field work was carried out under the permit BA27000904 issued by the Department of Biodiversity, Conservation and Attractions, Scientific User Licence U316 (2023-2025) issued by the Department of Primary Industries and Regional Development (DPIRD) and Animals Ethics Approval Number WAEC 23-09-56 issued by the DPIRD Wildlife Animal Ethics Committee.

2.4 Site selection

Manning Park comprises of the following landscape features and vegetation communities (Government of Western Australia, 2000):

- Vegetated uplands and limestone ridge supporting *Acacia rostellifera* Closed Scrub, *Melaleuca huegelii* Shrubland, Closed Heaths with *Banksia sessilis,* and Mixed Low Shrublands
- Vegetated wetlands supporting *Melaleuca rhaphiophylla* Low Open Forest
- Scattered *Eucalyptus decipiens* Tree Mallee and *Eucalyptus gomphocephala* Open Woodland
- Open water, and
- Open parkland and cleared, degraded and/or revegetated landscapes.

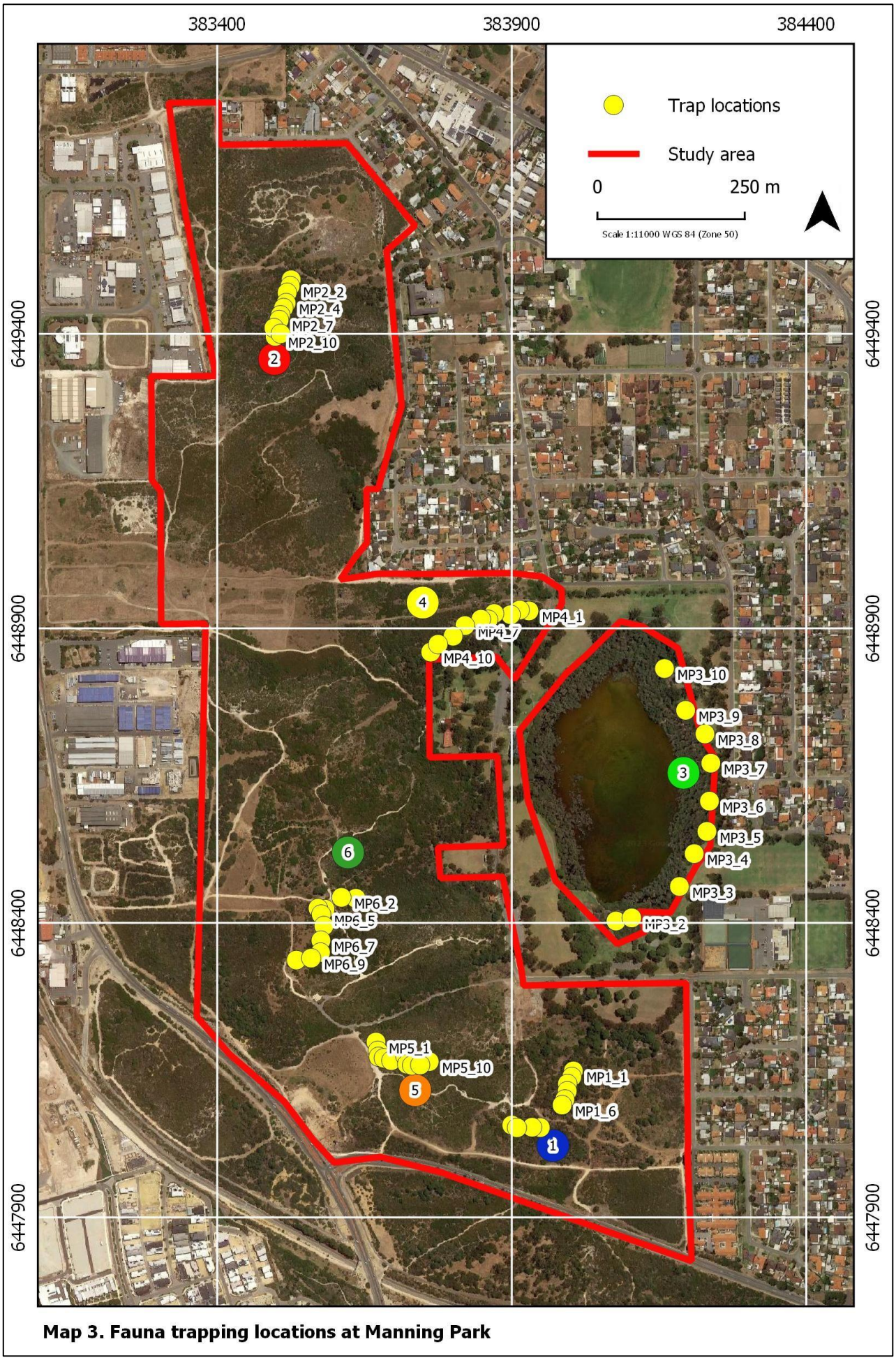
Three trapping transects were established within the reserve during 2017 fauna surveys (see FaunaTrack, 2018) and re-opened during the current survey. Sites were initially selected based on a combination of factors, including:

- Representation of vegetation associations
- Extent of 'intact' vegetation present
- Areas of conservation value or ecological sensitivity (including the likelihood of containing species of conservation significance), and
- Proximity to existing tracks to enable sites to be checked as early as possible each day.

Due to the comprehensive nature and scale of the current survey, an additional three trapping sites were established to further extend spatial and habitat coverage.

This resulted in the following six trapping sites established within the following broad fauna habitats (See Map 3);

1) Open Eucalypt (*Eucalyptus decipiens*) woodland
2) Closed heath with mixed shrubland on limestone ridge
3) *Melaleuca* woodland/wetland fringe
4) Tuart (*Eucalyptus gomphocephala*) woodland
5) Tall closed shrubland of *Acacia rostellifera* on limestone ridge, and
6) Low heath on limestone ridge



Map 3. Fauna trapping locations at Manning Park

2.5 Sampling methods for vertebrate fauna

Surveys were conducted during August/September and November 2023, whereby a variety of survey techniques were employed. This involved the following methods:

- Comprehensive trapping survey
- Bat detection
- Bird census
- Frog census
- Motion sensor camera deployment
- Nocturnal spotlighting
- Targeted searches for vertebrate fauna, particularly those of conservation significance, including a visual assessment of Black cockatoo habitat (breeding, foraging and roosting potential)
- Fauna habitat assessment, and
- Opportunistic observations

2.5.1 Trapping

Trapping for terrestrial fauna was undertaken at six sites from 16th - 24th November 2023 using conventional trapping techniques comprising a combination of twenty-litre pit-fall bucket traps, funnel traps, Elliot aluminium box traps and wire cage traps, with traps being open over seven consecutive nights, except for cage and Elliott traps, which were opened for five consecutive nights.

Five trapping sites contained a total of 10 pitfall traps, 20 funnel traps, 10 cage traps and/or large Elliott traps and 10 small Elliot box traps, with 10 individual trap lines spaced approximately 15-20m apart along a linear transect. Each trap line along the transect contained a single pitfall bucket with a 6-7m length of flywire drift fence (~30cm high) which bisected the bucket. A single funnel trap was then placed at either end of the drift fence. Each trap line also had a single small Elliot trap and a cage or large Elliot trap (trap type alternated along transect). The sixth trapping site consisted solely of a linear transect of cage and Elliott traps, whereby 10 cage traps and 10 small Elliott box traps were spaced at 50-100 metre intervals along the eastern edge of the lake. Cage and Elliot traps were baited with universal bait (peanut butter, rolled oats and sardines), which was replenished on an 'as needed' basis. All traps were checked each morning within three hours of sunrise.

In addition, we were able to determine the overall abundance of Quenda throughout the reserve by counting the number of new individuals captured during the five-day sampling period across all traps. To exclude, recaptures from this figure, we clipped a small area of fur on each trapped individual prior to release.

2.5.2 Bat detection

Bat echolocation calls were recorded using a Song Meter SM2BAT detector (Wildlife Acoustics, Concord MA, USA). Calls were recorded at each of the six trapping sites incorporating the dominant fauna habitats occurring in the reserve (Map 4) on the evenings of the 16th, 17th, 18th, 19th, 20th and 21st of November 2023. At each site units were left unattended overnight, ensuring peak activity periods were sampled.

2.5.3 Bird Census

Systematic, twenty-minute bird surveys were undertaken at each trapping site over five mornings during trap checks. Surveys were generally undertaken between 0530hrs and 0830hrs, ensuring peak bird activity was captured. Survey days and order of sites alternated, ensuring that each site had surveys undertaken at a diverse range of times. All birds recorded during systematic surveys were counted, including those observed flying overhead or in adjacent tenure. Surveys for birds were also carried out opportunistically when traversing through the study area.

2.5.4 Frog census

A casual frog census was undertaken over two consecutive nights on the 22nd and 23rd August, with surveys focusing on the lake and fringing wetland habitats. Surveys commenced approximately 30 minutes after sunset (approximately 6.45pm) and involved one person traversing the entire perimeter of the lake on foot. An hour was spent on each night inspecting the ground and low vegetation along the edge of wetland using a head-torch to pick up on the frogs distinctive dull eyeshine. Active listening for frog calls was also undertaken during this time, whereby 5 minutes was spent at several points around the lake edge that enabled access close to the water. All observations (sightings and calls) were recorded during this time.

2.5.5 Targeted searches

Targeted searches for terrestrial vertebrate fauna were undertaken on several occasions throughout the reserve, with searches undertaken on the 5th September, and 21st, 22nd, 23rd and 24th November 2023. Searches involved traversing the entire study area on foot to record sightings or evidence of fauna. This involved the raking of leaf litter and soft soil, the turning of rocks, fallen timber and rubbish, inspecting under bark, investigating hollows and burrows, and examining tracks, scats, and other traces of fauna.

2.5.6 Motion-sensor cameras

Camera trap surveys were undertaken over a 14-night period from the 17th of November to 1st December 2023, whereby sixteen motion-sensor camera units were deployed throughout the reserve. Due to the proximity of housing and open public accessibility, cameras were placed off main pathways and baited with a tuna oil-soaked cloth concealed within a small PVC cannister fixed to the ground. Each camera was attached to a steel fence post/dropper and positioned approximately 50 cm above the ground, angled downwards slightly and set to take a single photograph with a three second interval between successive photographs. Camera footage was downloaded at the end of the fortnight period.

2.5.7 Spotlighting transects

Nocturnal spotlighting surveys were undertaken over three successive nights on 21st, 22nd and 23rd of November 2023 along three pre-selected transects which optimised spatial and habitat coverage of the reserve. Each transect was traversed by two observers on foot (approximately 2-3km/hour) on a single evening between 7.15 - 8.30pm using a 30W hand-held spotlight and head-torches. Each transect covered approximately 2.5km and utilised existing tracks within the reserve and incorporated all habitats. During spotlight surveys, observations of all species detected were recorded. Species of conservation significance were marked with a handheld GPS at the point of observation.

2.5.8 Opportunistic records

Additional species opportunistically observed whilst traversing the survey area were recorded. Secondary evidence such as tracks, diggings, nests, scats and scratches were also recorded.

2.5.9 Fauna habitat assessment

Fauna habitat assessments were undertaken throughout the reserve. Factors used to assess fauna habitat quality incorporated the size of habitat, level of habitat connectivity, soil type and availability, tree hollow and other resource availability, fire history, and vegetation quality (EPA, 2020). These were further quantified using the following fauna habitat quality categories used in recent, nearby fauna surveys (i.e. PGV Env, 2021):

- **High:** No obvious disturbance, with vegetation structure, diversity, and quality like that prior to any disturbances, with a high level of habitat connectivity and is likely to contain a natural fauna assemblage.
- **Very Good:** Minimal disturbance and retaining habitat characteristics like that if it had not been disturbed, with a good level of habitat connectivity and fauna assemblages minimally affected by disturbance.
- **Good:** Some signs of disturbance, but still retaining many habitat characteristics if it had not been disturbed, with a good level of habitat connectivity, but the fauna assemblage has likely been affected by disturbances.
- **Disturbed:** Significant signs of disturbance, habitat characteristics have been modified (clearing of trees, shrubs, grazing, damage by vehicles and machinery and weed infestations) and limited habitat connectivity and fauna assemblages likely to differ from those expected in undisturbed sites.
- **Completely degraded:** Significant loss of vegetation, large weed infestations, a high number of vehicle tracks or have been completely cleared, with limited or no habitat connectivity and fauna assemblages likely to differ from those expected in undisturbed sites.

2.6 Taxonomy and nomenclature

Field identification of vertebrate species was based on the following field guides:

Birds	Simpson & Day (1999); Pizzey & Knight (1998); Morcombe & Stewart (2010)
Mammals	Menkhorst & Knight (2001); van Dyck *et al*. (2013)
Reptiles	Wilson & Swan (2021)
Amphibians	Tyler & Doughty (2009)

- In this report, nomenclature follows the Western Australian Museum's '*Checklist of the Fauna of Western Australia*'. WAM (2023).

Map 4. Motion camera and bat detector locations, and spotlight transects at Manning Park

2.7 Visual black cockatoo assessment

The study site was visually inspected for the presence or evidence of black cockatoo breeding, night roosting and/or foraging habitat. Any signs of live individuals and/or evidence of activity such as chew marks, branch clippings and chewed fruit and nuts were recorded.

2.7.1 Breeding habitat

Defined as habitat that contains known, suitable, or potential nesting trees (DAWE, 2022).

- A known nesting tree is a standing tree (dead or alive) containing a hollow where cockatoo breeding has been recorded or shows evidence of breeding (scratches, chew marks or feathers).
- Suitable nesting trees are those containing suitable hollows (>10cm wide), though have no evidence of use.
- A potential future nesting tree are those with a diameter at breast height (DBH) that may develop a hollow in the future. All trees with a diameter of 50cm or above were classed as potential future nesting trees.

Habitat trees were individually identified and incorporated the following attributes:

- Unique identification number
- Species
- Waypoint (Latitude/longitude)
- Alive or dead
- Diameter at breast height (DBH)
- Presence of hollows
- Number of hollows
- Hollow width
- Any usage, and
- Habitat category (known, suitable, potential, or foraging only)

2.7.2 Roosting habitat

Any groups of tall, native trees in or around the study site were assumed to provide potential roosting habitat for black cockatoo species and were recorded. Any signs of roosting behaviour were also noted.

2.7.3 Foraging habitat

Foraging habitat includes those habitats that typically comprise of plant species known to be consumed by black cockatoo species. These include a variety of proteaceous woodlands, shrublands and low heath, Eucalypt woodlands and a range of non-native habitats and species including pine trees and plantations, and parklands and gardens supporting species such as Cape Lilac (DAWE, 2022).

Foraging habitat was mapped for all three species, based on the presence of the following plant species known to be consumed by each species of black cockatoo, these include:

- **Baudin's cockatoo:** Woodland tree species such as Marri (*Corymbia calophylla*), proteaceous shrubs such as *Banksia* and *Hakea* spp., as well as Pine trees (*Pinus* sp.) (DAWE, 2022; Johnstone et. al. 2011).

- **Carnaby's cockatoo:** Proteaceous species such as *Banksia* and/or *Hakea* species, particularly Parrot bush (*Banksia sessilis*), and woodland tree species (many *Eucalyptus*/*Corymbia* species), particularly Tuart (*Eucalyptus gomphocephala*) and Marri and Pine trees (DAWE, 2022; Groom, 2011; Johnstone et. al. 2011).

- **Forest red-tailed black cockatoo:** Woodland tree species, particularly Jarrah (*Eucalyptus marginata*) and Marri, and Tuart, Redheart (*Eucalyptus decipiens*) and the introduced Cape Lilac (DAWE, 2022; Johnstone et. al. 2011; Johnstone et. al. 2017).

3. Results and discussion

3.1 Fauna habitats

Six broad fauna habitats were identified within the survey area (Map 5):

- Shrublands and heath
- Tall woodland
- Low open woodland
- Wetlands
- Open water, and
- Parkland

Shrublands and heath

Shrublands and heath habitats cover up to 64.3% of the study area and is predominantly centred along the limestone ridge and associated slopes, with much of the area containing skeletal sandy soils and extensive limestone exposure. Shrublands within the study site include low heaths dominated by *Melaleuca huegelii* on skeletal soils and limestone exposure in the higher parts of the landscape, with areas of taller heath/shrubland on the slopes and lower ridges supporting extensive *Banksia sessilis* shrublands, and dense thickets of tall shrubland with extensive leaf-litter dominated by *Acacia rostellifera* in areas containing deeper soils. Parts of this habitat, particularly on the slower slopes contain large infestations of the introduced Coastal tea-tree (*Leptospermum laevigatum*), with many isolated patches spread throughout higher parts of the limestone ridge. This habitat is of very high significance, as it provides an important food source for Carnaby's and Baudin's cockatoo (proteaceous shrublands), while the dense, low shrublands also provide a dense cover of low vegetation important for species such as Quenda and a range of small bushland birds, as well as sandy soils and extensive leaf litter, a habitat requirement for species such as the Perth lined slider.

Tall woodland

Tall woodland habitats cover up to 4.9% of the study area and predominantly occur in the vegetated uplands surrounding the wetland, with isolated stands occurring in the northeast of the reserve. These habitats are dominated by large Tuarts (*Eucalyptus gomphocephala*) over an open, mixed shrubland on shallow brown, loamy sands with areas of limestone exposure. This habitat is of high significance within the reserve, as it offers potential nesting and roosting habitat and extensive foraging resources for Carnaby's cockatoo and Forest red-tailed black cockatoo.

Low open woodland

Low open woodlands cover up to 4.7% of the study area. This habitat is poorly represented in the study area, where it predominantly occurs in the southern portion of the reserve, with several isolated pockets in the north and west. This habitat is dominated by Redheart (*Eucalyptus decipiens*) over mixed shrubland, with much of this habitat experiencing disturbances within the understorey layer, particularly from historical clearing and weed infestations (weedy grasses). A small area in the southeast also appears to have suffered from dieback, with much of the larger, mature trees all dying or dead. These areas are generally on the lower slopes and flats below the limestone ridge, with deeper, yellow sands and some limestone exposure.

Wetland

Wetland habitats cover approximately 6% of the study area. This habitat only occurs around the perimeter of the lake, between the open water habitats and extensive parkland. The vegetation is dominated by large Swamp paperbarks (*Melaleuca rhaphiophylla*) over dense low sedges and exposed areas on peaty sands which experience seasonal inundation. This habitat fringes most of the lake and provides important habitat and cover for a range of species including reptiles such as the King skink and a range of wetland bird species. The area also contains several large, hollow-bearing Tuarts along the outer edge, proving nesting potential, roosting habitat, and foraging resources for Carnaby's cockatoo and Forest red-tailed black cockatoo.

Open water

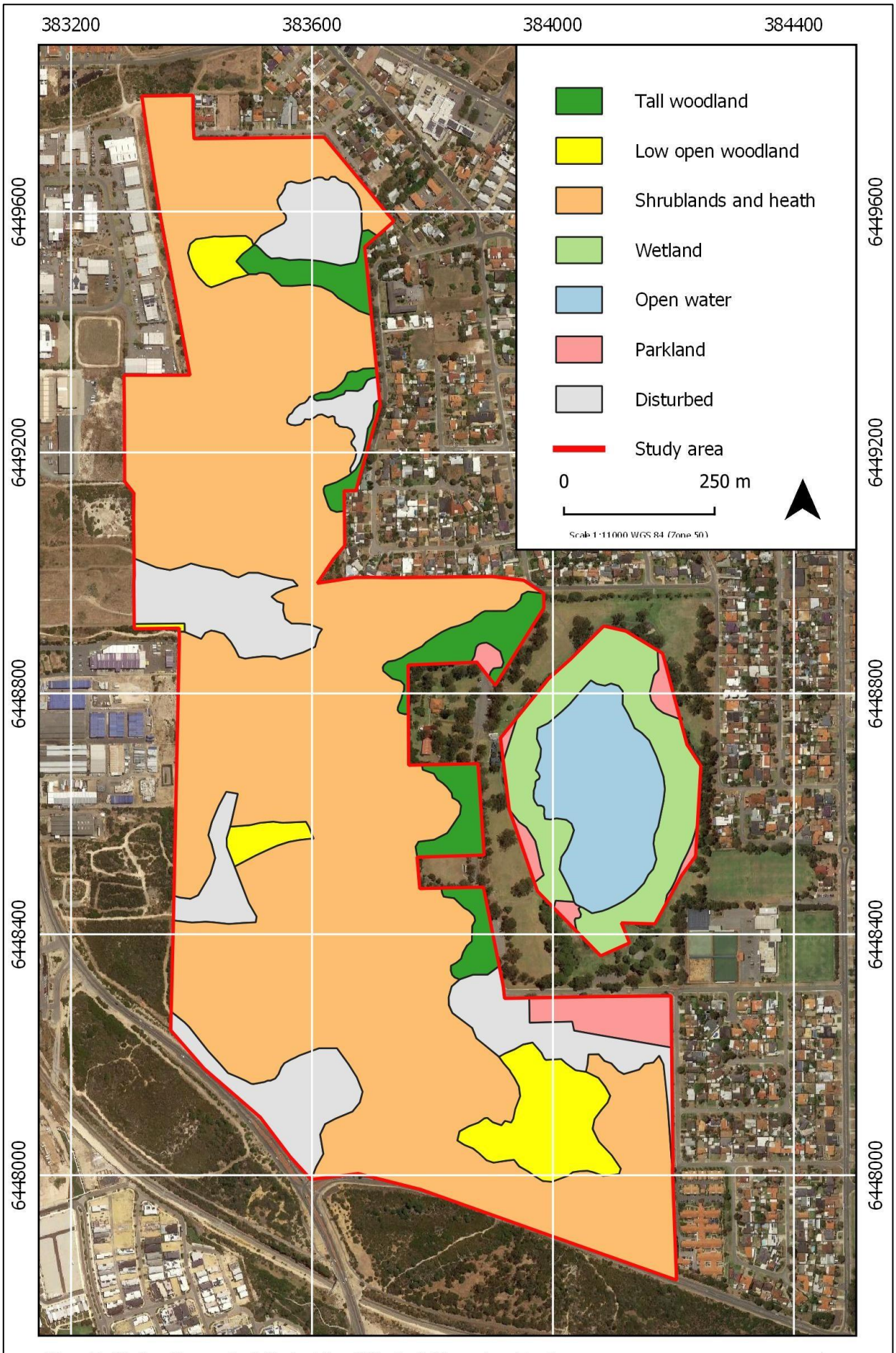
Comprising solely of Manning Lake, this habitat covers approximately 5.7% of the study area. This habitat is predominantly a moderate-sized, ephemeral to semi-permanent freshwater lake. Open water habitats are of varying depths, with much of the lake drying out in the late summer and autumn, exposing large areas of shoreline/mudflat habitats, with little to no vegetation or cover, while some deeper pools of water persist all year round. These areas, particularly the exposed mudflats and fringing vegetation are extremely important for a range of waterbirds, including a large variety of waterbirds and a range of conservation significant and migratory waders and shorebirds.

Parkland

Cleared, open parkland habitats only cover 2.3% of the area surveyed in the current study. However, a significant portion of the uplands immediately surrounding the wetland vegetation made up of predominantly manicured lawn grass and scattered large trees (mostly Tuart). This area is also of high importance, as the large trees that are scattered throughout the parkland area provide foraging and roosting habitat for a range of bird species, particularly Carnaby's and Forest red-tailed black cockatoos.

In addition, large areas of completely cleared and/or altered habitats also occur throughout the study area. These areas have generally been completely altered and no longer support any remaining native vegetation, of which are now predominantly bare soil or weedy grasslands. These areas cover the remaining 12.1% of the study area.

Figure 1. Manning Park fauna habitats: (a) Shrublands and heath; (b) Tall woodland; (c) Low, open woodland; (d) Wetland; (e) Open water; (f) Parkland.



Map 5. Major fauna habitats identified at Manning Park

3.2 Fauna habitat condition

A total of sixty-five fauna habitat assessments were undertaken throughout the study area. These assessments aimed to quantify the habitat quality throughout the reserve, with raw data presented in Appendix 10.

Fauna habitat condition varied throughout the site from very good through to completely degraded. Essentially all habitats within the study area have experienced some level of disturbance or degradation through historical land uses, the establishment of tracks, weedy grass infestations and feral species, subsequently no habitat was regarded as high-quality/pristine, however the central core of the reserve and areas higher in the landscape presented a much higher level of habitat quality and connectivity.

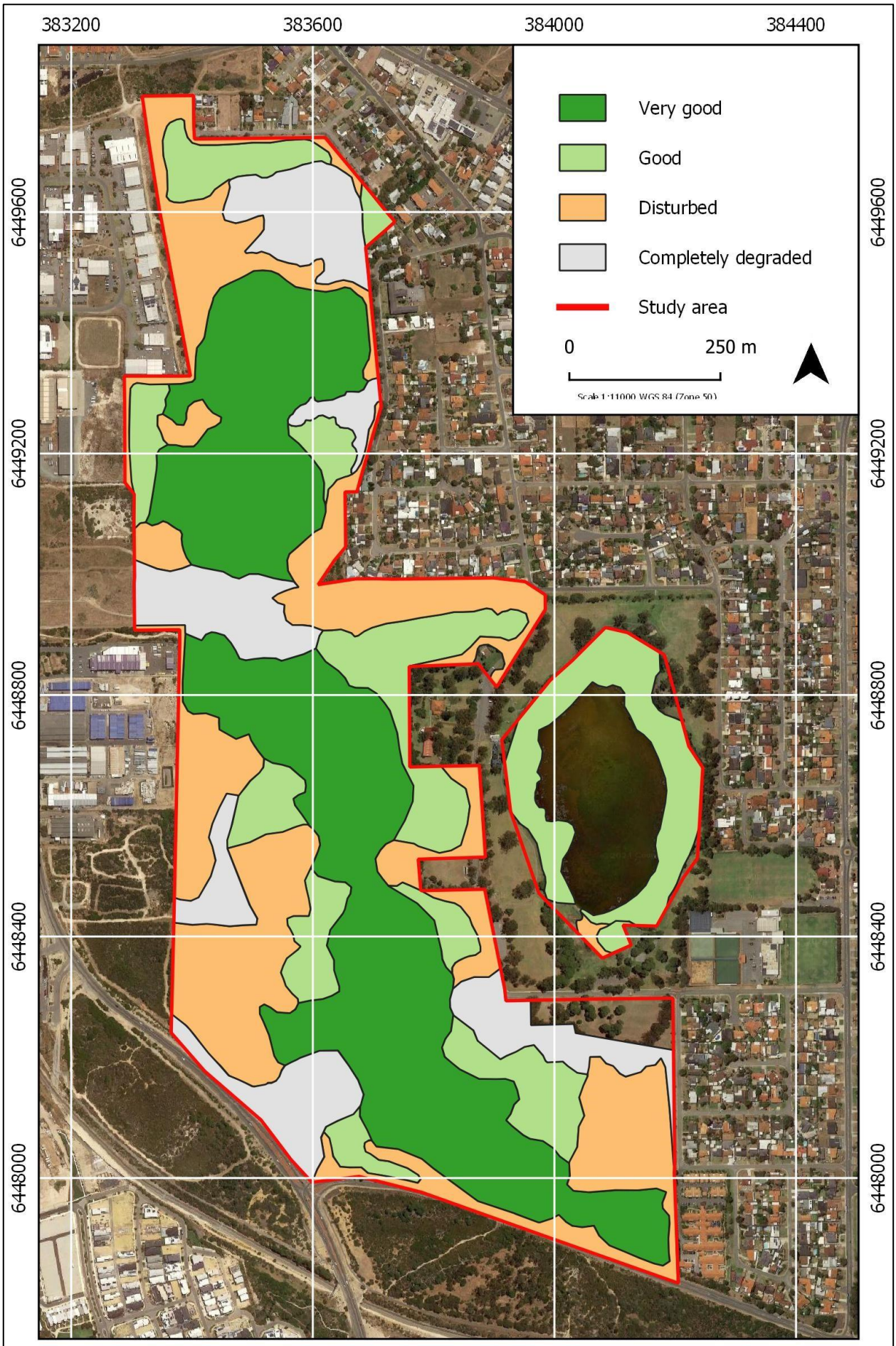
Habitats considered of 'Very Good' condition covered approximately 32.8% of the study area and mainly incorporated the 'Shrubland and Heath' habitats which occur throughout much of the reserve (Map 6; Figure 2a). These habitats generally have a high level of limestone exposure, skeletal soils and a very dense, in some instances almost impenetrable shrub layer and a high flora diversity, including herbs. These areas also contain extensive feeding grounds for black cockatoos, primarily Carnaby's and to a lesser extent Baudin's, of which the proteaceous shrubland, particularly Parrot bush (*Banksia sessilis*) forms a dominant feature of the upper shrub layer. These areas also present as having less tracks and pathways, and less cleared areas/exposed soil, erosion and weedy grass infestations and possess important habitat characteristics such as extensive leaf litter and woody debris.

Habitat considered of 'Good' condition covered approximately 20.1% of the study area (Map 6; Figure 2b). These areas were mostly on the lower slopes and closer to the edge of the reserve or in proximity to more disturbed/degraded areas, however, most form a continuous habitat corridor into the higher quality habitats. These areas incorporated most habitat types throughout the reserve, particularly the woodland and wetland habitats which have experienced a higher level of weedy grass invasion and some cleared/exposed soil, as well as some erosion on the slopes. These areas however are of high importance, as almost all the large, hollow-bearing trees occur in these areas, providing potential nesting opportunities for black cockatoo species and feeding grounds for Carnaby's and Forest red-tailed black cockatoos. The areas of 'Good' habitat throughout the limestone ridge habitat also possess substantial coverage of *Banksia sessilis*.

Disturbed areas covered approximately 25.3% of the study area (Map 6; Figure 2c). These areas are concentrated in the extreme northern and south-western parts of the reserve, particularly where large historical disturbances exist. A dominant feature of these habitats are the extensive infestations of the introduced Coastal tea-tree *(Leptospermum laevigatum*), which dominates the shrub/upper canopy layer. However, much of this habitat still comprise several elements of higher quality habitats, in particular scattered or isolated thickets of *Banksia sessilis*, extensive leaf litter patches and a dense, often impenetrable shrub layer, which offers adequate habitat for significant species such as Quenda, Perth-lined slider and locally significant bush birds such as the Splendid fairy-wren or White-browed scrub-wren, as well as connectivity to adjacent areas of higher quality habitat. These areas also often comprise of patchy cleared landscapes, scattered rubbish and feral animals, in particular rabbits.

Completely degraded areas cover approximately 13.4% of the study area (Map 6; Figure 2d). These areas are generally devoid of most of the original vegetation. Some isolated shrubs may be scattered around, but most areas contained extensive weedy grass infestations and exposed soils. Most of the highly degraded areas are associated with current and historical clearings such as old quarry sites in the north of the reserve, the powerline corridor through the central north of the reserve, parts of the south-west and also in the vicinity of the Davilak homestead ruins. These areas contain a high level of soil exposure, woody and grassy weeds, rubbish and numerous tracks and pathways.

The remaining 8.4% incorporates open water and parkland habitats.



Map 6. Fauna habitat condition at Manning Park

Figure 2. Manning Park fauna habitat condition: (a) Shrubland/heath in 'Very Good' condition, with little disturbance such as tracks and paths, and/or fragmentation and with low level weedy grass infestation, and overall providing high habitat value with dense, low vegetation cover and habitat connectivity, and extensive foraging resources (i.e. *Banksia sessilis*); (b) Shrubland/heath in 'Good' condition, with some weedy grass infestations, tracks and paths nearby, and low level woody weed encroachment, though still providing ample cover and foraging resources; (c) 'Disturbed' shrublands, with historical clearing/thinning, and extensive woody weed infestations, though some foraging resources persist; (d) 'Completely Degraded' habitats with high level disturbance such as clearing, weed infestation and fragmentation, with very little to no cover and/or foraging resources.

3.3 Black cockatoo habitat

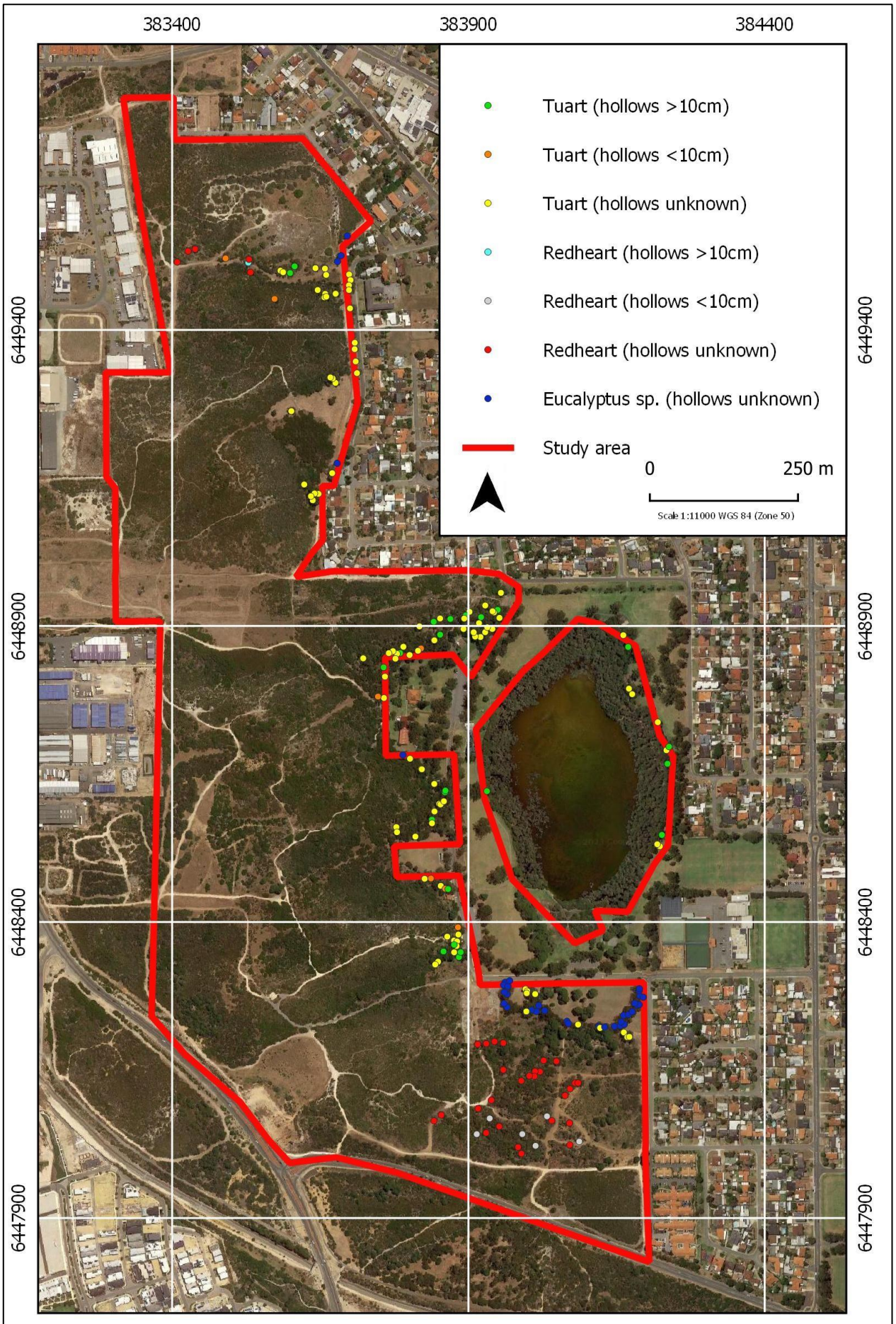
3.3.1 Breeding habitat

Two hundred and one potential habitat trees were located within the study area, which included both suitable and future potential nesting trees (Appendix 9). Habitat trees identified within the study area were mainly Tuart (*Eucalyptus gomphocephala*; 127 trees) and Redheart (*Eucalyptus decipiens*; 39 trees), while further 35 individuals of unknown large *Eucalyptus* species were also identified as potential breeding habitat.

Thirty-six of the trees identified in the study area contained visible hollows, with twenty-four of these supporting hollows of greater than 10cm wide which are considered suitable breeding habitat for black cockatoo species (i.e. Figure 3b). Of these however, 11 hollows were currently occupied by bees and a further hollow was being used by galahs. It is also of note that not all hollows or potential hollows are visible from the ground and there are many large trees present within the study area that may also contain hollows, potentially of suitability for black cockatoo species.

No known breeding hollows are present within the reserve and is unlikely that any White-tailed cockatoos will use the reserve for breeding, with the species rarely using the southern Perth metropolitan area of the Swan Coastal Plain as breeding locations (Johnstone et. al. 2011). However, an observation was made of seven Carnaby's cockatoos at tree #76 on the 24 November 2023. Two of the birds (male and female) were observed inspecting tree hollows present in the tree (see Figures 8a & 8e; Appendix 9). The birds however were chased off by Galahs and further investigation or monitoring of these hollows may be necessary. No known breeding hollows were observed within the reserve of the Forest red-tailed black cockatoo, however, unlike the white-tailed species, red-tailed black cockatoos have been known to breed on the Swan Coastal Plain (including within the City of Cockburn), with known breeding locations in the vicinity of Murdoch University and possibly Perry Lakes (Johnstone et. al. 2017) and Bibra Lake (Birdlife, 2023a). An observation was also made on the 5th September 2023 of two birds inspecting a large hollow in a smooth-barked Eucalypt in the parkland habitats of the reserve (see Figure 8f), however no further observations were made during the course of the survey and further investigation or monitoring of these hollows, and many others, may be necessary as opportunistic breeding of Forest red-tailed black-cockatoos is a possibility within the reserve.

Figure 3. (a) Tuart woodlands, including many large, hollow-bearing individuals (b) provide potential breeding habitat for Black cockatoos.



Map 7. Location of Black cockatoo habitat trees identified at Manning Park

3.3.2 Roosting habitat

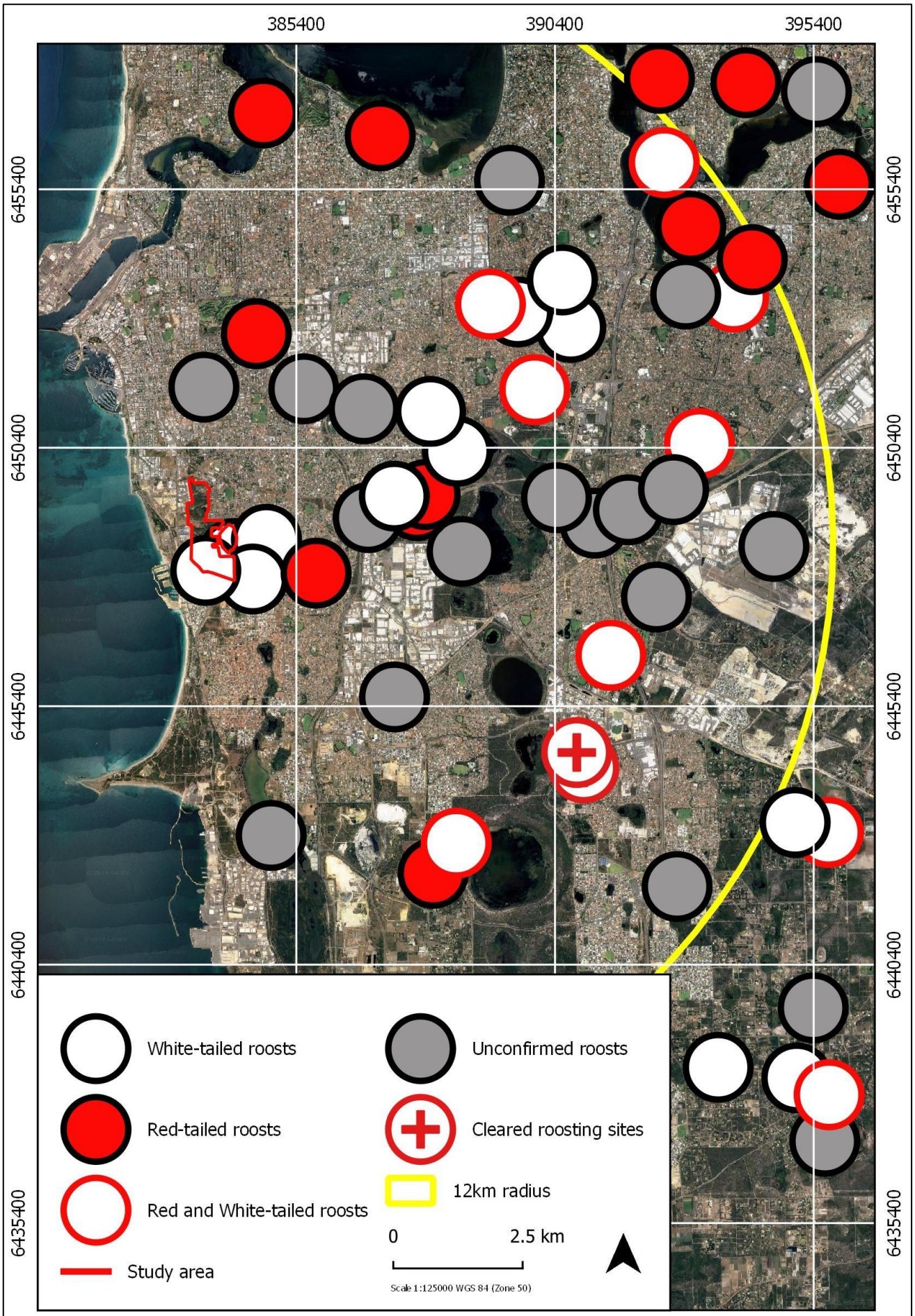
Up to 7.85 hectares of habitat was identified within the study area which would be classed as potential suitable for night roosting of black-cockatoo species. Much of this area (6.34 ha) occurs in the Tuart woodlands near the lake in the central-east and southeast of the reserve, while smaller areas (total 1.51ha) are patchily distributed in the north and northeast of the reserve. Large areas of potential roosting also occur throughout the parkland areas of the reserve which was not included as part of this study.

Two confirmed White-tailed black cockatoo roosts currently occur within Manning Park. While a further two confirmed roosts also occur within 1km of the reserve. A further 13 known roosts occur within 12km of the reserve and a further 16 unconfirmed roosts occur within 12km of the reserve (Birdlife, 2023a).

No Forest-red-tailed black cockatoo roosts are currently known from the reserve, however one confirmed roost is known within 2km of the reserve, while a further 15 known roosts occur within 12km of the reserve, and a further 16 unconfirmed roosts occur within 12km of the reserve (Birdlife, 2023a).

Figure 4. (a) Tuart woodlands, as well as tall trees situated within, and surrounding parkland habitat (b) provide possible roosting opportunities for Black cockatoos.

Map 8. Location of Black cockatoo roosting habitat identified at Manning Park



Map 9. Location of Black cockatoo roosting sites identified within 12km of Manning Park

3.3.3 Foraging habitat

The study area supports suitable foraging habitat for all three Black-cockatoo species. Up to 67.3 hectares of Baudin's cockatoo foraging habitat is present within the study area, which is predominantly shrubland/limestone ridge habitats containing proteaceous shrubs, particularly Parrot-bush (*Banksia sessilis)*, a high value food source for the species. No Marri trees were identified within the study area, and as such, the woodland areas are considered of lower foraging importance for the species. However, some large Pine trees (*Pinus* sp.) are scattered throughout the parkland and disturbed habitats to the south of the lake, which are of potential high value for the species. Previous surveys of the reserve, incorporating a large area of the parkland environments recorded two Marri trees in the reserve (see FVC, 2021). These however may not contribute a large resource to Baudin's cockatoo, though may be of supplementary feeding importance if and/or when Baudin's cockatoo forage within the reserve. Few confirmed records of Baudin's cockatoo are known from the reserve and the surrounding area (DBCA, 2023b).

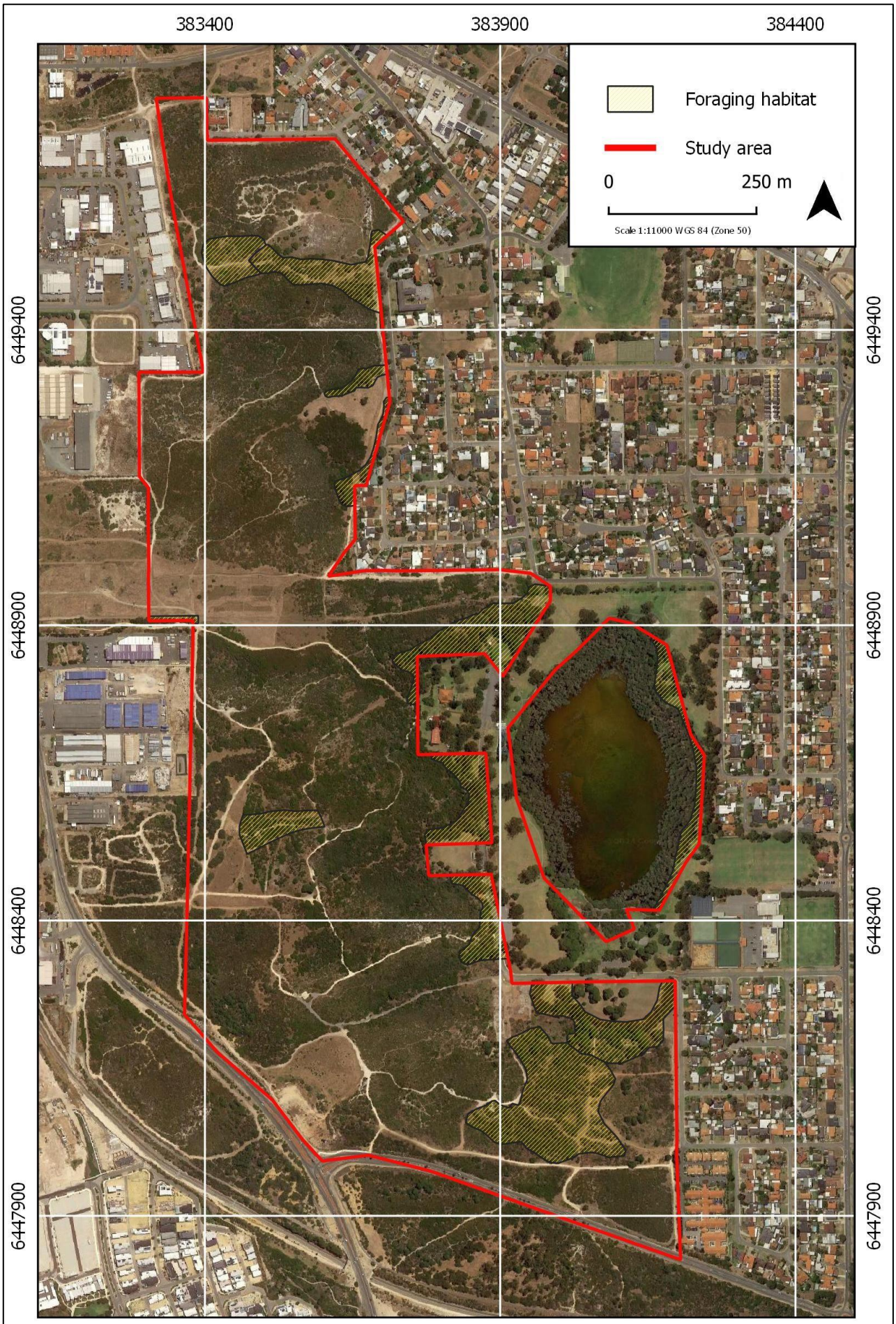
Up to 77.4 hectares of Carnaby's cockatoo foraging habitat is present within the study area, which is predominantly the shrubland/limestone ridge habitats containing proteaceous shrubs, particularly *Banksia sessilis*, a very high value food resource for the species. A significant part of the woodland and parkland habitats are also included as foraging habitat, as these areas contain extensive areas of Tuart woodland and isolated large Pine trees (*Pinus* sp.) which are also a high value food resource for the species. The *Melaleuca* woodland/wetland habitats surrounding the lake has not been highlighted as a major foraging resource for the species. However, several Carnaby's cockatoos were observed feeding in the woodlands surrounding the lake, with most feeding activity observed in from isolated Eucalypts, an observation was also made of what appeared as opportunistic feeding of *Melaleuca* seeds. There are no records in the literature of Carnaby's cockatoo feeding on *Melaleuca rhaphiophylla,* and this behaviour may have been secondary to the feeding on the Eucalypts feeding and further investigation is warranted. Several additional observations were made of Carnaby's cockatoos feeding or flying over the reserve in both shrubland and woodland habitats, as well as several observations of foraging signs (chewed *Banksia* spikes, *Callitris* nuts and pinecones), in the woodland, shrubland and parkland habitats.

Up to 12.2 hectares of Forest red-tailed black cockatoo foraging habitat was identified within the study area, which is predominantly the woodland habitats supporting Tuart and Redheart, which are considered a high value food resource, in particular Tuart. All observations of Forest red-tailed black cockatoos were made in the woodland and parkland areas, with several observations of animals feeding on Tuart nuts as well as an observation of feeding on a Cape Lilac tree just outside of the study area on Quarry Road.

Several other records of Carnaby's/White-tailed cockatoo species and Forest red-tailed black cockatoo occur within and close by the reserve and within 5km of the study area (DBCA, 2023b). Many large areas of foraging resources also exist within 20 kilometres of the reserve, including the extensive *Banksia*/Eucalypt woodlands of Jandakot Regional Park and *Banksia*/Eucalypt woodlands, and the Tuart woodlands occurring throughout the Beeliar Regional Park.

Map 10. Baudin's cockatoo foraging habitat identified at Manning Park

Map 11. Carnaby's cockatoo foraging habitat identified at Manning Park



Map 12. Forest red-tailed black cockatoo foraging habitat identified at Manning Park

Figure 5. (a) Extensive foraging resources (i.e. *Banksia sessilis*) for Carnaby's and Baudin's cockatoo throughout the proteaceous shrublands and heath; (b) Isolated Pines (*Pinus* sp.) located within parkland and some disturbed sites, provides important foraging resources for Carnaby's and Baudin's cockatoo; (c) *Eucalyptus decipiens* with some *Callitris preissii* in the low woodland habitats provide important foraging resources for Carnaby's and Forest red-tailed black cockatoo; (d) Tall Eucalypt woodlands in the vegetated uplands surrounding the wetland provide important foraging resources for Carnaby's and Forest red-tailed black cockatoo.

3.4 Vertebrate fauna assemblage

The overall trapping period incorporated 1650 trapping nights, 224 motion camera nights, six bat detector nights, 14 hours of bird surveys, eight person hours of nocturnal spotlighting, two hours of frog surveys, and 26 person hours of targeted searches (Table 1). This resulted in 903 individual fauna detections including the detection of four species of amphibian, 23 species of reptile, 12 species of mammal (including six introduced species) and 69 species of bird (including four introduced species) (Tables 2, 3, 4 and 7).

This brings the total species known from Manning Park to:

- Amphibians: Five species
- Reptiles: 23 species
- Mammals: 13 species
- Birds: 109 species

The survey area however has the potential to support up to nine amphibian species, 44 species of reptile (including four of conservation significance), 22 species of mammal (including up to four of conservation significance) and 173 species of bird (including up to 28 species of conservation significance) (Tables 2, 3, 4 and 7).

Surveys yielded five bird species, a single mammal species and a single reptile species of conservation significance:

- The EPBC listed Endangered Carnaby's cockatoo (*Zanda latirostris*)
- The EPBC listed Vulnerable Forest red-tailed black cockatoo (*Calyptorhynchus banksia naso)*
- The EPBC Migratory/Marine Pied Stilt (*Himantopus himantopus leucocephalus*)
- The EPBC Marine listed Rainbow Bee-eater (*Merops ornatus*)
- The EPBC Marine listed White-bellied sea-eagle (*Haliaeetus leucogaster*)
- The Priority 4 listed Quenda (*Isoodon fusciventer*), and
- The Priority 3 listed Perth-lined Slider (*Lerista lineata*)

Additionally, a single reptile and 14 bird species of local significance were also detected:

- Western bluetounge (*Tiliqua occipitalis*)
- Australasian shoveler
- Hardhead
- Pink-eared duck
- Dusky moorhen
- Painted button-quail
- White-browed scrub-wren
- New-holland honeyeater
- White-cheeked honeyeater
- Square-tailed kite
- Brown goshawk
- Splendid fairy-wren
- Variegated fairy-wren
- Weebill, and
- Yellow-rumped thornbill

The reserve is also known to support a further five species of conservation significance:

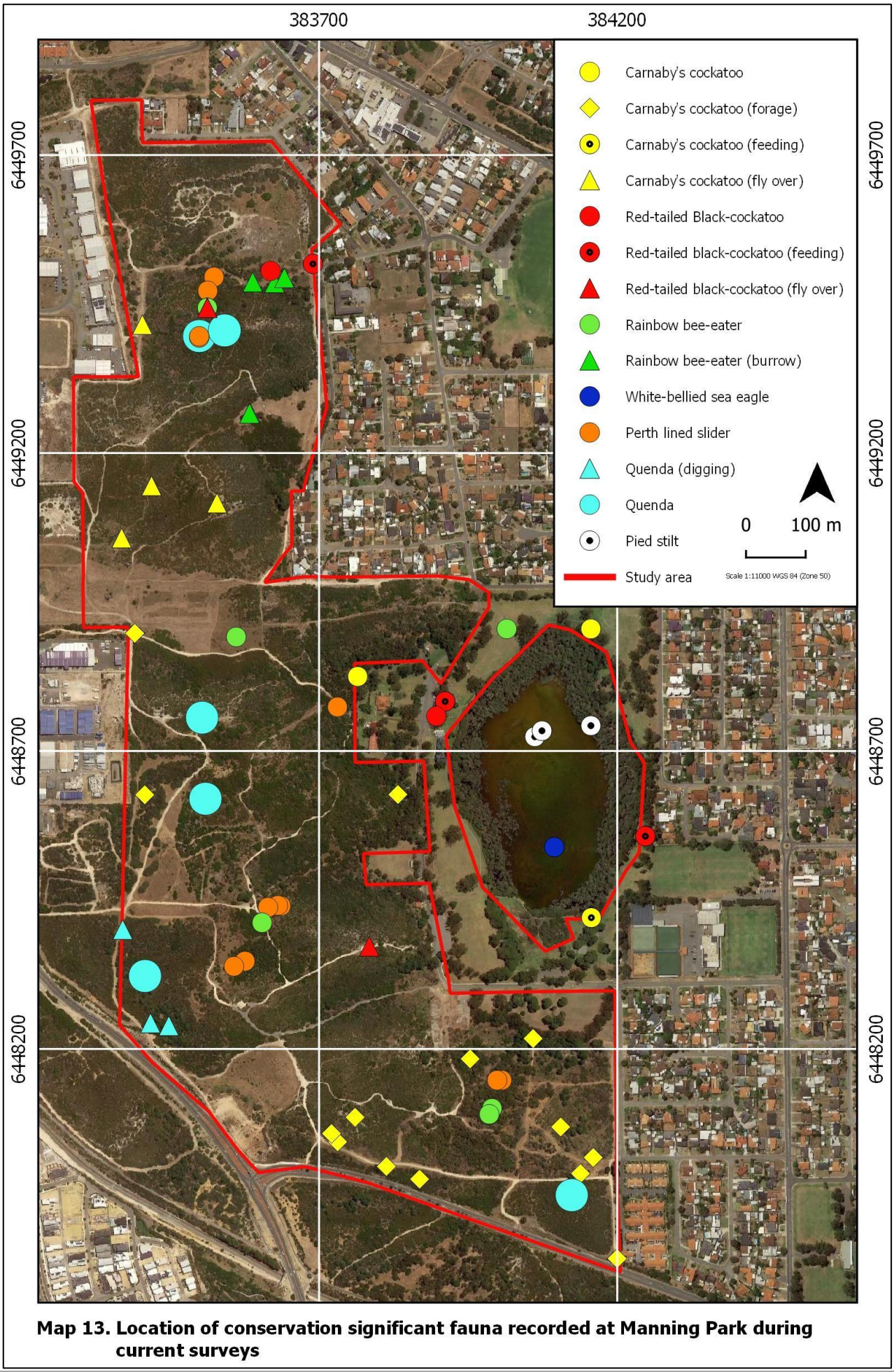
- The EPBC listed Endangered Baudin's cockatoo (*Zanda baudini*)
- The BC Act Specially Protected Peregrine falcon (*Falco peregrinus*)
- The Priority 4 Blue-billed duck (*Oxyura australis*)
- The EPBC Migratory listed Common greenshank
- The EPBC Marine listed Greater crested tern

An additional 11 species of local significant birds are also known from the reserve including:

- Musk duck
- Nankeen night-heron
- Little eagle
- Collared sparrowhawk
- Whistling kite
- Western rosella
- Western wattlebird
- Inland thornbill
- Western golden whistler
- Grey shrike-thrush, and
- Dusky woodswallow

Table 1. Number of trap-nights of each trap type across all trapping transects.

Site	Date opened	Date closed	Trap nights			
			Pitfalls	Funnels	Cages/Elliott (Large)	Elliott (Small)
1	16-Nov-23	23-Nov-23	70	140	50	50
2	16-Nov-23	23-Nov-23	70	140	50	50
3	16-Nov-23	23-Nov-23	0	0	50	50
4	16-Nov-23	23-Nov-23	70	140	50	50
5	17-Nov-23	24-Nov-23	70	140	50	50
6	17-Nov-23	24-Nov-23	70	140	50	50
Total trap-nights			350	700	300	300



Map 13. Location of conservation significant fauna recorded at Manning Park during current surveys

3.4.1 Amphibians

Up to nine species of amphibian have the potential to occur within Manning Park (Table 2). Of these, four species were recorded during the current survey: the Motorbike frog (*Litoria moorei*), Slender tree frog (*Litoria adelaidensis*), Moaning frog (*Heleioporus eyrei*), and Banjo frog (*Limnodynastes dorsalis*) (Table 2). All four species have previously been recorded in the reserve (FaunaTrack, 2018; WASAH, 1999), while the Squelching froglet (*Crinia insignifera*) has also been recorded on previous surveys of the reserve (WASAH, 1999), bringing the total number of species known to occur in the reserve to five (55.5% of predicted species).

All five species appeared to be confined to the wetland and open water habitats, with all sightings made from within and around this area, mostly during targeted frog surveys. No amphibians were captured in traps or detected during spotlighting or targeted searches in the vegetated uplands and limestone ridge habitats. However, previous fauna surveys had captured the Moaning frog and Banjo frog at all habitats within the reserve, including the limestone ridge (FaunaTrack, 2018; WASAH, 1999).

No other species of amphibians have been recorded within 2km of the reserve, however the Clicking froglet (*Crinia glauerti*), the Turtle Frog (*Myobatrachus gouldii*) and the locally significant Quacking froglet (*Crinia georgiana*) are known from approximately 5km of the reserve at North and Bibra Lakes within eastern Beeliar lake chain (ALA, 2023; DBCA, 2023c; FaunaTrack, 2022; Cornwall, 2004). While the Crawling toadlet (*Pseudophryne guentheri*) is known from Yangebup Lake (DBCA, 2023c). Most of these species are primarily associated with waterbodies and swamps on the Swan Coastal Plain, and although relatively common throughout the eastern Beeliar lake chain and neighbouring bushland areas, Manning Park contains an isolated, relatively small wetland and is separated from other large wetland systems by drier landscapes and a significant limestone ridge, as a result, these amphibians are unlikely to occur in the reserve. The Turtle frog however can be a difficult species to detect, particularly during the drier times of year, with their tendency to only emerge during heavy rainfall events, which were not encountered during the survey period. This species however mainly occurs in sandplains supporting Banksia/Eucalypt woodlands, a habitat not well represented within Manning Park, and is unlikely to occur in the reserve.

Table 2. Amphibians expected to occur, known to occur and/or recorded during the current survey at Manning Park

Species		Status	Likelihood	Recorded current survey	
				Trap	Opp
Pelodryadidae (Tree Frogs)					
Slender Tree Frog	*Litoria adelaidensis*		Known		+
Motorbike Frog	*Litoria moorei*		Known		+
Limnodynastidae (Large Ground Frogs)					
Moaning Frog	*Heleioporus eyrei*		Known		+
Banjo Frog	*Limnodynastes dorsalis*		Known		+
Myobatrachidae (Small Ground Frogs)					
Quacking Frog	*Crinia georgiana*	L	Possible		
Clicking Froglet	*Crinia glauerti*		Possible		
Squelching Froglet	*Crinia insignifera*		Known		
Turtle Frog	*Myobatrachus gouldii*		Possible		
Guenther's Toadlet	*Pseudophryne guentheri*		Possible		
Species expected	**9**				
Species recorded during 2023	**4**				

L = Locally significant due to a reduced distribution and/or population on the Swan Coastal Plain (Government of WA 2000),

3.4.2 Reptiles

Twenty-two (52%) of a potential 44 reptile species were recorded during the current survey, bringing the number of species known to occur in the reserve to 23 (55% of predicted species; see Table 3). This figure also includes three species that had not been recorded in the reserve previously, which include the Marbled gecko (*Christinus marmoratus*), South-west four-toed Lerista (*Lerista distinguenda*) and West coast pale-flecked Morethia (*Morethia lineoocellata*). These three species however are known from several locations near to the reserve (DBCA, 2023c). The only species detected previously in the reserve that was not detected during the current surveys was the Bynoe's gecko (*Heteronotia binoei*) (see FaunaTrack, 2018), however the natural distribution of this species in the area is unknown and most likely transported to the area (Bush et. al. 2010).

Skinks (12 species) were the most abundant and speciose group detected during the current survey. While three species of legless lizard and three species of snake were also recorded, along with two gecko species, and a single species of dragon lizard and a freshwater turtle. This also included the conservation significant Priority 3 Perth-lined slider (*Lerista lineata*), and the locally significant Western bluetongue (*Tiliqua occipitalis*) (see Table 3).

The limestone ridge habitats supporting shrublands appeared to support the highest reptile diversity, with 16 species recorded across the combination of sites 2(10), 5(11) and 6(11). This habitat also appeared to support four species that were not detected in other habitats. These include: Southern spiny-tailed gecko (*Strophurus spinigerus*), Western bearded dragon (*Pogona minor*), Gray's Delma (*Delma grayii*), Burton's snake-lizard (*Lialis burtonis*), Limestone Ctenotus (*Ctenotus australis*) and Black-striped snake (*Neelaps bimaculatus*). While the wetland habitats only appeared to support three species (Oblong turtle, King skink and Dugite), with many Oblong turtle (*Chelodina oblonga*) nests recorded in and around the perimeter of the wetland and extending into parkland habitats. The King skink (*Egernia kingii*) was only recorded within the *Melaleuca* forest surrounding the lake, while the Dugite (*Pseudonaja affinis*) was observed opportunistically crossing the walking path during targeted surveys, as well as throughout the remainder of the reserve. No pitfall or funnel traps were installed in the wetland habitat, so reptile captures were low and targeted searches failed to detect any additional species. The Tuart woodlands were moderately diverse, with 11 species detected here, three of which were not detected in other habitats: Marbled Gecko, South-west four-toed Lerista and West coast pale-flecked Morethia. While the woodland habitats supporting *Eucalyptus decipiens* recorded nine reptile species, with a combination of species regularly detected at all other habitats (excluding the wetland), including Sandplain worm-lizard (*Aprasia repens)*, West coast Ctenotus (*Ctenotus fallens)*, Two-toed mulch-skink (*Hemiergis quadrilineata)*, Dwarf skink (*Menetia greyii)* and Bobtail (*Tiliqua rugosa*).

The Perth lined slider was the only reptile species of conservation significance recorded during the current survey, detected on 10 separate occasions in limestone ridge habitats including the heathy shrublands of Site 2 and *Acacia* dominated shrublands of Site 6. Several detections were also made in the Redheart (*Eucalyptus decipiens*) woodland at Site 1, while a single individual was unearthed from beneath *Acacia* litter during targeted searches. The Perth-lined slider has previously been detected from the reserve (FaunaTrack 2018; WASAH, 1999), with all previous records located within the limestone ridge habitats (DBCA, 2023b; FaunaTrack, 2018). The Perth lined slider is largely restricted to the Swan Coastal Plain, from East Fremantle in the north (including Rottnest and Garden Islands) to Mandurah in the south, where it is found on coastal dunes supporting heath and shrublands, and *Banksia* and/or Eucalypt woodlands with pale sand on coastal plains, where it shelters in the loose upper soil, leaf litter and under logs. Its core range is centred around the highly disturbed southern Perth metropolitan areas, however much of its habitat has been destroyed through urbanisation and it is now restricted to remnant bushland areas and suburban gardens, where it is subject to a range of threats including weeds, fires, introduced predators and further habitat clearing and fragmentation (Maryan et. al. 2015). The high-quality shrublands and extensive ground litter occurring throughout much of the limestone ridge habitats in Manning Park are an important habitat and distributional stronghold for this species, particularly as Manning Park represents the a large part of the northerly distribution for the species along the coastline.

Few other species of conservation significance have the potential to occur within the reserve. Species such the Black-striped snake (*Neelaps calonotos*) may occur in the reserve. The Black-striped snake is confined to the Swan Coastal Plain from Dongara in the north to Mandurah in the south, where it is an inhabitant of coastal dunes and sandplains supporting *Banksia*/Eucalypt woodlands and heath. It is a fossorial species, sheltering in leaf litter and soil at the base of trees and shrubs, where it feeds exclusively on lizards, particularly *Lerista* and *Aprasia* (Bush et. al. 2010). It is generally more common north of Perth, particularly large bushland areas north of Alkimos, with records south of Perth uncommon to scarce, with most occurring from the larger inland reserves such as Jandakot Airport or coastal heath between Peron and Mandurah (He, 2021). Much of its distribution in the greater Perth metropolitan area has, and continues to be threatened by habitat loss through increased urban developments, and as such, this species is becoming increasingly restricted to these larger bushland remnants and becoming harder to find. A nearby record exists from Woodman Point (DBCA, 2023b) approximately 4km south of the study area, however this record is from 1965 and bushland in the local area was most likely much more connected and it is thought that *N. calonotos* populations may not persist in bushland areas of less than 1000 hectares (see How & Shine 1999; Bamford & Wilcox 2005).

In addition, the Western carpet python (*Morelia spilota imbricata*) is known to persist in large bushland remnants supporting woodlands and coastal limestone, however, most recent records are also from north of the Swan River (Bush et. al. 2010). Records further south are scarce, with no known recent records nearby to the reserve. While the Jewelled Ctenotus (*Ctenotus gemmula*) may also be absent from the reserve. This species is primarily an inhabitant of *Banksia* woodland with low vegetation (Bush *et. al.* 2010), a habitat generally absent from the reserve. There are no nearby records and recent records are generally scarce, most also being north of the Swan River as much of its former range south of the river has been cleared for developments (Bush *et al.* 2010).

Other notable reptile records from reserve included the locally significant Western bluetongue (*Tiliqua occipitalis*) and the potentially, locally restricted King Skink (*Egernia kingii*) and habitat restricted South-west four-toed Lerista (*Lerista distinguenda*).

The Western bluetongue was detected on several occasions in the limestone ridge habitats on cameras FA2 and FC9. The reserve represents the near southern distributional limit of for this species, which is reliant on large, undisturbed bushland areas, particularly with low, dense vegetation (Bush *et. al.* 2010). The Western bluetongue has previously been detected in the reserve on several occasions (ALA, 2023; WASAH, 1999) and is also known from adjoining bushland areas including CY O'Connor Reserve to the west and bushland areas to the south (pers. obs.) This species most likely persists due to the size and condition of bushland in the reserve and proximity to nearby bushland, creating a semi-connected habitat corridor through to the Woodman Point area and further to the south-east into Beeliar Regional Park.

The South-west four-toed Lerista is predominantly restricted to the Darling Range, however scattered populations occur along the Swan Coastal Plain, where it generally prefers woodlands on harder soils (Bush et. al. 2007). This species was only detected in the harder soils and rocky substrates of the Tuart woodlands within the reserve. Other nearby records include CY O'Connor Reserve (DBCA, 2023c) and Booyeembara Park in Fremantle (ALA, 2023), which also support harder, rocky substrates with Eucalypts. This habitat is not well represented within Manning Park or the local area, with remaining woodlands becoming degraded or isolated.

A population of the King skink inhabiting remnant vegetation around the lake is of interest. Although not of conservation significance, this represents a significant locality, as there are few known populations in the area, most separated by large expanses of urban development. The nearest known records are approximately 3.5km to the south at Lake Coogee (pers. obs.) and further to the north along the Swan/Canning Rivers (Bush et. al. 2010). However, unconfirmed records exist 5km to the east at North Lake (see Cornwall 2004), otherwise there seems to be no apparent records from the eastern Beeliar wetland chain. King skinks inhabit rocky outcrops and coastal heath or shrublands, often in association with limestone outcropping, where they shelter in rock crevices and tree hollows (Wilson & Swan, 2021). Being a large skink (up to 40 cm total length), they are extremely susceptible to predation by feral predators and domestic animals, particularly cats, with observations of up to four King skinks found in the stomach of a single feral cat (see Maryan et al 2017). No detections were made in the limestone ridge habitats, with all records from the wetland habitats. The area around the lake inhabited by the King skink contains large, hollow bearing trees (*Melaleuca* and *Eucalyptus* spp.), with a dense understorey providing ample shelter and foraging habitat. The area between the lake and the surrounding bushland is predominantly open parkland, with few areas of suitable cover, possibly restricting movements of the lizard into nearby bushland areas. The highly disturbed and fragmented coastal plain has no doubt affected the local distribution of this lizard, with fragmentation and clearing leaving lizards exposed to predation.

Figure 6. (a) The conservation significant (Priority 3) Perth-lined Slider (*Lerista lineata*) was captured on several occasions in limestone ridge habitats and low open woodland; (b) The habitat restricted Southwest four-toed Lerista (*Lerista distinguenda*) was only detected in Tall (Tuart) woodland habitats; (c) The locally significant Western bluetongue (*Tiliqua occipitalis*) was detected on several occasions on motion cameras; (d) The uncommon, and locally restricted King skink (*Egernia kingii*) was commonly detected in wetland habitats surrounding the lake.

Table 3. Reptiles expected to occur, known to occur and/or recorded during the current survey at Manning Park.

Species		Status	Likelihood	Trapping site						Targeted / opp
				1	2	3	4	5	6	
Cheluidae (Freshwater turtles)										
Oblong Turtle	*Chelodina oblonga*		Known			x				+
Agamidae (Dragon Lizards)										
Dwarf Bearded Dragon	*Pogona minor*		Known					1		+
Western Heath Dragon	*Ctenophorus adelaidensis*		Unlikely							
Diplodactylidae (Gondwanan Geckos)										
Southern Spiny-tailed Gecko	*Strophurus spinigerus*		Known		3			2	1	+
Gekkonidae (Cosmopolitan Geckos)										
Marbled Gecko	*Christinus marmoratus*		Likely				1			
Bynoe's Gecko	*Heteronotia binoei*		Known							
Pygopodidae (Legless Lizards)										
Sandplain Worm Lizard	*Aprasia repens*		Known	3	1		1	1		
Fraser's Legless Lizard	*Delma fraseri*		Likely							
Gray's Legless Lizard	*Delma grayii*		Known		1					
Burton's Snake Lizard	*Lialis burtonis*		Known		5			3	2	
Keeled Legless Lizard	*Pletholax gracilis*	L	Likely							
Common Scaly-foot	*Pygopus lepidopodus*		Likely							
Scincidae (Skinks)										
Southwest Cool Skink	*Acritoscincus trilineatus*	L	Likely							
Fence Skink	*Cryptoblepharus buchananii*		Known	2			3		1	+
Limestone Ctenotus	*Ctenotus australis*		Known		1				1	
West Coast Ctenotus	*Ctenotus fallens*		Known	11			4	14	4	+
Jewelled Ctenotus	*Ctenotus gemmula*	P3	Unlikely							
King Skink	*Egernia kingii*		Known			11				+
South-west Crevice Skink	*Egernia napoleonis*	L	Possible							
Two-toed Mulch Skink	*Hemiergis quadrilineata*		Known	9	3		4	1	4	+
South-west four-toed Lerista	*Lerista distinguenda*		Likely				22			
West-coast four-toed Lerista	*Lerista elegans*		Likely							
Perth Lined Slider	*Lerista lineata*	P3	Known	1	4				6	+
Line-spotted Lerista	*Lerista lineopunctata*		Possible							
Worm Lerista	*Lerista praepedita*	L	Possible							
Western Swamp Skink	*Lissolepis luctuosa*	L	Possible							
Dwarf Skink	*Menetia greyii*		Known	21	4		3		3	+
West Coast Morethia	*Morethia lineoocellata*		Likely				3			
Obscure Skink	*Morethia obscura*		Known				10		1	+
Western Blue-tongued Lizard	*Tiliqua occipitalis*	L	Known							+
Bobtail	*Tiliqua rugosa*		Known	10	6		9		5	+
Varanidae (Goannas)										
Gould's Goanna	*Varanus gouldii*		Possible							
Rosenberg's Goanna	*Varanus rosenbergi*	L	Unlikely							
Pythonidae (Pythons)										
Western Carpet Python	*Morelia spilota imbricata*	S	Possible							
Typhlopidae (Blind Snakes)										
Southern Blind Snake	*Anilios australis*		Known	1				5		
Elapidae (Front-fanged Land Snakes)										
Narrow-banded Shovel-nosed Snake	*Brachyurophis fasciolatus*		Unlikely							
Southern Shovel-nosed Snake	*Brachyurophis semifasciatus*		Possible							
Yellow-faced Whipsnake	*Demansia reticulata*	L	Possible							
Black-naped Snake	*Neelaps bimaculatus*		Known		2				1	
Black-striped Snake	*Neelaps calonotos*	P3	Possible							
Tiger Snake	*Notechis scutatus*		Likely							
Gould's Hooded Snake	*Suta gouldii*		Possible							
Dugite	*Pseudonaja affinis*		Known	3		x	1	1		+

Species		Status	Likelihood	Trapping site						Targeted / opp
				1	2	3	4	5	6	
Jan's Banded Snake	*Simoselaps bertholdi*		Likely							
Species expected	**44**	**Total species**		9	10	3	11	8	11	
Species recorded during 2023	**23**									

S = Specially Protected (BC Act)

P3 = Priority 3 (DBCA)

L = Locally significant due to a reduced distribution and/or population on the Swan Coastal Plain (Government of WA 2000)

3.4.3 Mammals

Twelve species of mammal were recorded during the current survey (Tables 4 and 6). Of these however, six are introduced and further five are insectivorous micro-bats. Subsequently, the Quenda (*Isoodon fusciventer*) was the only species of native, terrestrial mammal detected, and the only mammal of conservation significance detected during the current survey. Apart from anecdotal reports that Quenda inhabit Manning Park, this also formally includes Quenda in the species list for the reserve, as up until now, no official records were known from the reserve on public databases. The nearest confirmed records were from two animals just to the south and south-west of the reserve along Spearwood and Cockburn roads (DBCA, 2023b), which suggests that Quenda do occur in the reserve.

However, with this known, only a single Quenda was captured during the survey, despite 300 trapping nights across all trap locations. Several motion cameras did however detect Quenda, with further detections made across five motion cameras (FA7, FB7, FC2, FC3, and FD3). Several Quenda diggings were also recorded during targeted surveys.

All Quenda detections were from limestone ridge habitats, which generally consisted of a shrublands and heath with a dense, low shrub cover, a habitat requirement for the species. In addition, most Quenda were detected on the western side of the limestone ridge, as well as isolated detections in the north and south of the reserve. Quenda are generally known to inhabit a range of forest, woodlands and wetlands, providing there is sufficient low vegetation and habitat connectivity (Paull, 2008), however, no detections were made in the remaining habitats, including the well-vegetated wetland habitats. Quenda, were also recorded in dense thickets of the introduced tea-tree (*Leptospermum laevigatum*). The tea-tree is a established weed, that dominates the vegetation in the south-western part of the reserve, this also occurs in scattered localities throughout the reserve where it grows in disturbed sites and outcompetes local vegetation due to it dense, sprawling canopy and dense leaf-litter mats. As much of the south-western part of the reserve is disturbed to degraded, this habitat may currently play a role as a habitat corridor. The western and southern parts of the reserve are also the closest proximity to neighbouring bushland areas, such as those associated with the Fremantle rail corridor and further south of rail line towards Coogee. Although separated by major roads including Cockburn and Spearwood Roads, and the rail line, this part of the reserve may act as an important area, facilitating movement of Quenda within the reserve and to neighbouring bushland areas. The entire eastern edge of the reserve, including the wetland, is either isolated from adjacent bushland areas or adjoins residential development. These areas may not act as suitable areas for the Quenda to occur, or at least regularly frequent. Further surveys along the eastern edge of the reserve may help to further confirm Quenda presence/absence.

Few other mammal species of conservation significance are expected to occur within the reserve. A single Quokka record exists from approximately 1.1km northwest of the reserve, which represents a moderately certain observation of dead specimen on South Beach in 2009 (DBCA, 2023b). This may potentially be a beach-washed animal; however, the Quokka is assumed to be locally extinct in the immediate mainland area and highly unlikely to be present within the reserve or the local area.

The Specially Protected Brush-tailed phascogale (*Phascogale tapoatafa*) is a possibility to occur in the reserve, with known historical records from nearby, including a recent sighting 3.5km away on Rockingham Road in Lake Coogee in 2022 (DBCA, 2023b). The Brush-tailed phascogale is extremely rare in the greater Perth metropolitan area, with the only other nearby record being from the 1970's in Harry Waring Nature Reserve (DBCA, 2023b). Phascogales are typically associated with open forest containing sparse groundcover (Soderquist & Rhind, 2008), in particular the Tuart forests further south and Jarrah forests of the Darling Range. Suitable habitat occurs within the reserve of potential to support Brush-tailed phascogales, however overall suitable habitat is small and isolated, and it is unlikely that the species occurs or persists in the reserve. Further surveys, particular motion camera surveys of longer duration may help to confirm its presence.

The Priority 4 listed Western false pipistrelle (*Falsistrellus mackenziei*) may occasionally use the reserve. Although primarily an inhabitant of Eucalypt forests and woodlands of the lower south-west, it also occurs in *Banksia* woodlands on the Swan Coastal Plain, and favours tree hollows as roost sites (Churchill, 1998). Due to significant large trees and tree hollows within the reserve, there is potential for the species to roost in or nearby the reserve, or possibly forage within and around the reserve. Few records are known from Swan Coastal Plain around Perth, with only one nearby record from Thomson's Lake Nature Reserve (DBCA, 2023b), with the species being rarely detected. Otherwise, micro-bat diversity was relatively high, with five of a possible eight species being detected (Tables 4 and 5). All six sites (habitats) recorded the Gould's wattled bat (*Chalinolobus gouldii*), with this species being extremely adaptable, found in almost all habitats including urban areas (Churchill, 1998). The White-striped mastiff bat (*Austronomus australis*) was found at all sites except the wetland (Site 3). This species forages in a wide variety of habitats, however it tends to forage at much higher altitudes than other species, often 50m or more above the ground (Churchill, 1998). The dense canopy cover in the wetland habitats may have prevented the ultrasonic recorder from detecting this species. The wetland however, was the only location where the Lesser long-eared bat (*Nyctophilus geoffroyi*) was detected, with this species preferring to fly much lower, usually 6-10m from the ground, but often 1-4m in open areas (Churchill, 1998). Additionally, the Southern forest bat (*Vespadelus regulus*) was only detected at Site 4 and 6 and Western free-tail bat (*Ozimops kitcheneri*) also at site 6. These two species are often associated with tall forests habitats (Churchill, 1998), with both sites 4 and 6 within or near tall forest/woodland habitats. Although none of the confirmed species are of conservation significance, most insectivorous bats on the Swan Coastal Plain in the greater Perth metropolitan area are often regarded as locally significant (i.e. GHD, 2019), and the detection of a high diversity of species highlights the conservation significance of the reserve.

The locally significant Honey possum (*Tarsipes rostratus*) and Common brushtail possum (*Trichosurus vulpecula*) may occur in the reserve. Honey possums in particular rely on diverse, long-unburnt *Banksia* woodlands which provide a food source (nectar and pollen) all year round, which the reserve provides (*Banksia sessilis* and other proteaceous shrubs on the limestone ridge), however, the species is becoming increasingly scarce on the Swan Coastal Plain around Perth, mainly due to the reduction and degradation of *Banksia* woodland by increased urban development, fire and dieback (Bradshaw, 2014) and there are only a handful of records known from the broader area (i.e. Harry Waring Marsupial Reserve; DBCA, 2023b). The isolation of the reserve may limit their occurrence and further survey work is required to help determine their presence in the reserve. No detections were made of the Brushtail possum during the current surveys, however possums are also becoming increasingly scarce on the Swan Coastal Plain, mainly due to habitat fragmentation through increased urban development, fire and also predation by feral and domestic predators and road mortality. Few records are known from nearby, with almost all records associated with areas along the eastern Beeliar lake chain. Possums are reliant on large, hollow bearing trees, which are well represented within the reserve, with several trees containing large hollows suitable for possums (Appendix 9). Possums however may be susceptible to predation by feral predators and possibly domestic dogs, or succumbing to road deaths due to the close proximity to major roads, and isolation from any nearby suitable habitat.

Six introduced mammal species were recorded during the current survey, however this included observations of Domestic dogs on motion cameras. Subsequently, five species of introduced feral species were detected. The House mouse (*Mus musculus*) was detected at all trapping sites and on six of the 16 motion cameras. However, only a single capture was made at the woodland site 4 and the *Acacia* shrublands of site 6. The Black rat (*Rattus rattus*) was infrequently captured at trapping sites 2, 3, 4 and 6, however it was readily detected on 10 of the 16 motion cameras. While up to four individual Cats (*Felis catus*; feral/stray) were detected on motion cameras FA6 and FB2 in the far north of the reserve. Two additional cat sightings were also made in the north of the reserve during targeted surveys. Only a single detection was made of the Red fox (*Vulpes vulpes*), with an animal detected on camera FC8 in the northeastern side of the lake. Most Rabbit (*Oryctolagus cuniculus*) detections were made in the degraded habitats in the south-west of the reserve, with motion cameras FA2, FB7 and FD3 all detecting rabbits, while several diggings, scat piles (buckheaps), warrens and live individuals were also observed in the south-west of the reserve.

Table 4. Mammals expected to occur, known to occur and/or recorded during the current survey at Manning Park

Species		Status	Likelihood	Trapping site						Targeted / opp
				1	2	3	4	5	6	
Tachyglossidae (Echidnas)										
Echidna	*Tachyglossus aculeatus*		Unlikely							
Peramelidae (Bandicoots)										
Quenda	*Isoodon fusciventer*	P4	Likely		1					+
Dasyuridae (Carnivorous marsupials)										
Brush-tailed Phascogale	*Phascogale tapoatafa*	S	Possible							
Macropodidae (Kangaroos & Wallabies)										
Western Grey Kangaroo	*Macropus fuliginosus*		Unlikely							
Quokka	*Setonix brachyurus*	VU	Unlikely							
Phalangeridae (Brushtail Possums)										
Brush-tailed Possum	*Trichosurus vulpecula*	L	Possible							
Tarsipedidae (Honey Possum)										
Honey Possum	*Tarsipes rostratus*	L	Likely							
Molossidae (Free-tail Bats)										
White-striped Mastiff Bat	*Austronomus australis*		Known							+
Western Free-tail Bat	*Ozimops kitcheneri*		Likely							+
Vespertilionidae (Vespertilionid Bats)										
Southern Forest Bat	*Vespadelus regulus*		Likely							+
Gould's Wattled Bat	*Chalinolobus gouldii*		Known							+
Chocolate Wattled Bat	*Chalinolobus morio*		Possible							
Western False Pipistrelle	*Falsistrellus mackenziei*	P4	Possible							
Lesser Long-eared Bat	*Nyctophilus geoffroyi*		Known							+
Greater Long-eared Bat	*Nyctophilus major*		Possible							
Muridae (Rate and Mice)										
House Mouse	*Mus musculus*	*	Known	8	7	9	1	8	1	+
Brown Rat	*Rattus norvegicus*	*	Likely							
Black Rat	*Rattus rattus*	*	Known		1	4	1		1	+
Leporidae (Rabbit)										
European Rabbit	*Oryctolagus cuniculus*	*	Likely							+
Canidae (Fox and Dog)										
Domestic Dog	*Canis lupus familiaris*	*	Likely							+
European Red Fox	*Vulpes vulpes*	*	Known							+
Felidae (Cats)										
Cat	*Felis catus*	*	Likely							+
Species expected	**22**	**Total species**		1	2	1	1	1	1	
Species recorded during 2023	**12**									

VU = Vulnerable (EPBC and/or BC Act)

S = Specially protected (BC Act)

P4 = Priority 4 (DBCA)

L = Locally significant due to a reduced distribution and/or population on the swan coastal plain (Government of WA 2000), or at extreme limit of distribution

*** = Introduced species**

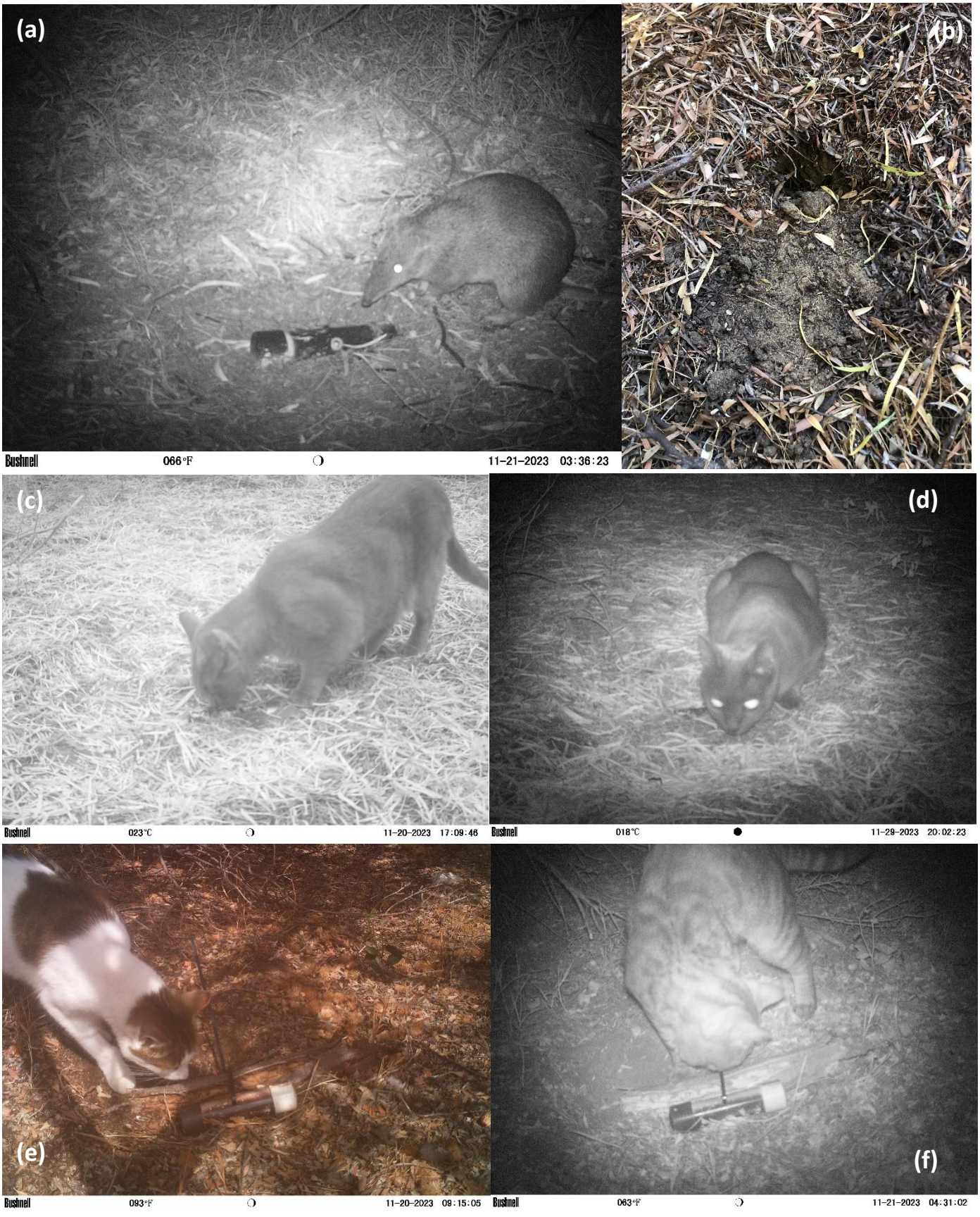


Figure 7. (a) The conservation significant (Priority 4) Quenda (*Isoodon fusciventer*) was readily detected on motion cameras on the limestone ridge, but rarely captured in traps; (b) Quenda diggings were also detected in the southwest of the reserve; (c-f) Four, uncollared Cats (*Felis catus*) detected on motion cameras; (g) The Red fox (*Vulpes vulpes*) was detected twice from motion cameras; (h) Rabbits (*Oryctolagus cuniculus*) were detected from cameras, scats and burrows, particularly in the southwest of the reserve.

Table 5. Results of bat call recording analysis outlining the date, site and species detected at each site at Manning Park

Date	Site	Species
16-Nov-23	4	*Austronomus australis* *Chalinolobus gouldii* *Vespadelus regulus*
17-Nov-23	1	*Austronomus australis* *Chalinolobus gouldii*
18-Nov-23	2	*Austronomus australis* *Chalinolobus gouldii*
19-Nov-23	5	*Austronomus australis* *Chalinolobus gouldii*
20-Nov-23	6	*Austronomus australis* *Chalinolobus gouldii* *Ozimops kitcheneri* *Vespadelus regulus*
21-Nov-23	3	*Chalinolobus gouldii* *Nyctophilus geoffroyi*

Table 6. Motion camera number and species detected on each camera (represented by an '+') at each camera location at Manning Park.

Species/Camera	FA1	FA2	FA6	FA7	FA10	FB1	FB2	FB3	FB7	FC2	FC3	FC6	FC8	FC9	FD3	FD6
Quenda				+					+	+	+				+	
Black Rat		+			+	+	+	+	+			+	+		+	+
Cat			+				+									
King Skink																
Fox									+				+			
House mouse	+				+					+	+			+		+
Buff-banded rail	+															
Bobtail		+		+	+	+	+	+	+		+	+			+	+
Spotted dove		+														
Rabbit		+							+						+	
Raven		+														
Western bluetongue		+												+		
Painted button-quail					+											
Domestic dog						+										
Scrub-wren							+									
Laughing dove								+								
Magpie																+

3.4.4 Birds

Sixty-nine species of bird were recorded during the current survey, which is 40% of a predicted 173 of potential species to occur in the reserve, or 63% of a total 109 bird species that have previously been recorded in the reserve (Table 7). Of the total potential species, up to 28 species of conservation significant bird species are known or have the potential to occur. However, only five species of conservation significance were detected during the current survey (Table 7): The EPBC and BC Act listed Endangered Carnaby's cockatoo (*Zanda latirostris*), EPBC and BC Act listed Vulnerable Forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*), and EPBC Act listed Marine Pied stilt (*Himantopus himantopus leucocephalus)*, Rainbow bee-eater (*Merops ornatus*) and White-bellied sea-eagle (*Haliaeetus leucogaster*).

The greatest bird diversity was in and around the wetland habitats of Site 3, with 45 species detected. This included 26 species that were not detected elsewhere in the reserve. All these species however, excluding the Magpie-lark, are predominantly wetland/and or coastal waterway species (i.e. ducks, grebes and cormorants), and besides the occasional flyover, are not generally seen away from wetland or coastal marine habitats. The wooded habitats of sites 1 and 4 yielded over 20 species of birds, with these sites (including site 3) recording a larger percentage of woodland and/or open parkland species such as the Galah, Little corella, Australian ringneck, Tawny Frogmouth, Southern Boobook, Striated pardalote, Mistletoebird, Australian Magpie and Yellow-rumped thornbill. Site 2 also recorded a selection of woodland species, however these were almost always associated with the wooded habitats on the lower limestone slopes. In particular, the Rainbow bee-eaters at this site were associated with the sandy track at the base of the hill, where several active nests were also detected. This was also the only detection made of the Spotted pardalote, which also nests on the ground in similar habitats to the Rainbow bee-eater (sandy banks and open areas on the edge of tracks). Sites 2, 5 and 6 generally included lower species diversity, though mainly recorded species associated with low, dense vegetation and included several species not detected in other habitats including White-cheeked honeyeater, Painted-button quail and Variegated fairy-wren. These habitats were also where the only observations of the Black-shouldered kite and Square-tailed kite were made, with these species possibly surveying the more open canopy structure of these areas.

Carnaby's cockatoo was detected across all habitats within the reserve, confirmed on 21 separate occasions during the current survey. Observations included live birds observed within and flying over the reserve, and also foraging signs left by birds. An observation included nine birds feeding on Eucalypts and *Melaleuca* fringing the south-east of the lake (Figure 8b), while an additional observation was made of seven birds gathered in the large Tuart adjacent to parkland habitats, which included two birds were observed prospecting hollows in the tree, before they were all disturbed by galahs (Figure 8a). Observations also included flocks of up to 20 individuals flying over the reserve and a further 14 separate foraging signs (*Banksia* spikes, pinecones and *Callitris* nuts) detected within the reserve. Carnaby's cockatoo's have previously been, and are regularly, recorded in Manning Park and the reserve is of high importance for the species, containing suitable foraging habitat (Proteaceous shrubland, *Eucalypt* woodlands and scattered pine trees), and known or potential roosting habitat and breeding habitat. Carnaby's cockatoo is endemic to the south-west of Western Australia. They typically breed in the wheatbelt region of Western Australia, where nesting primarily occurs in smooth-barked Eucalypts but are also known to nest in Tuart, Jarrah, Marri and Flooded Gums. They then move westwards onto the Swan Coastal Plain after breeding (late-spring to mid-winter) into near coastal *Banksia* woodlands and pine plantations, including the southern Perth metropolitan area, with large flocks often seen. Important food sources include *Banksia attenuata, B. menziesii*, *B. grandis, B.ilicifolia, B. sessilis, B. prionotes,* Marri (*Corymbia calophylla*) and Jarrah (*Eucalyptus marginata*). The species however has suffered a substantial decline in the last 50 years, particularly through clearing and fragmentation of habitat, with the loss of breeding hollows, increase of hollow competitors (i.e. galahs & bees), and vehicle strikes contributing a large part. On the Swan Coastal Plain Carnaby's cockatoo have changed their migration and foraging patterns in response to ongoing habitat destruction and discovery of new food sources, with locations of roosting sites and foraging areas often changing from year to year. Carnaby's cockatoo has started breeding

further south and west, including parts of the Darling Range and Swan Coastal Plain, however breeding records on the coastal plain are generally south of Baldivis (Johnstone et al 2011).

The Forest red-tailed black cockatoo was predominantly detected in the eastern and northern parts of the reserve, mainly in habitats containing large Eucalypt species, where in was confirmed on seven separate occasions during the current survey. Observations included live birds observed within and flying over the reserve, and also foraging signs left by birds. Observations also included flocks of between 3-12 birds observed feeding on Tuart nuts on three occasions, as well as three instances of small flocks of 4-6 birds flying over the reserve. Two individuals were also observed prospecting tree hollows in a large, smooth-barked Eucalypt in parkland habitats and another three observed feeding in a large Cape Lilac tree on Quarry Road adjacent to the reserve. Forest red-tailed black cockatoo's have previously, and are regularly recorded in Manning Park, including similar observations on the Quarry Road Cape Lilac (see Johnstone et. al. 2017), with the reserve being of high importance for the species, containing suitable foraging habitat (*Eucalypt* woodlands), as well as potential roosting and breeding habitat. The Forest red-tailed black cockatoo is endemic to the south-west corner of Western Australia where it is distributed from Gingin in the north, to as far east as Brookton and south-east as Green Range, and throughout much of the remaining south-west. Although once common, it is now patchily distributed through this region and is regarded as rare on the Swan Coastal Plain, however recent changes in foraging ecology in the northern Darling Range has seen the species slowly expand out onto the sandplains to the south of Perth, which has been attributed to their discovery of the introduced Cape Lilac. This change in foraging ecology has since seen the establishment of roosting sites on the coastal plain, as well as a small number of breeding locations (Johnstone et. al. 2017). On the coastal plain it feeds a variety of plant seeds including Jarrah and Marri, Tuart or She-oak and Cape Lilac and will roost in any tall trees, but prefers Jarrah, Marri or Tuart, and breeding has been recorded in November to December (Johnstone et. al. 2011).

The Rainbow Bee-eater (*Merops ornatus*) which was observed on several occasions throughout reserve, with both live individuals and active nests detected. Live birds were mainly observed in open parkland and woodland habitats, particularly in the north of the reserve, but also around the lake and the powerline track. The Rainbow bee-eater has previously been recorded in the reserve (Birdlife, 2023a) and is most likely a regular summer visitor/breeder in the reserve. Ranging from scarce to common throughout much of Western Australia, Rainbow bee-eaters inhabit lightly wooded landscapes with open sandy country, often near water. It can occur as either a resident, a breeding visitor or winter visitor to Western Australia, where it moves to the southwest during spring to breed, whereby nests are created in burrows, dug into sandy ground, often open areas including sandy banks and edges of roads and tracks (Johnstone & Storr, 1998). Nesting sites were generally observed in the open, disturbed areas, in particular the sandy, track edges in the north of the reserve.

The White-bellied sea-eagle was only recorded on a single occasion, with a brief observation of a young individual flying over the lake. The White-bellied sea-eagle is generally rare to uncommon in the area, where it is a casual visitor to rivers and near coastal wetlands on the west coast (Johnstone & Storr, 1998). Previously unrecorded in the reserve, nearby records exist from nearby Lake Coogee, Woodman Point and the eastern Beeliar wetland chain (Birdlife, 2023a), where it mainly feeds on fish and nestling seabirds, and has been known to take King skinks (Johnstone & Storr, 1998), which are present in large numbers around the lake.

Other species of conservation significance known to occur in the reserve, though not detected during the current survey include: Blue-billed duck (*Oxyura australis*) (6 sightings) (Birdlife, 2023a, 2023b; DBCA, 2023b), Peregrine falcon (1 sighting) (Birdlife, 2023a, 2023b), Baudin's cockatoo (1 sighting) (Birdlife, 2023a, 2023b), and Common greenshank (2 sightings) (Birdlife, 2023a, 2023b; DBCA, 2023b). Manning Lake may be an important habitat for the Blue-billed duck, as the species is an inhabitant of large permanent, open wetlands and densely vegetated lakes, particularly those with significant aquatic vegetation and fringing reeds and bullrush for nesting in which they rely on in the breeding season (November-March). Waterbodies also need to be large enough (>140 metres in size) to allow birds to enter and exit

(Cull et. al. 2021). As the lake does dry up significantly during the summer months, the lake may only be suitable during the wetter times of the year.

In addition, many other migratory, wading and wetland species are known from nearby lakes, wetlands and the coastline (see Appendix 11) and may use the reserve on occasion. Many of these species however are mainly associated with tidal mudflats, and rarely found far from the coast or inland freshwater wetlands (Geering et. al. 2007). Some of these species may only utilise Manning Lake when the water levels are low and there are large areas of shallow water and exposed mudflats. The water level in Manning Lake during the current survey was high, with very little exposed areas in and around the lake. In particularly, much of the shoreline and fringing swamp habitats were inundated. Besides occasional detections of Pied stilts, there was no sign of wading birds. Previous surveys have observed up to 87 Pied stilts on the lake in January when the lake was mostly dry (Western Wildlife, 2010). An extensive wetland and migratory shorebird survey was undertaken in 2010, which included Manning Lake and involved surveys on a monthly basis for a 12-month period (see Western Wildlife, 2010). Of the 32 wetland bird species known to occur in the reserve, 20 were detected during these surveys. Bird species and densities fluctuated throughout the year dependent on the level of water in the lake, however species diversity and abundance were generally low, suggesting that the lake is unlikely to support significant numbers of waterbird, with known conservation significant species such as the Common greenshank unlikely to regularly visit the lake (Western Wildlife, 2010). Additional surveys also suggest that the Common greenshank is an infrequent occurrence at the lake (Birdlife, 2023b), and although the species is associated with coastal, freshwater wetlands (Geering et. al. 2007), this species is more readily encountered in larger wetland systems such as Lake Coogee and the eastern Beeliar wetland chain (Birdlife, 2023a).

Baudin's Cockatoo is also unlikely to regularly use the reserve. Baudin's cockatoo is endemic to the south-west of Western Australia. It is primarily a resident of the deep south-west where it inhabits eucalypt forests, particularly Jarrah-Marri woodlands and Karri forests and forages widely throughout this habitat, with a preference for proteaceous trees and shrubs, particularly *Banksia* spp. The species breeds during September to December in the deep south-west, where they prefer large, vertical tree hollows, and migrate northwards in the autumn where it moves to the central and northern Darling Range and the adjacent far east of the Swan Coastal Plain (Johnstone et al 2011). Only a single record occurs from Manning Park (Birdlife, 2023) and this species is not likely to use the reserve on a regular basis.

The Peregrine falcon was only recently recorded from the reserve in May 2023 (Birdlife, 2023b), which represents the only record for the reserve. This species is considered rare to scarce on the Swan Coastal Plain, however they are often associated with wooded watercourses and lakes, where they feed almost exclusively on birds (Johnstone & Storr, 1998), with the reserve providing ample habitat and food sources and the species may use the reserve more frequently than observations suggest.

The Fork-tailed swift may also occasionally use the reserve. A migratory species that breeds in Asia, it generally arrives in Australia in winter, where it is a regarded as a relatively common visitor. In Australia, the species begins to arrive in the Kimberley in late September, the Pilbara in November and the southwest by mid-December. It is considered uncommon to moderately common and the west coasts, but rare to scarce in the southwest. They respond to broad-scale weather pattern changes and are attracted to thunderstorms. They rarely come to ground, living almost exclusively in the air where they feed on aerial insects (Johnstone & Storr 1998). Few records are known locally, with the closest being from North Coogee, Woodman Point, and North and Bibra Lakes (Birdlife, 2023a; DBCA, 2023b), with the species rarely detected in the region.

Fourteen additional bird species were also recorded which are considered of local conservation significance (see Government of Western Australia, 2000). These include many waterbirds such as Pink-eared duck, Hardhead, Australasian shoveler and Dusky moorhen, as well as a range of specialised bush birds, including Painted button-quail, Square-tailed kite, Brown goshawk, Splendid fairy-wren, Variegated fairy-wren, New-holland honeyeater, White-cheeked honeyeater, Weebill, White-browed Scrub-wren, and Yellow-rumped Thornbill. An additional 11 locally significant bird species have also previously been detected within the reserve that were not detected during the current survey, these include: Musk duck, Nankeen night-heron, Little eagle, Collared sparrowhawk, Whistling kite, Western rosella, Western wattlebird, Inland thornbill, Western golden whistler, Grey shrike-thrush, and Dusky woodswallow. Many of these species have decreased in abundance since European settlement, with many species declining due to land clearing, with many now absent from large parts of the Swan Coastal Plain, with most of these only surviving due to the persistence of some urban remnants (Government of Western Australia, 2000), and the confirmation of these birds at the reserve show a good level of habitat quality and/or connectivity. Of particular note is the presence of the Variegated fairy-wren. This species is uncommon on the Swan Coastal Plain to the south of Perth, where this represents its southern distributional limit where it doesn't generally occur more than 2km from the coast, and closely associated with *Acacia rostellifera* thickets (Johnstone & Storr, 2004), a habitat well represented on the limestone ridge and may be an important stronghold for this species in the local area.

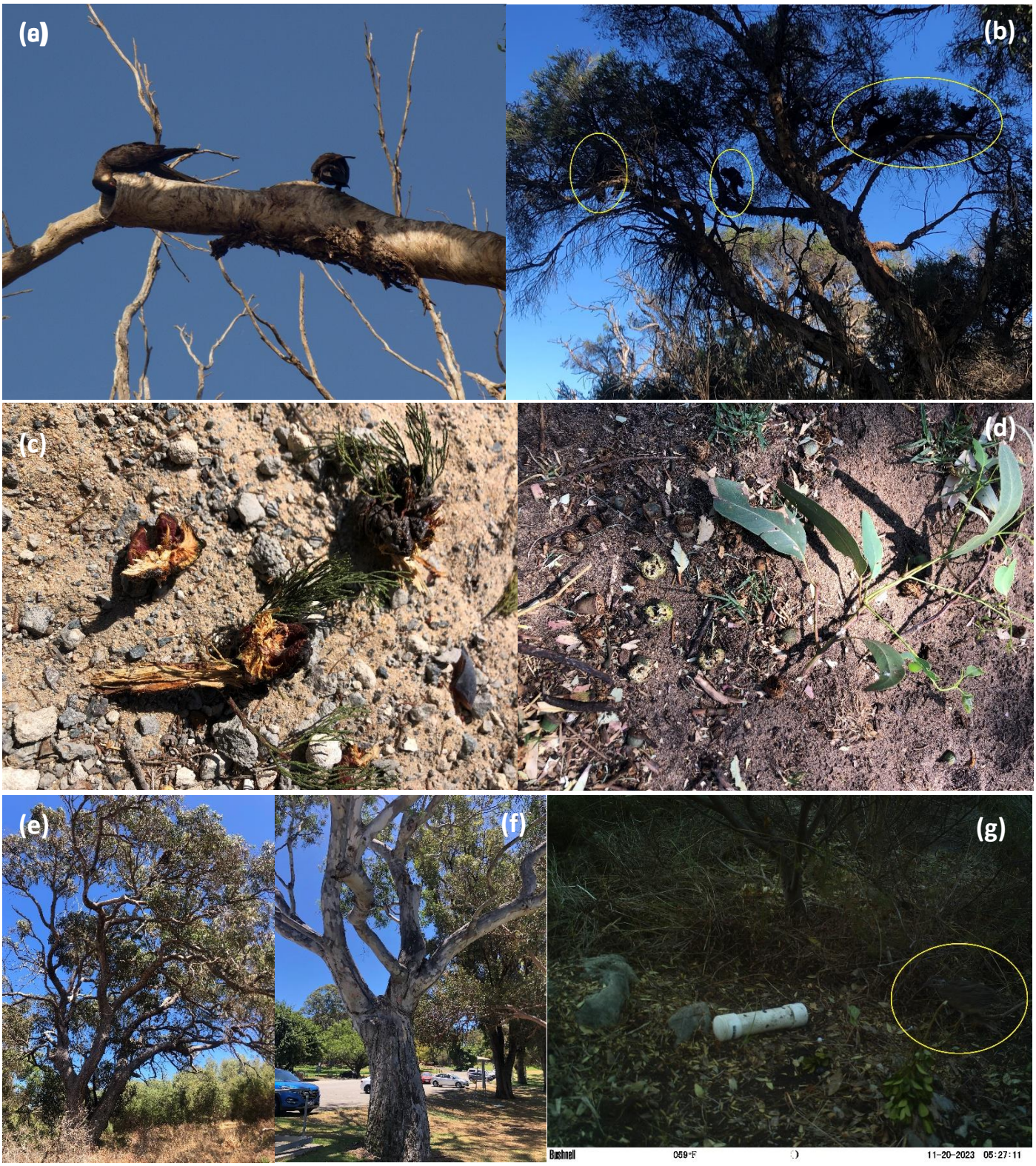


Figure 8. (a) Carnaby's cockatoo observed prospecting tree hollows in a large Tuart during the current survey; (b) Carnaby's cockatoo observed feeding on Swamp paperbark seeds around the wetland; (c) Recent foraging evidence on *Callitris preissii* by Carnaby's cockatoo; (d) Recent foraging evidence on Tuart by Forest red-tailed black cockatoos; (e) Large Tuart in which Carnaby's cockatoo were observed prospecting; (f) Large smooth-barked Eucalypt where Forest red-tailed black-cockatoos were observed prospecting; (g) The locally significant Painted Button-quail (*Turnix varius*) was only detected via motion camera in the dense, heathy shrublands of the limestone ridge.

Table 7. Birds expected to occur, known to occur and/or recorded during the current survey at Manning Park.

Species		Status	Likelihood	Trapping site						Opp
				1	2	3	4	5	6	
Anatidae (ducks & swans)										
Blue-billed Duck	*Oxyura australis*	P4	Known							
Pink-eared Duck	*Malacorhynchus membranaceus*	L	Known			+				
Black Swan	*Cygnus atratus*		Known			+				+
Radjah Shelduck	*Radjah radjah*		Possible							
Australian Shelduck	*Tadorna tadornoides*		Known			+				+
Hardhead	*Aythya australis*	L	Known			+				
Australasian Shoveler	*Spatula rhynchotis*	L	Known			+				
Pacific Black Duck	*Anas superciliosa*		Known			+				+
Mallard hybrid	*Anas sp.*	*	Known							
Grey Teal	*Anas gracilis*		Known			+				+
Chestnut Teal	*Anas castanea*		Possible							
Freckled Duck	*Stictonetta naevosa*	L	Possible							
Musk Duck	*Biziura lobata*	L	Known							
Australian Wood Duck	*Chenonetta jubata*		Known							
Domestic Duck	*Anas platyrhynchos domesticus*	*	Known							
Muscovy Duck	*Cairina moschata*	*	Known							
Domestic Goose	*Anser anser*	*	Known							
Phasianidae (true quails)										
Brown Quail	*Coturnix ypsilophora*		Known							
Stubble Quail	*Coturnix pectoralis*		Possible							
Podicipedidae (grebes)										
Australasian Grebe	*Tachybaptus novaehollandiae*		Known			+				
Hoary-headed Grebe	*Poliocephalus poliocephalus*		Known			+				
Great Crested Grebe	*Podiceps cristatus*		Likely							
Columbidae (pigeons & doves)										
Rock Dove	*Columba livia*	*	Known							
Spotted Dove	*Streptopelia chinensis*	*	Known		+	+	+	+	+	+
Laughing Dove	*Streptopelia senegalensis*	*	Known	+		+				+
Common Bronzewing	*Phaps chalcoptera*	L	Likely							
Crested Pigeon	*Ocyphaps lophotes*		Known	+		+				+
Cuculidae (cuckoos)										
Horsfield's Bronze-Cuckoo	*Chalcites basalis*		Known							
Shining Bronze-Cuckoo	*Chalcites lucidus*		Known							
Fan-tailed Cuckoo	*Cacomantis flabelliformis*		Known							
Pallid Cuckoo	*Cacomantis pallidus*		Likely							
Podargidae (frogmouths)										
Tawny Frogmouth	*Podargus strigoides*		Known		+					+
Apododae (swifts & swiftlets)										
Fork-tailed Swift	*Apus pacificus*	MI	Possible							
Rallidae (crakes & rails)										
Buff-banded Rail	*Hypotaenidia philippensis*		Known			+				+
Australian Spotted Crake	*Porzana fluminea*		Known							
Spotless Crake	*Zapornia tabuensis*		Possible							
Australian Swamphen	*Porphyrio porphyrio*		Known			+				+
Dusky Moorhen	*Gallinula tenebrosa*	L	Known			+				+
Black-tailed Native-hen	*Tribonyx ventralis*		Possible							
Eurasian Coot	*Fulica atra*		Known			+				
Haematopodidae (osyercatchers)										

Species		Status	Likelihood	Trapping site 1	2	3	4	5	6	Opp
Australian Pied Oystercatcher	*Haematopus longirostris*		Possible							
Recurvirostridae (stilts & avocets)										
Banded Stilt	*Cladorhynchus leucocephalus*		Known							
Red-necked Avocet	*Recurvirostra novaehollandiae*	MA	Likely							
Pied Stilt	*Himantopus h. leucocephalus*	MA	Known			+				
Charadriidae (plovers & dotterels)										
Grey Plover	*Pluvialis squatarola*	MI/MA	Possible							
Pacific Golden Plover	*Pluvialis fulva*	MI/MA	Unlikely							
Red-capped Plover	*Charadrius ruficapillus*		Possible							
Black-fronted Dotterel	*Elseyornis melanops*		Known							
Banded Lapwing	*Vanellus tricolor*		Unlikely							
Red-kneed Dotterel	*Erythrogonys cinctus*	L	Possible							
Scolopacidae (sandpipers & stints)										
Bar-tailed Godwit	*Limosa lapponica*	MI/MA	Possible							
Great Knot	*Calidris tenuirostris*	CE	Possible							
Red Knot	*Calidris canutus*	EN	Unlikely							
Sharp-tailed Sandpiper	*Calidris acuminata*	MI/MA	Unlikely							
Curlew Sandpiper	*Calidris ferruginea*	CE	Possible							
Red-necked Stint	*Calidris ruficollis*	MI/MA	Possible							
Sanderling	*Calidris alba*	MI/MA	Unlikely							
Common Sandpiper	*Actitis hypoleucos*	MI/MA	Possible							
Grey-tailed Tattler	*Tringa brevipes*	MI/MA/P4	Unlikely							
Common Greenshank	*Tringa nebularia*	MI/MA	Known							
Marsh Sandpiper	*Tringa stagnatilis*	MI/MA	Possible							
Turnicidae (button-quails)										
Painted Button-quail	*Turnix varius*	L	Known							+
Laridae (gulls & terns)										
Silver Gull	*Chroicocephalus novaehollandiae*		Known			+				+
Fairy Tern	*Sternula nereis*		Possible							
Caspian Tern	*Hydroprogne caspia*	MI/MA	Possible							
Whiskered Tern	*Chlidonias hybrida*		Possible							
Greater Crested Tern	*Thalasseus bergii*	MI	Known							
Pelicanidae (pelican)										
Australian Pelican	*Pelecanus conspicillatus*		Known			+				
Ardeidae (bittern, egrets & herons)										
Nankeen Night-Heron	*Nycticorax caledonicus*	L	Known							
White-Necked Heron	*Ardea pacifica*		Known							
Eastern Great Egret	*Ardea modesta*		Known			+				+
White-faced Heron	*Egretta novaehollandiae*		Known			+				+
Little Egret	*Egretta garzetta*		Known							
Threskiornithidae (ibis & spoonbills)										
Australian White Ibis	*Threskiornis moluccus*		Known			+		fo		
Straw-necked Ibis	*Threskiornis spinicollis*		Known			+				
Yellow-billed Spoonbill	*Platalea flavipes*		Known			+				
Glossy Ibis	*Plegadis falcinellus*	MI	Possible							
Phalacrocoracidae (cormorants)										
Little Pied Cormorant	*Microcarbo melanoleucos*		Known							
Great Cormorant	*Phalacrocorax carbo*		Known							
Little Black Cormorant	*Phalacrocorax sulcirostris*		Known			+				
Great Pied Cormorant	*Phalacrocorax varius*		Known			+				

Species		Status	Likelihood	Trapping site 1	2	3	4	5	6	Opp
Australasian Darter	*Anhinga novaehollandiae*		Known			+				
Accipitridae (eagles, harriers & kites)										
Osprey	*Pandion haliaetus*	MI/MA	Likely							
Black-shouldered Kite	*Elanus axillaris*		Known					+		
Square-tailed Kite	*Lophoictinia isura*	L	Possible							+
Wedge-tailed Eagle	*Aquila audax*	L	Possible							
Little Eagle	*Hieraaetus morphnoides*	L	Known							
Swamp Harrier	*Circus approximans*		Known							
Brown Goshawk	*Accipiter fasciatus*	L	Known	+		+	+	+		+
Collared Sparrowhawk	*Accipiter cirrocephalus*	L	Known							
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	MA/MI	Possible			+				
Whistling Kite	*Haliastur sphenurus*	L	Known							
Tytonidae (barn owls)										
Barn Owl	*Tyto alba*		Likely							
Masked Owl (SW)	*Tyto n. novaehollandie*		Possible							
Strigidae (hawk owls)										
Australian Boobook	*Ninox boobook*		Likely							+
Barking Owl (SW)	*Ninox c. connivens*	P2	Unlikely							
Meropidae (bee-eaters)										
Rainbow Bee-eater	*Merops ornatus*	MA	Known	+	+	+				+
Halcyonidae (kingfishers)										
Sacred Kingfisher	*Todiramphus sanctus*		Known							
Laughing Kookaburra	*Dacelo novaeguineae*	*	Known				+			+
Falconidae (falcons)										
Nankeen Kestrel	*Falco cenchroides*		Known							+
Eurasian Hobby	*Falco subbuteo*	*	Possible							
Australian Hobby	*Falco longipennis*		Known							
Brown Falcon	*Falco berigora*	L	Likely							
Peregrine Falcon	*Falco peregrinus*	S	Known							
Cacatuidae (cockatoos & corellas)										
Forest Red-tailed Black-Cockatoo	*Calyptorhynchus banksii naso*	VU	Known		+					+
Baudin's Cockatoo	*Zanda baudini*	EN	Known							
Carnaby's Cockatoo	*Zanda latirostris*	EN	Known			+				+
Galah	*Eolophus roseicapilla*		Known	+		+	+			+
Western Corella	*Cacatua pastinator*		Known							
Little Corella	*Cacatua sanguinea*		Known	+		+	+			+
Long-billed Corella	*Cacatua tenuirostris*		Known							
Psittacidae (parrots)										
Regent Parrot	*Polytelis anthopeplus*		Possible							
Red-capped Parrot	*Purpureicephalus spurius*		Known			+	+			+
Western Rosella	*Platycercus icterotis*	L	Known							
Australian Ringneck	*Barnardius zonarius*		Known	+		+				+
Elegant Parrot	*Neophema elegans*		Likely							
Rock Parrot	*Neophema petrophila*	L	Possible							
Purple-crowned Lorikeet	*Glossopsitta porphyrocephala*		Possible							
Rainbow Lorikeet	*Trichoglossus moluccanus*	*	Known	+	+	+	+	+	+	+
Maluridae (fairy-wrens)										
Splendid Fairy-wren	*Malurus splendens*	L	Known	+	+			+		+
Variegated Fairy-wren	*Malurus lamberti*	L	Known					+	+	+
Meliphagidae (honeyeaters)										

Species		Status	Likelihood	Trapping site 1	2	3	4	5	6	Opp
Brown Honeyeater	*Lichmera indistincta*		Known	+	+		+			+
New Holland Honeyeater	*Phylidonyris novaehollandiae*	L	Known		+		+			
White-cheeked Honeyeater	*Phylidonyris niger*	L	Known		+					+
Brown-headed Honeyeater	*Melithreptus brevirostris*		Unlikely							
White-naped Honeyeater	*Melithreptus lunatus*	L	Possible							
Tawny-crowned Honeyeater	*Glyciphila melanops*	L	Possible							
Western Spinebill	*Acanthorhynchus superciliosus*		Possible							
White-fronted Chat	*Epthianura albifrons*		Likely							
Spiny-cheeked Honeyeater	*Acanthaegenys rufogularis*		Unlikely							
Western Wattlebird	*Anthochaera lunulata*	L	Known							
Red Wattlebird	*Anthochaera carunculata*		Known	+		+	+		+	+
Yellow-throated Minor	*Manorina flavigula*	L	Unlikely							
Yellow-plumed Honeyeater	*Ptilotula ornata*		Unlikely							
Singing Honeyeater	*Gavicalis virescens*		Known	+	+		+	+	+	+
Pardalotidae (pardalotes & thornbills)										
Spotted Pardalote	*Pardalotus punctatus*		Known		+					
Striated Pardalote	*Pardalotus striatus*		Known			+	+			+
Western Gerygone	*Gerygone fusca*		Known	+	+		+		+	+
Weebill	*Smicrornis brevirostris*	L	Known	+	+		+			+
White-browed Scrub-wren	*Sericornis frontalis*	L	Known	+	+		+	+	+	+
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	L	Known	+	+					
Inland Thornbill	*Acanthiza apicalis*	L	Known							
Western Thornbill	*Acanthiza inornata*	L	Possible							
Varied Sittella	*Daphoenositta chrysoptera*	L	Possible							
Campephagidae (cuckoo-shrikes)										
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*		Known	+	+		+			+
White-winged Triller	*Lalage tricolor*		Possible							
Pachycephalidae (whistlers)										
Rufous Whistler	*Pachycephala rufiventris*		Known	+	+	+			+	
Golden Whistler	*Pachycephala pectoralis*	L	Known							
Grey Shrike-thrush	*Colluricincla harmonica*	L	Known							
Artamidae (woodswallows & magpies)										
Grey Currawong	*Strepera versicolor*	L	Unlikely							
Australian Magpie	*Gymnorhina tibicen*		Known	+		+	+			+
Pied Butcherbird	*Cracticus nigrogularis*		Possible							
Grey Butcherbird	*Cracticus torquatus*		Known			+	+			
Dusky Woodswallow	*Artamus cyanopterus*	L	Known							
Corvidae (ravens & crows)										
Little Crow	*Corvus bennetti*		Unlikely							
Australian Raven	*Corvus coronoides*		Known	+	+	+	+	+	+	+
Dicruidae (fantails & flycatchers)										
Magpie-lark	*Grallina cyanoleuca*		Known			+				+
Restless Flycatcher	*Myiagra inquieta*		Unlikely							
Willie Wagtail	*Rhipidura leucophrys*		Known	+	+	+				+
Grey Fantail	*Rhipidura fuliginosa*		Known	+	+		+			
Petroicidae (robins)										
Scarlet Robin	*Petroica multicolor*	L	Possible							
Red-capped Robin	*Petroica goodenovii*		Known							
Hooded Robin	*Melanodryas cucullata*		Unlikely							
Jacky Winter	*Microeca fascinans*		Unlikely							

Species		Status	Likelihood	Trapping site 1	2	3	4	5	6	Opp
Mistletoebird	*Dicaeum hirundinaceum*		Known	+		+	+			
Passeridae (mannikins)										
Chestnut-breasted Mannikin	*Lonchura castaneothorax*	*	Unlikely							
Motacillidae (pipits)										
Australasian Pipit	*Anthus novaeseelandiae*		Likely							
Sylviidae (old world warblers)										
Little Grassbird	*Poodytes gramineus*		Possible							
Australian Reed-Warbler	*Acrocephalus australis*		Known							
Hirundinidae (swallows & martins)										
Fairy Martin	*Petrochelidon ariel*		Possible							
Tree Martin	*Petrochelidon nigricans*		Known			+		+	+	
Welcome Swallow	*Hirundo neoxena*		Known							+
Zosteropidae (white-eyes)										
Silvereye	*Zosterops lateralis*		Known	+	+		+	+	+	
Species expected	**173**			24	21	46	22	12	11	
Species recorded during 2023	**69**									

+ = Species recorded during the 2023 survey *** = Introduced species**

CE = Critically Endangered (EPBC and/or BC Act) **fo = flyover only**

EN = Endangered (EPBC and/or BC Act)

VU = Vulnerable (EPBC and/or BC Act)

MI = Migratory species (EPBC and/or BC Act)

MA = Marine species (EPBC Act)

S = Specially Protected (BC Act)

P2 = Priority 2 (DBCA)

P4 = Priority 4 (DBCA)

L = Locally significant due to a reduced distribution and/or population on the Swan Coastal Plain (Government of WA 2000)

3.4.5 Invertebrates

Two conservation significant invertebrate species have the potential to occur within the reserve, the Priority 3 Swan Coastal Plain Shied-backed trapdoor spider (*Idiosoma sigillatum*) and the Priority 3 Graceful sun-moth (*Synemon gratiosa*), however no detections of either species were made during the survey period.

The Swan Coastal Plain Shied-backed trapdoor spider is widely distribution along the Swan Coastal Plain, where it is known to occur from Dalyellup in the south to at least Ledge Point in the north and across to the foothills of the Darling Escarpment. It is also known from Rottnest and Garden Islands. Once widespread throughout the Perth region, it is now restricted to remnant bushland areas, where it inhabits *Banksia* woodlands and heath on sandy soils. It is now locally extinct throughout much of its former range due to land clearing (Rix et al 2018). Recent records (2019) exist within 5km of the reserve including Spearwood and Beeliar (DBCA, 2023b) and this species may occur on in the reserve. Only a single trapdoor spider was detected during the survey, a Brush-footed trapdoor spider of the Genus *Idiomata*, which was captured in the limestone outcropping at Site 6 (Figure 9a). Searching for burrows during the wetter parts of the years within suitable habitat is the most effective way of surveying for Shield-back trapdoor spiders, and pit-traps placed around vegetation in suitable habitats during May-July may be used to catch wandering males, when activity is known to peak in May corresponding to the first winter rains (Rix et. al. 2018). Further surveys during late autumn to winter may help to determine the presence of the Swan Coastal Plain Shied-backed trapdoor spider within the reserve.

The Graceful sun-moth is widely distributed along the Swan Coastal Plain from Nambung National Park in the north through to Mandurah in the south. It strictly associated two habitat types: Coastal heathland on Quindalup dunes, where is occurs on sand dunes supporting the host plant *Lomandra maritima*, and *Banksia* woodlands on Spearwood and Bassendean dunes which support the host plant *Lomandra hermaphrodita*. Adults breed once and only during February to April, with a very short flight time of one to two weeks and may only fly in suitable weather conditions. Sites in limestone may have both *Lomandra hermaphrodita* and *L. maritima* present and can often comprise the dominant understorey herb in these habitats (Bishop et. al. 2010). The reserve has the potential to support populations of the Graceful sun-moth, with several known localities within 5km of the reserve including *Banksia* woodland at Sir Frederick Sampson Park and Forrest Road in Bibra Lake (DBCA, 2023b). The host plant *Lomandra maritima* has been recorded from the reserve, with plants known to occur in the tall shrublands supporting *Acacia rostellifera* (FVC, 2021; see Figure 9b). The percent coverage of *Lomandra maritima* in this habitat was only 5% (see FVC, 2021), and may not be extensive enough to support populations of the Golden sun-moth, however, future surveys mapping the entire distribution and density of *Lomandra maritima* within the reserve and targeted surveys searching for live moths during February to April may help to determine the presence of the Graceful sun-moth within the reserve.

Figure 9. (a) A Brush-footed trapdoor spider (*Idiomata* sp.) detected at Site 2 on the limestone ridge; b) Shrubland on the limestone ridge containing *Lomandra maritima*, and potentially the Graceful sun-moth.

4. Conclusions & management recommendations

Manning Park supports (or has the potential to support) a very good fauna assemblage. Although the current survey was limited to a single season, a relatively high vertebrate fauna assemblage was detected, with high reptile diversity, as well as a large diversity of frog, bird, and microbat species. Few fauna surveys have been undertaken in Manning Park, however of those surveys, particularly the long history of bird surveys undertaken by Birdlife Australia, they highlight what species are generally detectable or most commonly occur within the reserve and is helping to understand the fauna assemblage occurring within Manning Park. Several species detected rely on key habitat characteristics such as diverse micro-habitats, key food sources and habitat connectivity. The species present within the study area are most likely a direct result of the remaining intact, remnant vegetation, particularly the extensive and high-quality proteaceous shrublands on the limestone ridge, as well as the lake and wetlands habitats and the surrounding woodlands. These areas are particularly importance for a range of species detected within the reserve including black cockatoos, Perth-lined slider and Quenda.

The study area contains extensive foraging habitats for all three species of black cockatoo. Particularly the limestone ridge habitats which contain large expanses of Parrot bush (*Banksia sessilis*), which is of high importance for both Carnaby's and Baudin's cockatoo, as well as other proteaceous shrubs such as *Hakea* sp. The significant areas of woodland on the lower slopes and vegetated uplands surrounding the lake also provide important foraging resources for Carnaby's and Forest red-tailed black cockatoos. These areas also contain many large, hollow-bearing trees, which provide potential breeding habitat for Carnaby's and Forest red-tailed black cockatoos, as well as potential habitat for arboreal mammal species such as the specially protected Brush-tailed phascogale. The limestone ridge habitats also provide extensive, low shrublands, sandy soils and leaf litter beds which provide critical habitat for the Perth lined slider and potentially Black-striped snake. While the dense shrublands and continuity of this habitat throughout the reserve also provides suitable habitat and movement corridors for Quenda. These areas also provide critical habitat for a range of locally significant bird and reptile species such as the Variegated fairy-wren, Painted button-quail and Western bluetongue.

The lake and fringing wetland habitats provide suitable foraging habitat for a range of conservation significant species including the Peregrine falcon, White-bellied sea-eagle, Pied stilt, Common greenshank, Blue-billed duck and a range of locally significant wetland bird species. While the *Melaleuca* forest surrounding the lake also supports a significant population of the King skink, which may be of local significance. The woodland surrounding the lake also provide ample perching and feeding locations for Rainbow-bee-eaters, as well as the nearby open sandy areas of the upland vegetation, which provide suitable nesting locations and is known to breed in the reserve.

In addition, due to the presence of *Lomandra maritima* along parts of the limestone ridge, the Graceful sun-moth may occur in the study area, while the Swan Coastal Plain Sield-back trapdoor spider may occur in the sandier heath habitats.

These habitats however need to be carefully managed to ensure these species persist and continue to inhabit the reserve in sufficient numbers. Due to the location of the reserve (isolated and enclosed by major roads, residential and industrial developments) and current and past land use (i.e. agriculture and recreation), several threats currently exist, including:

- Weed infestations
- Habitat loss and fragmentation (including dissection and degradation of habitat through track establishment)
- Fire
- Dieback
- Erosion
- Potential road mortality of some species, and
- Feral animals (particularly cats and hollow competitors such as bees).

In protecting, managing and enhancing existing habitats within the reserve, the following recommendations may help to guide management:

- The continued protection of intact vegetation is crucial, particularly the proteaceous shrublands and heath on the limestone ridge, and the tall woodlands on the lower slopes and surrounding the lake. These areas are of high conservation value, providing important foraging and roosting habitat for all three species of Black cockatoo, and cover for species such as Quenda, Perth lined slider and a range of specialised bush birds.
- Enhancement and revegetation of degraded landscapes, as well as the creation of additional habitat corridors. For example, connecting the lake to surrounding bushland, or looking at ways to connect the Manning Park bushland to surrounding bushland (i.e. road underpasses/habitat strips), as well as further enhancing the bushland corridors along the eastern edge of the reserve.
- Weed management, in particular woody weed infestations such as coastal tea tree. This however will need to be carefully managed, as tea tree thickets currently provide important habitat for species such as Quenda and locally significant bush birds. Removal of this cover may result in negative implications for the species relying on this habitat.
- Restricting recreational use to certain areas. For example, restriction of access to high quality habitats and conserve these areas as high priority conservation areas, whereby access tracks are limited. Activities that require regular or repeated access (i.e. bike riding and/or walking tracks) can be concentrated in areas of lower ecological value (i.e. lower slopes and/or disturbed areas) or reduced to a subset of fewer tracks (i.e. the Davilak trail).
- Dieback management. This is particularly crucial due to the nature of the reserve landscape and land use. Increased recreational activities throughout the reserve, particularly during the wetter months has higher potential for dieback spread. Restricted access to high quality habitats could also help mitigate the spread of dieback to these areas.
- Feral animal management is also crucial, particularly cats which pose serious threats to Quenda, and an assortment of birds and reptiles, as well as managing nest hollow competitors such as feral honeybees.
- Implement plans and promote education with the local community and landholders of the awareness of and need to manage fauna, particularly those of conservation significance and feral animals, as well the spread of weeds and diseases.

Future follow-up surveys will be an important aspect in further understanding the fauna assemblage of the reserve. A survey of this level often only gathers partial information on the fauna occurring in the reserve. It generally takes several trapping seasons and/or extensive trapping periods to detect a large percentage of the species occurring within a defined area (How and Dell 2000). Surveys incorporating the drier summer periods when the lake is dry may help to detect additional species of migratory shorebirds or may encounter more individuals of some species (i.e. large feeding flocks of Carnaby's cockatoo over the summer period). While targeted surveys in late summer to early winter may help to detect species such as the Graceful sun-moth and/or Swan Coastal Plain Sheild-backed trapdoor spider. Motion camera surveys of longer duration and at different times of the year may also help in the potential detection of arboreal mammals such as the Brush-tailed phascogale or Brush-tailed possum, while also collecting information of feral predator distribution and abundance, which may help to inform management programs.

5. Discussion of potential mountain bike trails

A large proportion of the Manning Park bushland is currently dissected by a range of tracks and pathways. These include management vehicle access tracks, infrastructure access tracks such as power and communications lines, and walking paths, as well as many 'unsanctioned' paths and tracks currently used by mountain bike riders visiting the park. Many of these however form a complex network of trails that may inadvertently create a range of impacts, particularly along the limestone ridge habitats. Much of this area supports significant limestone exposure and skeletal soils, which is very fragile, and once degraded may be very hard to rehabilitate. Owing to the naturally steep topography of the landscape, and the low, heathy vegetation it supports, these areas are highly susceptible to erosion, weed incursions and disease infestations such as dieback, and the increasing degradation of these areas, particularly the increased exposure of densely vegetated areas may create improved access for feral predators such as cats and foxes to roam.

These areas currently offer a range of sanctioned walking tracks, however, most of which are primarily made for low impact walking and jogging, with many formally developed with base material, erosion control (i.e. stairs) and hand-railing, such as walking tracks leading to lookout areas (i.e. the Davilak trail). The establishment and regular use of mountain bike trails in these areas may have some significant impacts on both the natural environment and the current use of the existing tracks, in particular:

- Potential and/or increased negative bike-rider/pedestrian interaction.
- Potential and/or increased bike-rider/wildlife interaction (i.e. tracks deaths to Bobtails, Western bluetongue lizards, etc).
- Change in behaviour of wildlife where continued disturbance may prevent some species from using an area. For example, regular traffic on sandy tracks may destroy Rainbow bee-eater nests or deter them from nesting, or species such as Carnaby's or Forest red-tailed black cockatoos may avoid certain feeding areas.
- Development of, or increased erosion.
- Dieback introduction and spread,
- Weed introduction and spread, and
- Improved feral predator access.

To combat some of these potential issues, it seems feasible to establish a network of mountain trails that have minimal impacts relating to the above potential concerns, these include:

- Establishing a trail network throughout areas that already contain a high level of degradation or where any future rehabilitation may be difficult.
- Focus on areas that have considerably less foot traffic (i.e. away from lookouts, etc).
- Avoid areas that contain critical habitat trees or extensive feeding grounds for black cockatoo species.
- Prioritise areas of lower habitat sensitivity and connectivity, and
- Establish in areas that provides direct or straightforward access to the site without having to traverse larger parts of the reserve.

Several potential areas currently exist which may help to mitigate some of the impacts a mountain trail network may have on the larger part of Manning Park. The following options may be of consideration:

Option 1: Old Quarry/North location (see Map 14)

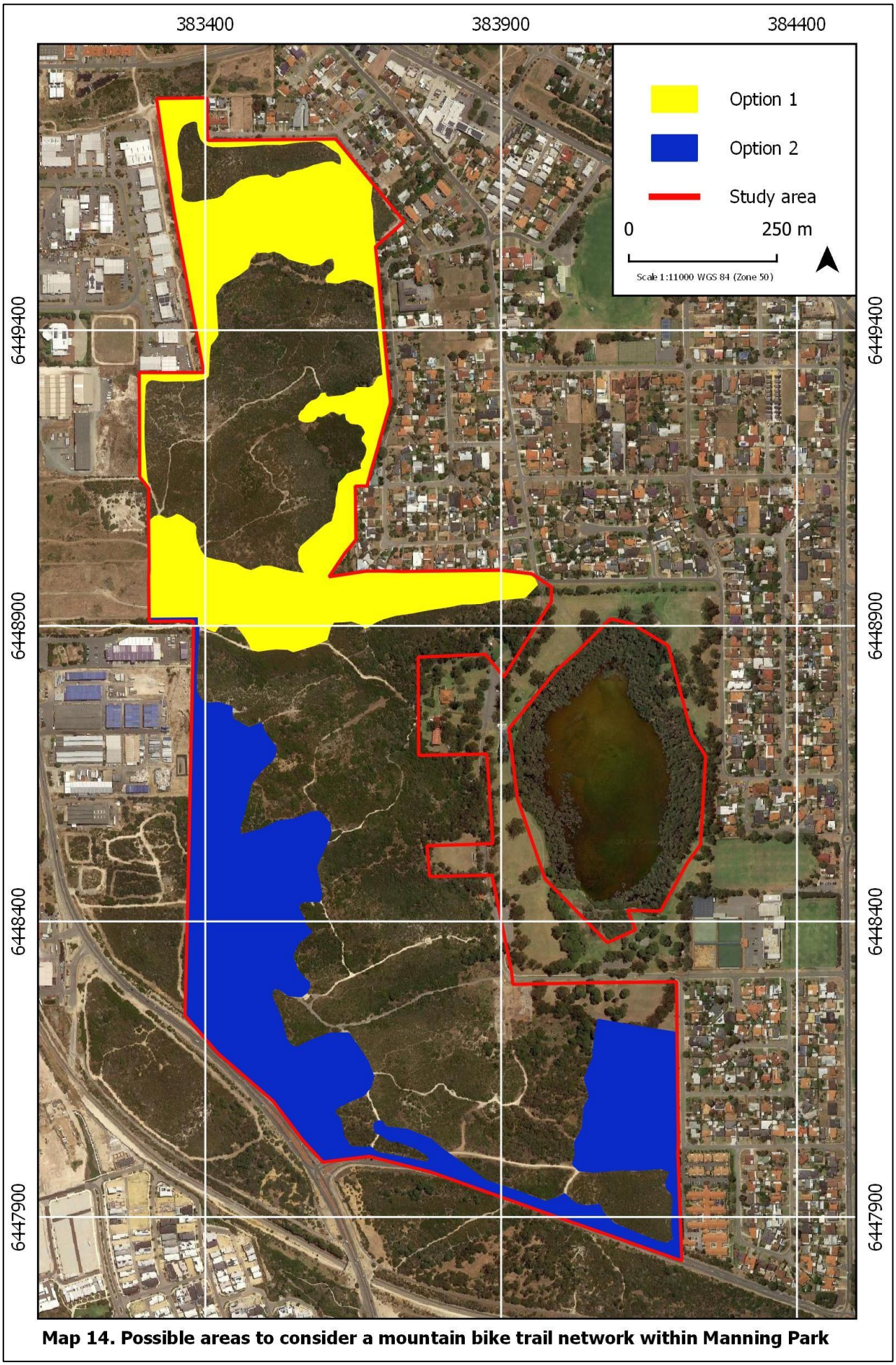
A suitable site to establish a mountain bike trail network could be the area to the north of the reserve bounded by Whitton Street, Nunn Street and the access track running westwards from Quarry Road. This area has undergone significant degradation and has a network of well used, interconnected tracks currently used by mountain bike riders. The area also has the least adjacent habitat continuity of the reserve, with several roads (including Rockingham Road), residential housing and open, grassy paddocks separating the reserve from the bushland of Clontarf Hill, with any habitat north of this area minimal to absent. This area was also the only location stray/feral cats were detected during the current surveys. The area encompasses almost 3.5 hectares of completely degraded habitats and a further 3.5 hectares of disturbed habitats, mainly surrounding the already degraded landscapes and the reserve perimeter. If more area was required to establish a track network of a larger size, extensions to this area could either incorporate the disturbed areas along Quarry Road (or along Quarry Road itself), or alternatively the western boundary track to the south and throughout the powerline corridor. In this instance, up to 8 hectares of currently highly degraded or disturbed habitat could be added to a trail network and all associated mountain bike activities could be restricted to areas from the powerline track northwards. Restricting mountain bike trails to a particular section may help to minimise impacts over a greater area and incorporating current degraded areas and areas lower in the landscape may also have minimal disturbance to the current environment. This may also considerably limit any potential negative interactions with walking tracks associated with the lookout areas to the south and tracks nearby to existing public open space and car parking facilities, while also avoiding higher quality habitats containing extensive feeding resources for Black cockatoo species (see Map 15). Additionally, there may be potential to create car-parking/access facilities to the north of the reserve in the degraded areas along Bellion Drive. This will enable direct access to the trail network without the need to traverse through other areas of the reserve or to add additional congestion/further development of car parking facilities currently available within the reserve.

Option 2: Southwest location (see Map 14)

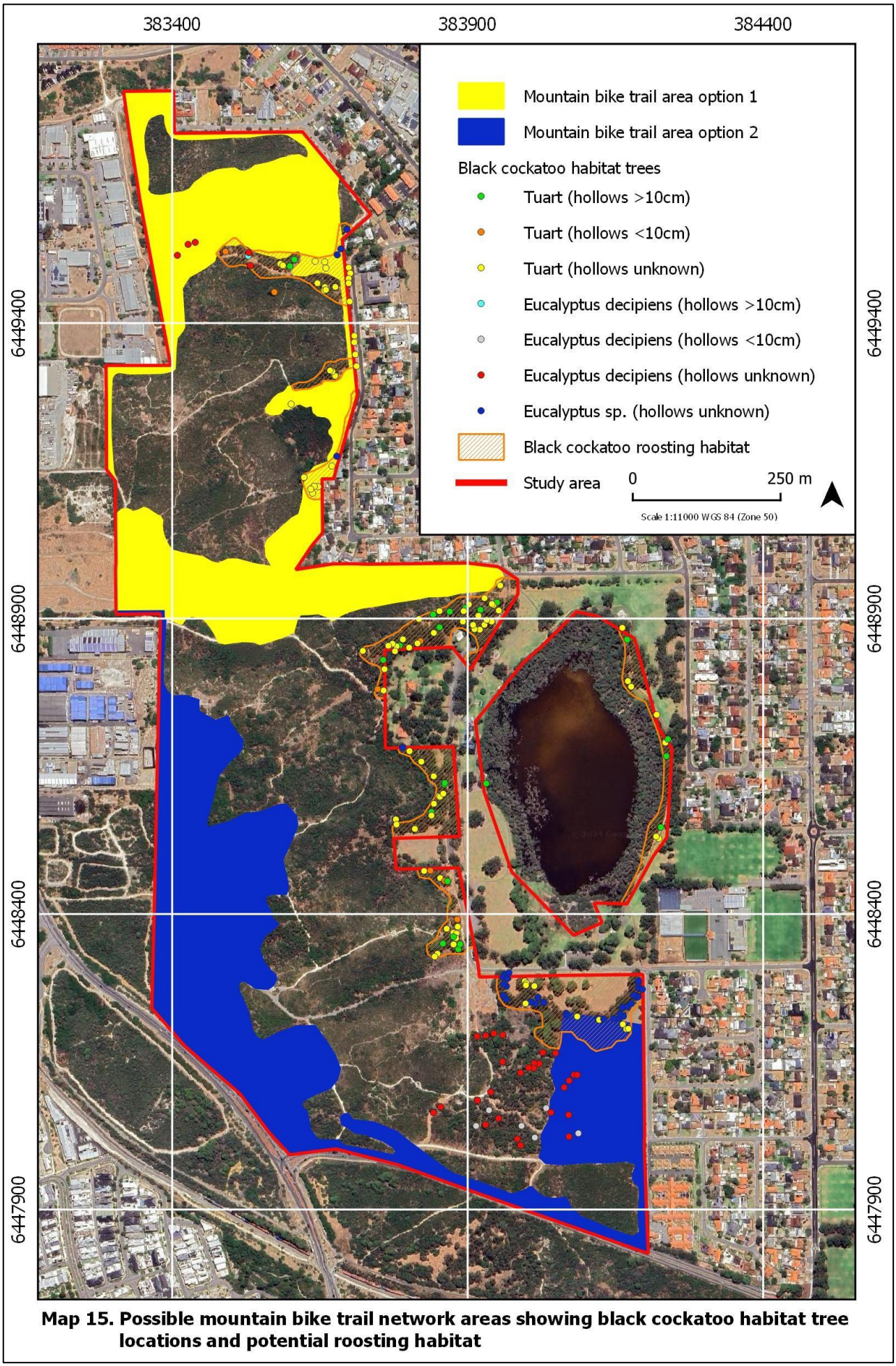
The area on the lower slopes to the west of the limestone ridge in the southwest of the reserve could potentially provide an alternative location. This area has undergone significant degradation, with extensive woody weed infestations, large cleared areas and possibly the main area of the reserve containing a significant rabbit problem. This area would incorporate an area of up to 12 hectares of highly degraded and disturbed habitats from near the intersection of Cockburn and Spearwood Roads to near the adjacent industrial area approximately 800 metres to the north. Potential access to the site may be possible from Cockburn Road with the addition of carparking facilities or alternatively access may be possible from the Azelia Road carparking area, with a designated access trail beginning in the degraded areas to the east of the Davilak homestead ruins and following the boundary tracks where the trail network may begin near the junction of Cockburn and Spearwood Roads. This would potentially provide an additional trail network area of up to 5 hectares and would incorporate existing degraded and disturbed landscapes. This area however is in much closer proximity to larger bushland areas where current habitat connectivity is high and future habitat connectivity is much more achievable. This area also appears to support a significant Quenda population (see Map 16). Although much of the area is degraded and infested with woody weeds, this creates substantial habitat for Quenda, which should be considered when and if designing a mountain bike trail (or any future management actions) in this area.

Option 3: Alternative location

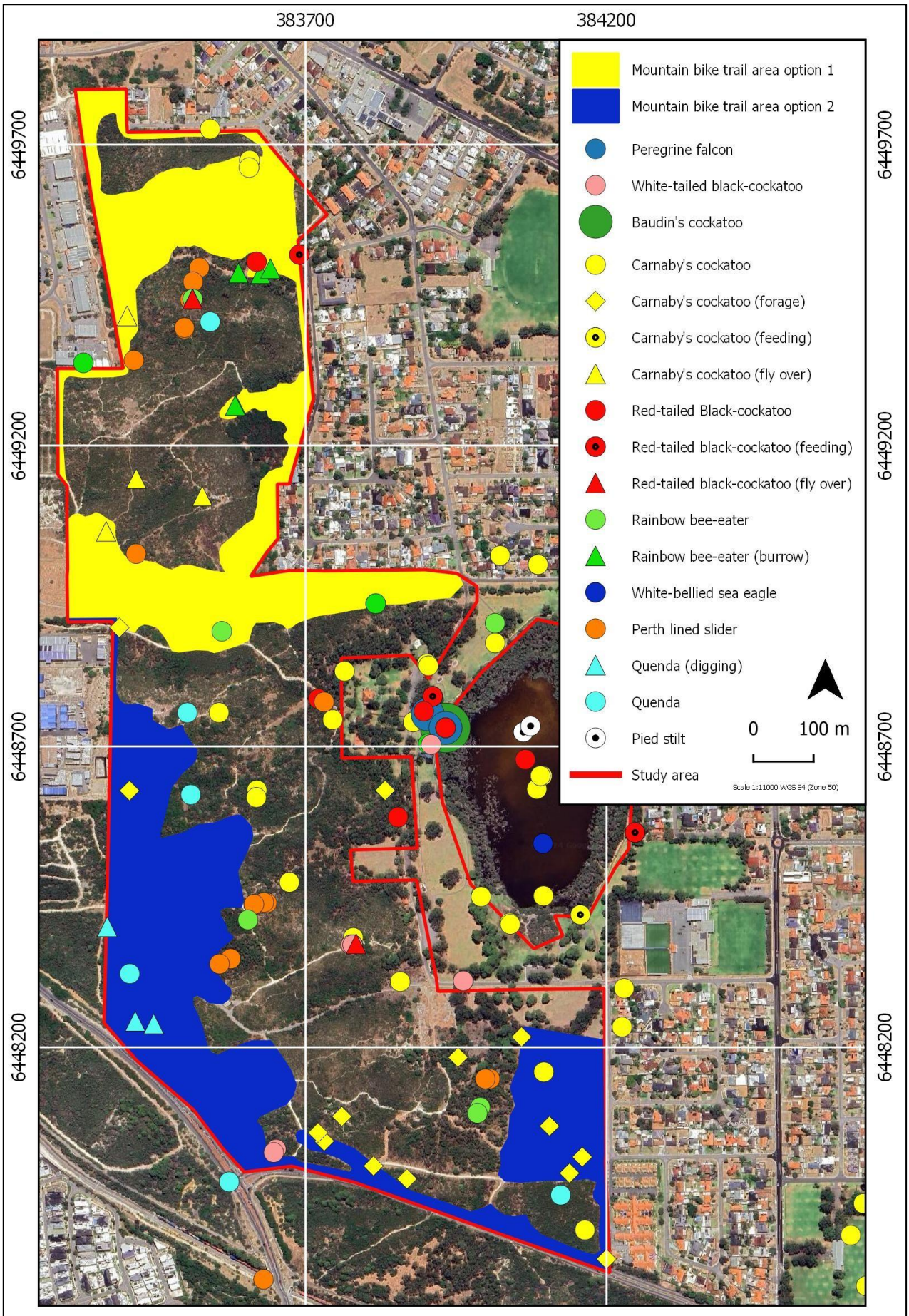
An alternative location to Manning Park may also be a consideration. A nearby, potentially suitable location may include the area allocated for the proposed Coogee Golf Complex to the south of Manning Park. This area has suffered extensive degradation and habitat fragmentation, with only small, isolated areas of fauna habitat remaining (Regen4 et. al. 2018, 2013). A trail network here could utilise existing degraded landscapes, while protecting remaining bushland areas. The area currently supports a small car parking facility, which could be extended into existing degraded landscapes if required. Additionally, any proposed impact of mountain bike trail development could be offset by rehabilitating degraded areas of Manning Park and establishing and enhancing bushland corridors in areas surrounding Manning Park, including looking at ways to connect Manning Park to CY O'Connor Reserve to the west and linking up to bushland in the south, as well as looking at ways to connect Manning Lake to neighbouring bushland.



Map 14. Possible areas to consider a mountain bike trail network within Manning Park



Map 15. Possible mountain bike trail network areas showing black cockatoo habitat tree locations and potential roosting habitat



Map 16. Possible mountain bike trail network areas showing all known localities (current survey, DBCA database and Birdlife Australia records) of conservation significant fauna occurring within Manning Park

References

ALA (2023) Atlas of Living Australia occurrence download at: https://biocache.ala.org.au/occurrences/search?&q=%3A*&fq=geospatial_kosher%3Atrue&fq=%28species_group%3A%22Birds%22+OR+species_group%3A%22Reptiles%22+OR+species_group%3A%22Amphibians%22+OR+species_group%3A%22Mammals%22%29&disableAllQualityFilters=true&fq=-basisOfRecord%3A%22FOSSIL_SPECIMEN%22+AND+-%28basisOfRecord%3A%22MATERIAL_SAMPLE%22+AND+contentTypes%3A%22EnvironmentalDNA%22%29&fq=-%28duplicate_status%3A%22ASSOCIATED%22+AND+duplicateType%3A%22DIFFERENT_DATASET%22%29&fq=-assertions%3ATAXON_MATCH_NONE+AND+-assertions%3AINVALID_SCIENTIFIC_NAME+AND+-assertions%3ATAXON_HOMONYM+AND+-assertions%3AUNKNOWN_KINGDOM+AND+-assertions%3ATAXON_SCOPE_MISMATCH&fq=-occurrenceStatus%3AABSENT&fq=-userAssertions%3A50001+AND+-userAssertions%3A50005&fq=-year%3A%5B*+TO+1700%5D&fq=-establishmentMeans%3A%22MANAGED%22+AND+-decimalLatitude%3A0+AND+-decimalLongitude%3A0+AND+-assertions%3A%22PRESUMED_SWAPPED_COORDINATE%22+AND+-assertions%3A%22COORDINATES_CENTRE_OF_STATEPROVINCE%22+AND+-assertions%3A%22COORDINATES_CENTRE_OF_COUNTRY%22+AND+-assertions%3A%22PRESUMED_NEGATED_LATITUDE%22+AND+-assertions%3A%22PRESUMED_NEGATED_LONGITUDE%22&fq=-outlierLayerCount%3A%5B3+TO+*%5D&fq=-spatiallyValid%3A%22false%22&fq=-coordinateUncertaintyInMeters%3A%5B10001+TO+*%5D&qc=-_nest_parent_%3A*&lat=-32.0976&lon=115.7686&radius=5.0 accessed on 04 September 2023.*

Bamford, M. J. and Wilcox, J. A. (2005) The amphibians, reptiles and mammals of three reserves in the City of Cockburn: Bibra Lake, Yangebup Lake and Little Rush Lake. Unpublished report to the City of Cockburn.

BirdLife Australia (2023a). Birdata Platform Extract (https://birdata.birdlife.org.au/). BirdLife Australia, Melbourne. Generated on 25-09-2023.

BirdLife Australia (2023b). https://birdata.birdlife.org.au/explore#map=-22.5083100_136.0786120_4

Bishop C., M. Williams, D. Mitchell & T. Gamblin (2010). Survey guidelines for the Graceful sun-moth (*Synemon gratiosa*) & site habitat assessments. Department of Environment and Conservation, Perth, WA.

Bradshaw, D. (2014) The Honey Possum, *Tarsipes rostratus*, A keystone species in the Kwongan. In book: *Plant Life on the Sandplains in southwest Australia, a Global Biodiversity hotspot*., Chapter: 7E, Publisher: UWA Publishing, Editors: Lambers, H, pp.215-224

Bush, B., Maryan, B., Browne-Cooper, R. and Robinson, D. (2010) Field Guide to Reptiles & Frogs of the Perth Region. Western Australian Museum, Welshpool, WA.

Bush, B., Maryan, B., Browne-Cooper, R. and Robinson, D. (2007) Reptiles and Frogs in the Bush: Southwestern Australia. University of Western Australia Press, Crawley, WA.

Churchill, S. (1998) Australian Bats. Reed New Holland, Sydney.

City of Cockburn. (2023) Manning Park https://www.cockburn.wa.gov.au/Recreation-and-Attractions/Parks-and-Playgrounds/Manning-Park

Cornwell, T (2004) Western Australia's Herpetofauna. North Lake Banksia Woodland. A species richness study in Beeliar Regional Park, Perth, WA. Independent Research Study, Murdoch University, Perth, WA.

Cull, Newman & Plew (2021) Observation Records and Breeding Summary of Blue-billed Ducks Oxyura australis in Victoria from 2015 to mid-2021 Indicating Species Decline. Based on data from VBA – Victorian Biodiversity Atlas, eBird Australia and Birdata (Birdlife Australia) along with Relevant Site Observations, Lake Knox, Victoria. Authors: John Cull, Kevin Newman and Russell Plew, October 2021.

Department of Agriculture, Water and the Environment (DAWE) (2023) Protected Matters Database Search Tool. Accessed 20th September 2023.

Department of Agriculture, Water and the Environment (DAWE) (2022) Referral guideline for 3 WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black cockatoo. Canberra.

Department of Biodiversity, Conservation and Attractions (DBCA) (2023a) DBCA and Western Australian Museum NatureMap Species Database. Requested 4th September 2023.

Department of Biodiversity, Conservation and Attractions (DBCA) (2023b) Threatened and Priority Fauna Database. A list compiled by the Department of Parks and Wildlife. Perth, Western Australia. Requested 4th September 2023.

Department of Biodiversity, Conservation and Attractions (DBCA) (2023c) Dandjoo Biodiversity Data Repository

De Tores. (2008a) Quokka (*Setonix brachyurus*). In van Dyck, S., and Strahan, R. Eds. The Mammals of Australia. Reed New Holland, Australia.

De Tores. (2008b) Western Ringtail Possum (*Pseudocheirus occidentalis*). In van Dyck, S., and Strahan, R. Eds. The Mammals of Australia. Reed New Holland, Australia.

Environmental Protection Authority (EPA). (2020) Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment. EPA, Western Australia.

FaunaTrack. (2022) Detailed Fauna and Fauna Assemblages Survey of Bibra Lake and Yaakan Park. Unpublished report to the City of Cockburn.

FaunaTrack. (2018) Reptiles, amphibians and mammals of Manning Park. Unpublished report to the City of Cockburn.

Focused Vision Consulting (FVC). (2021) Biological Survey of Manning Park. Unpublished report to the City of Cockburn.

Geering, A., Agnew, L. and Harding, S. (2007) Shorebirds of Australia. CSIRO Publishing, Collingwood, Australia.

GHD. (2019) Mitchell Freeway Extension Hester Avenue to Romeo Road Biological Survey. Unpublished report to Main Roads, WA.

Government of Western Australia (2000) Bush Forever Volume 2. Department of Environmental Protection, Perth.

Groom, C. (2011) Plants used by Carnaby's black cockatoo. Department of Environment and Conservation, Perth.

He, F. (2021) The distribution of the threatened Black-striped Burrowing Snake (*Neelaps calonotos*) in the Perth region, Western Australia. *Journal of the Royal Society of Western Australia* 104: 85-90.

Hinds, L. A. (2008) Tammar Wallaby (*Macropus eugenii*). In van Dyck, S., and Strahan, R. Eds. The Mammals of Australia. Reed New Holland, Australia.

How, R. A. and Dell, J. (2000) Ground vertebrate fauna of Perth's vegetation remnants: Impact of 170 years of urbanisation. *Pacific Conservation Biology* 6: 198-217.

How, R.A. and Shine, R. (1999). Ecological traits and conservation biology of five fossorial "sand-swimming" snake species (*Simoselaps*: Elapidae) in south-western Australia. Journal of Zoology, London. 249: 269-282.

Johnstone, R. E., Kirkby, T. and Sarti, K. (2017) The distribution, status movements and diet of the forest red-tailed black cockatoo in the south-west with emphasis on the greater Perth region, Western Australia, The West Australian Naturalist, 30(4): 193-219.

Johnstone, R. E., Johnstone, C. and Kirkby, T. (2011) Black Cockatoos on the Swan Coastal Plain. Unpublished report for the Department of Planning, Western Australia.

Johnstone, R. E. and Storr, G. M. (1998) Handbook of Western Australian Birds. Volume 1: Non-Passerines (Emu to Dollarbird). Western Australian Museum, Perth.

Johnstone, R. E. and Storr, G. M. (2004) Handbook of Western Australian Birds. Volume 2: Passerines (Blue-winged Pitta to Goldfinch). Western Australian Museum, Perth.

Maryan, B., Shea, G., Valentine, L., Ford, S., Gaikhorst, G. & Craig, M. 2017. *Egernia kingii*. The IUCN Red List of Threatened Species 2017: e.T178540A101749086. http://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T178540A101749086.en.

Maryan, B., Gaikhorst, G., O'Connell, M. and Callan, S. (2015) Notes on the distribution and conservation status of the Perth Lined Skink, *Lerista lineata*: A small lizard in a big city. *The Western Australia Naturalist* 30(1): 12-29.

Menkhorst, P. and Knight, F. (2000) A field guide to the mammals of Australia, Oxford University Press, Australia.

Mitchell, D., Williams, K. and Desmond, A. (2002) Swan Coastal Plain 2 (SWA2 – Swan Coastal Plain subregion). In: A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002. Ed by J. E. May and N. L. McKenzie. CALM, WA.

Morcombe, M. and Stewart, D. (2010) Michael Morcombe & David Stewart Eguide to the Birds of Australia. http://www.mydigitalearth.com/mde/digital/Home/tabid/97/Default.aspx.

Olsen, P. D. (2008) Water Rat (*Hydromys chrysogaster*). In van Dyck, S., and Strahan, R. Eds. The Mammals of Australia. Reed New Holland, Australia.

Paull, D. J. (2008) Southern Brown Bandicoot (*Isoodon obesulus*). In van Dyck, S., and Strahan, R. Eds. The Mammals of Australia. Reed New Holland, Australia.

Pizzey, G. and Knight, F. (1998) The Field Guide to the Birds of Australia. Angus & Robertson, Sydney, NSW.

PGV Environmental. (2021) Quill Way and Cockburn Road intersection upgrades: Flora, vegetation and fauna survey. Unpublished report to DevelopmentWA.

Regen4 Environmental Services, Western Wildlife, and Ironbark Environmental. (2018) Level 1 Flora and Fauna Survey: Lots 38, 9902, 9903, 9905 and 9909, Cockburn, Spearwood and Ocean Roads. Unpublished report to the City of Cockburn.

Regen4 Environmental Services, Western Wildlife, and Ironbark Environmental. (2013) Level 1 Flora and Fauna Survey: Lots 9902, 9903, 9905 and 38, Cockburn and Ocean Roads. Unpublished report to the City of Cockburn.

Rix, M. G., Huey, J. A., Cooper, S. J. B., Austin, A. D., and Harvey, M. S. (2018) Conservation systematics of the shield-backed trapdoor spiders of the *nigrum*-group (Mygalomorphae, Idiopidae, *Idiosoma*): Integrative taxonomy reveals a diverse and threatened fauna from south-western Australia. ZooKeys 756: 1-121.

Serena, M. and Soderquist, T. (2008) Western Quoll (*Dasyurus geoffroii*). In van Dyck, S., and Strahan, R. Eds. The Mammals of Australia. Reed New Holland, Australia.

Simpson, K. and Day, N. (1999) Field guide to the birds of Australia, Penguin Books Australia, Australia.

Soderquist, T. and Rhind, S. (2008) Brush-tailed Phascogale (*Phascogale tapoatafa*). In van Dyck, S., and Strahan, R. Eds. The Mammals of Australia. Reed New Holland, Australia.

Tyler, M. J. and Doughty, P. (2009) Field Guide to Frogs of Western Australia. Western Australian Museum, Welshpool, WA.

van Dyck, S., Gynther, I. and Baker, A. (2013) Field companion to the mammals of Australia, Reed New Holland, Australia.

Western Australian Museum (WAM) (2023). Checklists of the Fauna of Western Australia. Unpublished checklist. Last updated November 2023. Western Australian Museum, Perth.

Western Australian Society of Amateur Herpetologists (WASAH) (1999) Herpetofauna survey of Manning Lake Bushland Area.

Western Wildlife. (2010) Roe Highway extension: Wetland and Migratory Bird Study, 2009-2010. Unpublished report for South Metro Connect, Perth, WA.

Wilson, S. and Swan, G. (2021) A complete guide to reptiles of Australia, Reed New Holland, Australia.

APPENDIX 1. Fauna trapping sites and motion camera locations at Manning Park

Faunal Habitat Description	Image
Site 1 Low open woodland of Redheart (*Eucalyptus decipiens*) over mixed shrubland, and grassy (weedy grasses) understorey.	
Site 2 Shrubland/heath on the limestone ridge and slope containing *Melaleuca huegelii* and *Banksia sessilis* on skeletal soils and limestone exposure	

Faunal Habitat Description	Image
Site 3 Wetland dominated by large Swamp paperbarks (*Melaleuca rhaphiophylla*) over dense low sedges and exposed areas on peaty-sands, and isolated Tuarts	
Site 4 Vegetated uplands with large Tuarts (*Eucalyptus gomphocephala*) over an open, mixed shrubland on shallow brown, loamy sands with areas of limestone exposure.	

Faunal Habitat Description	Image
Site 5 Low shrubland/heath on the limestone ridge and slope containing *Melaleuca huegelii* on skeletal soils and limestone exposure	
Site 6 Tall shrublands on the western slopes of *Acacia rostellifera*, with weedy grasses and extensive leaf litter on deeper sandy soils and minimal limestone exposure	

Faunal Habitat Description	Image
FA1 Wetland	
FA2 Tall (*Acacia rostellifera*) shrubland (Site 6)	

Faunal Habitat Description	Image
FA6 Shrublands/heath on limestone ridge	
FA7 Shrublands/heath on limestone ridge	

Faunal Habitat Description	Image
FA10 Low heath on limestone ridge (Site 5)	
FB1 Low open woodland	

Faunal Habitat Description	Image
FB2 Tall (*Acacia rostellifera*) shrubland	
FB3 Tall woodland (Site 4)	

Faunal Habitat Description	Image
FB7 Tall (*Acacia rostellifera*) shrubland	
FC2 Shrublands/heath on limestone ridge	

Faunal Habitat Description	Image
FC3 Shrublands/heath on limestone ridge (Site 2)	
FC6 Tall woodland	

Faunal Habitat Description	Image
FC8 Wetland (Site 3)	
FC9 Shrublands/heath on limestone ridge	

Faunal Habitat Description	Image
FD3 Tall (*Acacia rostellifera*) shrubland	
FD6 Low open woodland (Site 1)	

APPENDIX 2: Individual trapping site locations at Manning Park

Site/trap Number	Latitude	Longitude	Date Opened	Date Closed	Site Visits
MP1_1	-32.097	115.7707	16-Nov-23	23-Nov-23	12
MP1_2	-32.0971	115.7707	16-Nov-23	23-Nov-23	12
MP1_3	-32.0972	115.7706	16-Nov-23	23-Nov-23	12
MP1_4	-32.0973	115.7706	16-Nov-23	23-Nov-23	12
MP1_5	-32.0975	115.7705	16-Nov-23	23-Nov-23	12
MP1_6	-32.0975	115.7705	16-Nov-23	23-Nov-23	12
MP1_7	-32.0979	115.7701	16-Nov-23	23-Nov-23	12
MP1_8	-32.0979	115.7699	16-Nov-23	23-Nov-23	12
MP1_9	-32.0979	115.7697	16-Nov-23	23-Nov-23	12
MP1_10	-32.0978	115.7696	16-Nov-23	23-Nov-23	12
MP2_1	-32.0849	115.7658	16-Nov-23	23-Nov-23	12
MP2_2	-32.085	115.7658	16-Nov-23	23-Nov-23	12
MP2_3	-32.0851	115.7657	16-Nov-23	23-Nov-23	12
MP2_4	-32.0852	115.7657	16-Nov-23	23-Nov-23	12
MP2_5	-32.0853	115.7656	16-Nov-23	23-Nov-23	12
MP2_6	-32.0854	115.7656	16-Nov-23	23-Nov-23	12
MP2_7	-32.0855	115.7656	16-Nov-23	23-Nov-23	12
MP2_8	-32.0856	115.7655	16-Nov-23	23-Nov-23	12
MP2_9	-32.0857	115.7656	16-Nov-23	23-Nov-23	12
MP2_10	-32.0857	115.7655	16-Nov-23	23-Nov-23	12
MP3_1	-32.0947	115.7715	19-Nov-23	24-Nov-23	12
MP3_2	-32.0947	115.7718	19-Nov-23	24-Nov-23	12
MP3_3	-32.0942	115.7726	19-Nov-23	24-Nov-23	12
MP3_4	-32.0937	115.7729	19-Nov-23	24-Nov-23	12
MP3_5	-32.0934	115.7732	19-Nov-23	24-Nov-23	12
MP3_6	-32.0929	115.7732	19-Nov-23	24-Nov-23	12
MP3_7	-32.0923	115.7732	19-Nov-23	24-Nov-23	12
MP3_8	-32.0919	115.7731	19-Nov-23	24-Nov-23	12
MP3_9	-32.0915	115.7728	19-Nov-23	24-Nov-23	12
MP3_10	-32.0909	115.7724	19-Nov-23	24-Nov-23	12
MP4_1	-32.09	115.77	16-Nov-23	23-Nov-23	12
MP4_2	-32.09	115.7698	16-Nov-23	23-Nov-23	12
MP4_3	-32.09	115.7697	16-Nov-23	23-Nov-23	12
MP4_4	-32.09	115.7694	16-Nov-23	23-Nov-23	12
MP4_5	-32.0901	115.7693	16-Nov-23	23-Nov-23	12
MP4_6	-32.0901	115.7691	16-Nov-23	23-Nov-23	12
MP4_7	-32.0902	115.7688	16-Nov-23	23-Nov-23	12
MP4_8	-32.0903	115.7686	16-Nov-23	23-Nov-23	12
MP4_9	-32.0905	115.7684	16-Nov-23	23-Nov-23	12
MP4_10	-32.0906	115.7682	16-Nov-23	23-Nov-23	12

Site/trap Number	Latitude	Longitude	Date Opened	Date Closed	Site Visits
MP5_1	-32.0966	115.7672	17-Nov-23	24-Nov-23	12
MP5_2	-32.0967	115.7672	17-Nov-23	24-Nov-23	12
MP5_3	-32.0968	115.7672	17-Nov-23	24-Nov-23	12
MP5_4	-32.0968	115.7673	17-Nov-23	24-Nov-23	12
MP5_5	-32.0968	115.7674	17-Nov-23	24-Nov-23	12
MP5_6	-32.0968	115.7677	17-Nov-23	24-Nov-23	12
MP5_7	-32.0969	115.7677	17-Nov-23	24-Nov-23	12
MP5_8	-32.0969	115.7678	17-Nov-23	24-Nov-23	12
MP5_9	-32.0969	115.7679	17-Nov-23	24-Nov-23	12
MP5_10	-32.0969	115.7681	17-Nov-23	24-Nov-23	12
MP6_1	-32.0943	115.7668	17-Nov-23	24-Nov-23	12
MP6_2	-32.0943	115.7666	17-Nov-23	24-Nov-23	12
MP6_3	-32.0945	115.7663	17-Nov-23	24-Nov-23	12
MP6_4	-32.0945	115.7661	17-Nov-23	24-Nov-23	12
MP6_5	-32.0946	115.7662	17-Nov-23	24-Nov-23	12
MP6_6	-32.0948	115.7662	17-Nov-23	24-Nov-23	12
MP6_7	-32.095	115.7662	17-Nov-23	24-Nov-23	12
MP6_8	-32.0952	115.7662	17-Nov-23	24-Nov-23	12
MP6_9	-32.0953	115.766	17-Nov-23	24-Nov-23	12
MP6_10	-32.0953	115.7657	17-Nov-23	24-Nov-23	12

APPENDIX 3. Date and location of motion cameras deployed at Manning Park

Camera Number	Site Number	Latitude	Longitude	Date Deployed	Date Retrieved
FA1	-	-32.0947	115.7718	17/11/2023	1/12/2023
FA2	MP6	-32.0953	115.7662	17/11/2023	1/12/2023
FA6	-	-32.083	115.7648	17/11/2023	1/12/2023
FA7	-	-32.0988	115.7719	17/11/2023	1/12/2023
FA10	MP5	-32.0971	115.7678	17/11/2023	1/12/2023
FB1	-	-32.0844	115.7645	17/11/2023	1/12/2023
FB2	-	-32.0871	115.767	17/11/2023	1/12/2023
FB3	MP4	-32.0904	115.7687	17/11/2023	1/12/2023
FB7	-	-32.0954	115.7644	17/11/2023	1/12/2023
FC2	-	-32.0915	115.7655	17/11/2023	1/12/2023
FC3	MP2	-32.0856	115.7659	17/11/2023	1/12/2023
FC6	-	-32.0933	115.7684	17/11/2023	1/12/2023
FC8	MP3	-32.0907	115.7723	17/11/2023	1/12/2023
FC9	-	-32.0877	115.7639	17/11/2023	1/12/2023
FD3	-	-32.0927	115.7655	17/11/2023	1/12/2023
FD6	MP1	-32.0976	115.7707	17/11/2023	1/12/2023

APPENDIX 4: Bat detector locations at Manning Park

Bat Detector ID	Site Number	Latitude	Longitude	Date Deployed	Date Retrieved
BAT_MP1	1	-32.0975	115.7708	17/11/2023	18/11/2023
BAT_MP2	2	-32.0856	115.7664	18/11/2023	19/11/2023
BAT_MP3	3	-32.0915	115.7725	21/11/2023	22/11/2023
BAT_MP4	4	-32.0901	115.7693	16/11/2023	17/11/2023
BAT_MP5	5	-32.0969	115.7674	19/11/2023	20/11/2023
BAT_MP6	6	-32.0952	115.7662	20/11/2023	21/11/2023

APPENDIX 5. All fauna detected during trapping surveys of Manning Park

Date	Taxon Name	Capture number	Site number	Lat	Long	Method
17/11/2023	*Mus musculus*	1	1	-32.097851	115.769951	Bucket
17/11/2023	*Ctenotus fallens*	1	1	-32.097851	115.769951	Bucket
17/11/2023	*Lerista lineata*	1	1	-32.097034	115.770721	Bucket
17/11/2023	*Menetia greyii*	1	1	-32.097034	115.770721	Bucket
17/11/2023	*Menetia greyii*	1	1	-32.097107	115.770683	Bucket
17/11/2023	*Australian magpie*	1	1	-32.097843	115.7696	Cage
17/11/2023	*Ctenotus fallens*	1	1	-32.097107	115.770683	Funnel
17/11/2023	*Ctenotus fallens*	1	1	-32.097424	115.770576	Funnel
17/11/2023	*Hemiergis quadrilineata*	1	1	-32.097332	115.770607	Funnel
17/11/2023	*Tiliqua rugosa*	1	1	-32.097233	115.770668	Large Elliott
17/11/2023	*Menetia greyii*	2	1	-32.097527	115.770538	Bucket
17/11/2023	*Tiliqua rugosa*	1	1	-32.0979	115.770103	Large Elliott
17/11/2023	*Anilios australis*	1	2	-32.085461	115.765579	Bucket
17/11/2023	*Hemiergis quadrilineata*	1	2	-32.085674	115.76561	Funnel
17/11/2023	*Menetia greyii*	1	2	-32.085304	115.765656	Bucket
17/11/2023	*Lialis burtonis*	1	2	-32.085461	115.765579	Funnel
17/11/2023	*Cryptoblepharus buchananii*	1	4	-32.089985	115.769676	Bucket
17/11/2023	*Morethia lineoocellata*	1	4	-32.090092	115.769272	Bucket
17/11/2023	*Morethia lineoocellata*	1	4	-32.090569	115.768211	Funnel
18/11/2023	*Ctenotus fallens*	1	1	-32.097874	115.769676	Bucket
18/11/2023	*Tiliqua rugosa*	1	1	-32.097294	115.770592	Cage
18/11/2023	*Ctenotus fallens*	1	1	-32.097034	115.770737	Funnel
18/11/2023	*Ctenotus fallens*	1	1	-32.097294	115.770592	Funnel
18/11/2023	*Menetia greyii*	1	1	-32.097034	115.770737	Funnel
18/11/2023	*Tiliqua rugosa*	1	1	-32.097427	115.770576	Large Elliott
18/11/2023	*Mus musculus*	1	1	-32.097897	115.769676	Small Elliott
18/11/2023	*Mus musculus*	1	1	-32.097816	115.769531	Small Elliott
18/11/2023	*Mus musculus*	1	1	-32.0979	115.770088	Small Elliott
18/11/2023	*Menetia greyii*	1	2	-32.084946	115.765755	Bucket
18/11/2023	*Lialis burtonis*	1	2	-32.085304	115.765694	Funnel
18/11/2023	*Lialis burtonis*	1	2	-32.085415	115.765594	Funnel
18/11/2023	*Strophurus spinigerus*	1	2	-32.08551	115.765579	Funnel
18/11/2023	*Tiliqua rugosa*	1	2	-32.08551	115.765579	Large Elliott
18/11/2023	*Mus musculus*	1	2	-32.085304	115.765694	Small Elliott
18/11/2023	*Mus musculus*	1	2	-32.085594	115.765495	Small Elliott
18/11/2023	*Mus musculus*	1	2	-32.085674	115.765579	Small Elliott
18/11/2023	*Tiliqua rugosa*	1	2	-32.085049	115.765694	Small Elliott
18/11/2023	*Egernia kingii*	1	3	-32.09293	115.773209	Cage
18/11/2023	*Egernia kingii*	1	3	-32.090866	115.772415	Cage
18/11/2023	*Egernia kingii*	1	3	-32.092323	115.773262	Cage
18/11/2023	*Mus musculus*	1	3	-32.094215	115.772591	Small Elliott
18/11/2023	*Mus musculus*	1	3	-32.091541	115.772789	Small Elliott
18/11/2023	*Lerista distinguenda*	1	4	-32.089977	115.769905	Bucket
18/11/2023	*Rattus rattus*	1	4	-32.090084	115.769257	Cage
18/11/2023	*Tiliqua rugosa*	1	4	-32.09	115.769646	Cage
18/11/2023	*Tiliqua rugosa*	1	4	-32.089985	115.769371	Cage
18/11/2023	*Ctenotus fallens*	1	4	-32.090054	115.769112	Funnel
18/11/2023	*Ctenotus fallens*	1	4	-32.090172	115.768867	Funnel
18/11/2023	*Hemiergis quadrilineata*	1	4	-32.090366	115.768669	Funnel
18/11/2023	*Morethia obscura*	1	4	-32.089958	115.769806	Funnel
18/11/2023	*Mus musculus*	1	4	-32.090084	115.769257	Small Elliott
18/11/2023	*Anilios australis*	1	5	-32.09679	115.767265	Bucket

Date	Taxon Name	Capture number	Site number	Lat	Long	Method
18/11/2023	*Ctenotus fallens*	1	5	-32.096882	115.767708	Funnel
18/11/2023	*Ctenotus fallens*	4	5	-32.096779	115.767204	Funnel
18/11/2023	*Ctenotus fallens*	1	5	-32.096565	115.767159	Funnel
18/11/2023	*Lialis burtonis*	1	5	-32.096912	115.767952	Funnel
18/11/2023	*Strophurus spinigerus*	1	5	-32.096565	115.767159	Funnel
18/11/2023	*Menetia greyii*	1	6	-32.094334	115.7668	Bucket
18/11/2023	*Morethia obscura*	1	6	-32.094749	115.766243	Funnel
19/11/2023	*Cryptoblepharus buchananii*	1	1	-32.097332	115.770607	Bucket
19/11/2023	*Hemiergis quadrilineata*	1	1	-32.097145	115.770706	Bucket
19/11/2023	*Lerista lineata*	1	1	-32.097034	115.770638	Bucket
19/11/2023	*Menetia greyii*	1	1	-32.097034	115.770638	Bucket
19/11/2023	*Menetia greyii*	1	1	-32.097462	115.770554	Bucket
19/11/2023	*Tiliqua rugosa*	1	1	-32.097145	115.770706	Cage
19/11/2023	*Ctenotus fallens*	1	1	-32.097816	115.769516	Funnel
19/11/2023	*Menetia greyii*	1	1	-32.097034	115.770638	Funnel
19/11/2023	*Menetia greyii*	1	1	-32.097145	115.770706	Funnel
19/11/2023	*Mus musculus*	1	1	-32.097462	115.770554	Small Elliott
19/11/2023	*Mus musculus*	1	1	-32.097904	115.770119	Small Elliott
19/11/2023	*Ctenotus australis*	1	2	-32.084824	115.76577	Bucket
19/11/2023	*Delma grayii*	1	2	-32.0854	115.765594	Bucket
19/11/2023	*Hemiergis quadrilineata*	1	2	-32.085606	115.76548	Bucket
19/11/2023	*Lerista lineata*	1	2	-32.084824	115.76577	Bucket
19/11/2023	*Menetia greyii*	1	2	-32.085491	115.765556	Bucket
19/11/2023	*Tiliqua rugosa*	1	2	-32.085606	115.76548	Cage
19/11/2023	*Isoodon fusciventer*	1	2	-32.085716	115.765495	Large Elliott
19/11/2023	*Tiliqua rugosa*	1	2	-32.085491	115.765556	Large Elliott
19/11/2023	*Rattus rattus*	1	3	-32.094215	115.772606	Cage
19/11/2023	*Egernia kingii*	1	3	-32.090885	115.77243	Cage
19/11/2023	*Mus musculus*	1	3	-32.094215	115.772606	Small Elliott
19/11/2023	*Mus musculus*	1	3	-32.09333	115.773163	Small Elliott
19/11/2023	*Mus musculus*	1	3	-32.085308	115.765671	Small Elliott
19/11/2023	*Rattus rattus*	1	3	-32.08567	115.765579	Small Elliott
19/11/2023	*Hemiergis quadrilineata*	1	4	-32.090553	115.768181	Bucket
19/11/2023	*Lerista distinguenda*	1	4	-32.089931	115.769875	Bucket
19/11/2023	*Lerista distinguenda*	1	4	-32.089977	115.769386	Bucket
19/11/2023	*Lerista distinguenda*	1	4	-32.090153	115.768845	Bucket
19/11/2023	*Morethia lineoocellata*	1	4	-32.089977	115.769806	Bucket
19/11/2023	*Egernia kingii*	1	4	-32.092873	115.773209	Cage
19/11/2023	*Tiliqua rugosa*	1	4	-32.089977	115.769386	Cage
19/11/2023	*Ctenotus fallens*	1	4	-32.090069	115.769073	Funnel
19/11/2023	*Ctenotus fallens*	2	5	-32.096775	115.76722	Bucket
19/11/2023	*Ctenotus fallens*	2	5	-32.096798	115.767303	Funnel
19/11/2023	*Mus musculus*	1	5	-32.096939	115.767807	Small Elliott
19/11/2023	*Mus musculus*	1	5	-32.094341	115.766571	Small Elliott
19/11/2023	*Hemiergis quadrilineata*	1	6	-32.094357	115.76683	Bucket
19/11/2023	*Lerista lineata*	1	6	-32.095188	115.766182	Bucket
19/11/2023	*Lerista lineata*	1	6	-32.094357	115.76683	Bucket
19/11/2023	*Tiliqua rugosa*	1	6	-32.09499	115.766212	Bucket
19/11/2023	*Rattus rattus*	1	6	-32.094532	115.766258	Cage
19/11/2023	*Ctenotus fallens*	1	6	-32.094498	115.766159	Funnel
19/11/2023	*Ctenotus fallens*	1	6	-32.094357	115.766602	Funnel
20/11/2023	*Hemiergis quadrilineata*	1	1	-32.097126	115.770668	Bucket
20/11/2023	*Hemiergis quadrilineata*	1	1	-32.097355	115.770576	Bucket

Date	Taxon Name	Capture number	Site number	Lat	Long	Method
20/11/2023	*Menetia greyii*	1	1	-32.097008	115.770706	Bucket
20/11/2023	*Menetia greyii*	1	1	-32.097126	115.770668	Bucket
20/11/2023	*Menetia greyii*	1	1	-32.097359	115.770576	Bucket
20/11/2023	*Tiliqua rugosa*	1	1	-32.097359	115.770576	Cage
20/11/2023	*Ctenotus fallens*	1	1	-32.097126	115.770668	Funnel
20/11/2023	*Ctenotus fallens*	1	1	-32.097855	115.769562	Funnel
20/11/2023	*Pseudonaja affinis*	1	1	-32.097855	115.769562	Funnel
20/11/2023	*Tiliqua rugosa*	1	1	-32.097431	115.770592	Large Elliott
20/11/2023	*Lerista lineata*	1	2	-32.085033	115.765656	Bucket
20/11/2023	*Neelaps bimaculatus*	1	2	-32.085033	115.765656	Bucket
20/11/2023	*Lialis burtonis*	1	2	-32.085411	115.76561	Funnel
20/11/2023	*Mus musculus*	1	2	-32.085022	115.765671	Small Elliott
20/11/2023	*Mus musculus*	1	2	-32.085316	115.76564	Small Elliott
20/11/2023	*Egernia kingii*	1	3	-32.093376	115.773109	Cage
20/11/2023	*Egernia kingii*	1	3	-32.092937	115.773178	Cage
20/11/2023	*Rattus rattus*	1	3	-32.091858	115.773079	Funnel
20/11/2023	*Mus musculus*	1	3	-32.090885	115.772446	Small Elliott
20/11/2023	*Mus musculus*	1	3	-32.094711	115.771759	Small Elliott
20/11/2023	*Mus musculus*	1	3	-32.094742	115.77153	Small Elliott
20/11/2023	*Lerista distinguenda*	1	4	-32.089966	115.76976	Bucket
20/11/2023	*Lerista distinguenda*	1	4	-32.089985	115.769432	Bucket
20/11/2023	*Menetia greyii*	1	4	-32.090206	115.768883	Bucket
20/11/2023	*Tiliqua rugosa*	1	4	-32.090149	115.769272	Cage
20/11/2023	*Tiliqua rugosa*	1	4	-32.090473	115.768379	Cage
20/11/2023	*Ctenotus fallens*	1	4	-32.090099	115.769089	Funnel
20/11/2023	*Morethia obscura*	1	4	-32.089985	115.769432	Funnel
20/11/2023	*Morethia obscura*	1	4	-32.090149	115.769272	Funnel
20/11/2023	*Anilios australis*	1	5	-32.096767	115.767204	Bucket
20/11/2023	*Strophurus spinigerus*	1	5	-32.096691	115.767189	Bucket
20/11/2023	*Ctenotus fallens*	1	5	-32.096767	115.767204	Funnel
20/11/2023	*Pseudonaja affinis*	1	5	-32.096569	115.767159	Funnel
20/11/2023	*Mus musculus*	1	5	-32.096569	115.767159	Large Elliott
20/11/2023	*Silvereye*	5	5	-32.09677	115.767682	Sighting
20/11/2023	*Singing honeyeater*	1	5	-32.09677	115.767682	Sighting
20/11/2023	*Mus musculus*	1	5	-32.096878	115.767708	Small Elliott
20/11/2023	*Mus musculus*	1	5	-32.09676	115.767708	Small Elliott
20/11/2023	*Mus musculus*	1	5	-32.096569	115.767159	Small Elliott
20/11/2023	*Tiliqua rugosa*	1	6	-32.095009	115.766212	Bucket
20/11/2023	*Tiliqua rugosa*	1	6	-32.094501	115.766228	Cage
20/11/2023	*Ctenotus fallens*	1	6	-32.095188	115.766197	Funnel
20/11/2023	*Tiliqua rugosa*	1	6	-32.094357	115.7668	Small Elliott
21/11/2023	*Mus musculus*	1	1	-32.097107	115.770683	Bucket
21/11/2023	*Aprasia repens*	1	1	-32.097908	115.76992	Bucket
21/11/2023	*Menetia greyii*	1	1	-32.097107	115.770683	Bucket
21/11/2023	*Menetia greyii*	1	1	-32.097332	115.770607	Bucket
21/11/2023	*Menetia greyii*	1	1	-32.097427	115.770538	Bucket
21/11/2023	*Menetia greyii*	1	1	-32.097591	115.770477	Bucket
21/11/2023	*Menetia greyii*	1	1	-32.097908	115.76992	Bucket
21/11/2023	*Menetia greyii*	1	1	-32.097874	115.769577	Bucket
21/11/2023	*Hemiergis quadrilineata*	1	1	-32.09705	115.770721	Funnel
21/11/2023	*Hemiergis quadrilineata*	1	1	-32.097881	115.769936	Funnel
21/11/2023	*Tiliqua rugosa*	1	1	-32.097427	115.770538	Large Elliott
21/11/2023	*Tiliqua rugosa*	1	1	-32.097897	115.770119	Large Elliott

Date	Taxon Name	Capture number	Site number	Lat	Long	Method
21/11/2023	*Mus musculus*	1	1	-32.097324	115.770653	Small Elliott
21/11/2023	*Lialis burtonis*	1	2	-32.085464	115.765556	Bucket
21/11/2023	*Neelaps bimaculatus*	1	2	-32.084846	115.76577	Bucket
21/11/2023	*Tiliqua rugosa*	2	2	-32.084908	115.7658	Cage
21/11/2023	*Tiliqua rugosa*	1	2	-32.085659	115.76561	Cage
21/11/2023	*Hemiergis quadrilineata*	1	2	-32.084969	115.765739	Funnel
21/11/2023	*Mus musculus*	1	2	-32.085728	115.765495	Small Elliott
21/11/2023	*Rattus rattus*	1	3	-32.093731	115.772919	Cage
21/11/2023	*Rattus rattus*	1	3	-32.093372	115.773109	Cage
21/11/2023	*Egernia kingii*	1	3	-32.092979	115.773209	Cage
21/11/2023	*Egernia kingii*	1	3	-32.090919	115.772415	Cage
21/11/2023	*Mus musculus*	1	3	-32.094841	115.7715	Small Elliott
21/11/2023	*Christinus marmoratus*	1	4	-32.089981	115.76963	Bucket
21/11/2023	*Lerista distinguenda*	3	4	-32.089985	115.769844	Bucket
21/11/2023	*Menetia greyii*	1	4	-32.090034	115.769257	Bucket
21/11/2023	*Tiliqua rugosa*	1	4	-32.090034	115.769257	Cage
21/11/2023	*Hemiergis quadrilineata*	1	4	-32.089981	115.76963	Funnel
21/11/2023	*Hemiergis quadrilineata*	1	4	-32.090431	115.768356	Funnel
21/11/2023	*Lialis burtonis*	1	4	-32.089985	115.769844	Funnel
21/11/2023	*Morethia obscura*	1	4	-32.090034	115.769257	Funnel
21/11/2023	*Morethia obscura*	1	4	-32.090412	115.768379	Funnel
21/11/2023	*Morethia obscura*	1	4	-32.090557	115.768181	Funnel
21/11/2023	*Aprasia repens*	1	5	-32.096657	115.767204	Bucket
21/11/2023	*Hemiergis quadrilineata*	1	5	-32.096752	115.767235	Bucket
21/11/2023	*Pogona minor*	1	5	-32.096794	115.767349	Bucket
21/11/2023	*Ctenotus fallens*	1	5	-32.096794	115.767448	Funnel
21/11/2023	*Ctenotus fallens*	1	5	-32.096752	115.767235	Funnel
21/11/2023	*Strophurus spinigerus*	1	5	-32.096794	115.767349	Funnel
21/11/2023	*Mus musculus*	1	5	-32.096931	115.767921	Small Elliott
21/11/2023	*Mus musculus*	1	5	-32.096874	115.767723	Small Elliott
21/11/2023	*Ctenotus australis*	1	6	-32.095272	115.765968	Bucket
21/11/2023	*Lialis burtonis*	1	6	-32.094345	115.766777	Bucket
21/11/2023	*Menetia greyii*	1	6	-32.095161	115.766197	Bucket
21/11/2023	*Menetia greyii*	1	6	-32.094322	115.766647	Bucket
21/11/2023	*Tiliqua rugosa*	1	6	-32.094566	115.766197	Cage
21/11/2023	*Ctenotus fallens*	1	6	-32.094978	115.766212	Funnel
21/11/2023	*Neelaps bimaculatus*	1	6	-32.095161	115.766197	Funnel
21/11/2023	*Mus musculus*	1	6	-32.095257	115.765709	Small Elliott
22/11/2023	*Aprasia repens*	1	1	-32.09742	115.770554	Bucket
22/11/2023	*Aprasia repens*	1	1	-32.097805	115.769577	Bucket
22/11/2023	*Ctenotus fallens*	1	1	-32.097546	115.770508	Bucket
22/11/2023	*Hemiergis quadrilineata*	1	1	-32.097202	115.770592	Bucket
22/11/2023	*Hemiergis quadrilineata*	1	1	-32.097912	115.770088	Bucket
22/11/2023	*Menetia greyii*	1	1	-32.097214	115.770607	Bucket
22/11/2023	*Menetia greyii*	1	1	-32.097878	115.770088	Bucket
22/11/2023	*Ctenotus fallens*	1	1	-32.097103	115.770638	Funnel
22/11/2023	*Hemiergis quadrilineata*	1	1	-32.096996	115.770737	Funnel
22/11/2023	*Menetia greyii*	1	1	-32.096996	115.770737	Funnel
22/11/2023	*Tiliqua rugosa*	1	1	-32.097881	115.769661	Funnel
22/11/2023	*Lerista lineata*	1	2	-32.08572	115.765495	Bucket
22/11/2023	*Menetia greyii*	1	2	-32.08559	115.76548	Bucket
22/11/2023	*Strophurus spinigerus*	2	2	-32.085003	115.765755	Funnel
22/11/2023	*Egernia kingii*	1	3	-32.092991	115.773209	Cage

Date	Taxon Name	Capture number	Site number	Lat	Long	Method
22/11/2023	*Egernia kingii*	1	3	-32.09153	115.772789	Cage
22/11/2023	*Mus musculus*	1	3	-32.094742	115.771515	Small Elliott
22/11/2023	*Lerista distinguenda*	1	4	-32.089962	115.769386	Bucket
22/11/2023	*Lerista distinguenda*	4	4	-32.090359	115.768654	Bucket
22/11/2023	*Lerista distinguenda*	4	4	-32.090435	115.768425	Bucket
22/11/2023	*Lerista distinguenda*	1	4	-32.090576	115.768166	Bucket
22/11/2023	*Lialis burtonis*	1	4	-32.089954	115.76973	Bucket
22/11/2023	*Menetia greyii*	1	4	-32.089962	115.769386	Bucket
22/11/2023	*Morethia obscura*	1	4	-32.089962	115.769386	Bucket
22/11/2023	*Morethia obscura*	1	4	-32.09008	115.769302	Bucket
22/11/2023	*Morethia obscura*	1	4	-32.090576	115.768166	Bucket
22/11/2023	*Tiliqua rugosa*	1	4	-32.09008	115.769302	Bucket
22/11/2023	*Aprasia repens*	1	4	-32.090176	115.768867	Funnel
22/11/2023	*Tiliqua rugosa*	1	4	-32.089962	115.769386	Funnel
22/11/2023	*Ctenotus fallens*	1	5	-32.095268	115.765984	Bucket
22/11/2023	*Lialis burtonis*	1	5	-32.096783	115.76722	Bucket
22/11/2023	*Lialis burtonis*	1	5	-32.095203	115.766212	Funnel
22/11/2023	*Cryptoblepharus buchananii*	2	6	-32.09499	115.766212	Bucket
22/11/2023	*Lerista lineata*	2	6	-32.094349	115.766777	Bucket
22/11/2023	*Lialis burtonis*	1	6	-32.094517	115.766243	Bucket
23/11/2023	*Ctenotus fallens*	1	1	-32.090137	115.769058	Funnel
23/11/2023	*Pseudonaja affinis*	1	1	-32.091393	115.765999	Large Elliott
23/11/2023	*Tiliqua rugosa*	1	1	-32.091412	115.768082	Large Elliott
23/11/2023	*Aprasia repens*	1	2	-32.085396	115.765594	Bucket
23/11/2023	*Cryptoblepharus buchananii*	1	4	-32.090343	115.768669	Bucket
23/11/2023	*Lerista distinguenda*	1	4	-32.089973	115.76963	Bucket
23/11/2023	*Lerista distinguenda*	1	4	-32.090084	115.769218	Bucket
23/11/2023	*Lerista distinguenda*	1	4	-32.090111	115.769127	Bucket
23/11/2023	*Morethia obscura*	1	4	-32.089973	115.76963	Funnel
23/11/2023	*Morethia obscura*	1	4	-32.090099	115.769157	Funnel
23/11/2023	*Strophurus spinigerus*	1	5	-32.096748	115.767189	Bucket
23/11/2023	*Lialis burtonis*	1	6	-32.094597	115.766212	Bucket
23/11/2023	*Strophurus spinigerus*	1	6	-32.09528	115.765724	Funnel
24/11/2023	*Aprasia repens*	1	5	-32.096657	115.767204	Bucket
24/11/2023	*Hemiergis quadrilineata*	1	6	-32.094505	115.766243	Bucket
24/11/2023	*Lerista lineata*	1	6	-32.094376	115.766602	Bucket
24/11/2023	*Hemiergis quadrilineata*	1	6	-32.094482	115.766159	Funnel
24/11/2023	*Hemiergis quadrilineata*	1	6	-32.095287	115.765724	Funnel
24/11/2023	*Lerista lineata*	1	6	-32.095264	115.765984	Funnel

APPENDIX 6. All birds detected during systematic bird surveys at trapping sites at Manning Park

Date	Common Name	Observed number	Site number	Lat	Long	Method
17/11/2023	Australian magpie	4	1	-32.09746	115.770543	Sighting
17/11/2023	Australian raven	2	1	-32.09746	115.770543	Sighting
17/11/2023	Australian ringneck	1	1	-32.09746	115.770543	Sighting
17/11/2023	Brown honeyeater	2	1	-32.09746	115.770543	Sighting
17/11/2023	Galah	2	1	-32.09746	115.770543	Sighting
17/11/2023	Grey fantail	1	1	-32.09746	115.770543	Sighting
17/11/2023	Mistletoebird	1	1	-32.09746	115.770543	Sighting
17/11/2023	Rainbow bee-eater	1	1	-32.09746	115.770543	Sighting
17/11/2023	Rainbow lorikeet	2	1	-32.09746	115.770543	Sighting
17/11/2023	Red wattlebird	3	1	-32.09746	115.770543	Sighting
17/11/2023	Rufous whistler	1	1	-32.09746	115.770543	Sighting
17/11/2023	Silvereye	3	1	-32.09746	115.770543	Sighting
17/11/2023	Singing honeyeater	1	1	-32.09746	115.770543	Sighting
17/11/2023	Splendid fairy-wren	4	1	-32.09746	115.770543	Sighting
17/11/2023	Tawny frogmouth	4	1	-32.09746	115.770543	Sighting
17/11/2023	Weebill	2	1	-32.09746	115.770543	Sighting
17/11/2023	Western gerygone	3	1	-32.09746	115.770543	Sighting
17/11/2023	Willie wagtail	1	1	-32.09746	115.770543	Sighting
17/11/2023	Yellow-rumped thornbill	3	1	-32.09746	115.770543	Sighting
17/11/2023	Australian raven	3	2	-32.08529	115.765645	Sighting
17/11/2023	Grey fantail	1	2	-32.08529	115.765645	Sighting
17/11/2023	Laughing kookaburra	1	2	-32.08529	115.765645	Sighting
17/11/2023	Rainbow bee-eater	2	2	-32.08529	115.765645	Sighting
17/11/2023	Rufous whistler	2	2	-32.08529	115.765645	Sighting
17/11/2023	Silvereye	2	2	-32.08529	115.765645	Sighting
17/11/2023	Singing honeyeater	2	2	-32.08529	115.765645	Sighting
17/11/2023	Weebill	2	2	-32.08529	115.765645	Sighting
17/11/2023	Western gerygone	1	2	-32.08529	115.765645	Sighting
17/11/2023	Black-faced cuckoo-shrike	1	4	-32.0901	115.769262	Sighting
17/11/2023	Brown goshawk	1	4	-32.0901	115.769262	Sighting
17/11/2023	Brown honeyeater	3	4	-32.0901	115.769262	Sighting
17/11/2023	Galah	2	4	-32.0901	115.769262	Sighting
17/11/2023	Grey butcherbird	1	4	-32.0901	115.769262	Sighting
17/11/2023	Laughing kookaburra	2	4	-32.0901	115.769262	Sighting
17/11/2023	Little corella	3	4	-32.0901	115.769262	Sighting
17/11/2023	Mistletoebird	1	4	-32.0901	115.769262	Sighting
17/11/2023	Rainbow lorikeet	4	4	-32.0901	115.769262	Sighting
17/11/2023	Red wattlebird	4	4	-32.0901	115.769262	Sighting
17/11/2023	Silvereye	3	4	-32.0901	115.769262	Sighting
17/11/2023	Singing honeyeater	2	4	-32.0901	115.769262	Sighting
17/11/2023	Spotted dove	1	4	-32.0901	115.769262	Sighting
17/11/2023	Weebill	3	4	-32.0901	115.769262	Sighting
17/11/2023	Western gerygone	2	4	-32.0901	115.769262	Sighting
18/11/2023	Australian magpie	4	1	-32.097547	115.770492	Sighting
18/11/2023	Australian raven	2	1	-32.097547	115.770492	Sighting
18/11/2023	Brown goshawk	1	1	-32.097547	115.770492	Sighting
18/11/2023	Brown honeyeater	5	1	-32.097547	115.770492	Sighting
18/11/2023	Crested pigeon	2	1	-32.097547	115.770492	Sighting
18/11/2023	Grey fantail	1	1	-32.097547	115.770492	Sighting
18/11/2023	Mistletoebird	1	1	-32.097547	115.770492	Sighting
18/11/2023	Rainbow lorikeet	6	1	-32.097547	115.770492	Sighting
18/11/2023	Red wattlebird	1	1	-32.097547	115.770492	Sighting

Date	Common Name	Observed number	Site number	Lat	Long	Method
18/11/2023	Rufous whistler	1	1	-32.097547	115.770492	Sighting
18/11/2023	Silvereye	2	1	-32.097547	115.770492	Sighting
18/11/2023	Singing honeyeater	1	1	-32.097547	115.770492	Sighting
18/11/2023	Weebill	4	1	-32.097547	115.770492	Sighting
18/11/2023	Willie wagtail	1	1	-32.097547	115.770492	Sighting
18/11/2023	Australasian grebe	2	3	-32.0943	115.771122	Sighting
18/11/2023	Australasian shoveler	2	3	-32.0943	115.771122	Sighting
18/11/2023	Australian magpie	4	3	-32.091682	115.772377	Sighting
18/11/2023	Australian pelican	3	3	-32.0943	115.771122	Sighting
18/11/2023	Australian shelduck	2	3	-32.0943	115.771122	Sighting
18/11/2023	Australian white ibis	3	3	-32.0943	115.771122	Sighting
18/11/2023	Black swan	4	3	-32.0943	115.771122	Sighting
18/11/2023	Buff-banded rail	1	3	-32.0943	115.771122	Sighting
18/11/2023	Dusky moorhen	2	3	-32.0943	115.771122	Sighting
18/11/2023	Eurasian coot	30	3	-32.0943	115.771122	Sighting
18/11/2023	Galah	5	3	-32.091682	115.772377	Sighting
18/11/2023	Grey butcherbird	2	3	-32.091682	115.772377	Sighting
18/11/2023	Grey teal	20	3	-32.0943	115.771122	Sighting
18/11/2023	Hoary-headed grebe	1	3	-32.0943	115.771122	Sighting
18/11/2023	Little black cormorant	2	3	-32.0943	115.771122	Sighting
18/11/2023	Little corella	6	3	-32.091682	115.772377	Sighting
18/11/2023	Pacific black duck	4	3	-32.0943	115.771122	Sighting
18/11/2023	Pink-eared duck	5	3	-32.0943	115.771122	Sighting
18/11/2023	Purple swamphen	1	3	-32.0943	115.771122	Sighting
18/11/2023	Rainbow lorikeet	8	3	-32.091682	115.772377	Sighting
18/11/2023	Silver gull	3	3	-32.0943	115.771122	Sighting
18/11/2023	White-faced heron	2	3	-32.0943	115.771122	Sighting
18/11/2023	Willie wagtail	2	3	-32.091682	115.772377	Sighting
18/11/2023	Yellow-billed spoonbill	3	3	-32.0943	115.771122	Sighting
18/11/2023	Australian raven	5	4	-32.0901	115.769262	Sighting
18/11/2023	Brown honeyeater	2	4	-32.0901	115.769262	Sighting
18/11/2023	Galah	2	4	-32.0901	115.769262	Sighting
18/11/2023	Little corella	2	4	-32.0901	115.769262	Sighting
18/11/2023	New-holland honeyeater	2	4	-32.0901	115.769262	Sighting
18/11/2023	Rainbow lorikeet	7	4	-32.0901	115.769262	Sighting
18/11/2023	Red wattlebird	6	4	-32.0901	115.769262	Sighting
18/11/2023	Red-capped parrot	2	4	-32.0901	115.769262	Sighting
18/11/2023	Rufous whistler	1	4	-32.0901	115.769262	Sighting
18/11/2023	Silvereye	2	4	-32.0901	115.769262	Sighting
18/11/2023	Spotted dove	1	4	-32.0901	115.769262	Sighting
18/11/2023	Striated pardalote	1	4	-32.0901	115.769262	Sighting
18/11/2023	Weebill	4	4	-32.0901	115.769262	Sighting
18/11/2023	Western gerygone	2	4	-32.0901	115.769262	Sighting
19/11/2023	Australian magpie	1	1	-32.097547	115.770492	Sighting
19/11/2023	Australian raven	4	1	-32.097547	115.770492	Sighting
19/11/2023	Black-faced cuckoo-shrike	1	1	-32.097547	115.770492	Sighting
19/11/2023	Galah	3	1	-32.097547	115.770492	Sighting
19/11/2023	Little corella	1	1	-32.097547	115.770492	Sighting
19/11/2023	Rainbow lorikeet	4	1	-32.097547	115.770492	Sighting
19/11/2023	Red wattlebird	3	1	-32.097547	115.770492	Sighting
19/11/2023	Silvereye	6	1	-32.097547	115.770492	Sighting
19/11/2023	Singing honeyeater	1	1	-32.097547	115.770492	Sighting
19/11/2023	Splendid fairy-wren	4	1	-32.097547	115.770492	Sighting

Date	Common Name	Observed number	Site number	Lat	Long	Method
19/11/2023	Weebill	4	1	-32.097547	115.770492	Sighting
19/11/2023	Western gerygone	4	1	-32.097547	115.770492	Sighting
19/11/2023	Australian raven	3	2	-32.08529	115.765645	Sighting
19/11/2023	Black-faced cuckoo-shrike	1	2	-32.08529	115.765645	Sighting
19/11/2023	Grey fantail	1	2	-32.08529	115.765645	Sighting
19/11/2023	New-holland honeyeater	3	2	-32.08529	115.765645	Sighting
19/11/2023	Rainbow bee-eater	2	2	-32.08529	115.765645	Sighting
19/11/2023	Rainbow lorikeet	3	2	-32.08529	115.765645	Sighting
19/11/2023	Red-tailed Black-cockatoo	4	2	-32.08529	115.765645	Sighting
19/11/2023	Rufous whistler	1	2	-32.08529	115.765645	Sighting
19/11/2023	Silvereye	6	2	-32.08529	115.765645	Sighting
19/11/2023	Splendid fairy-wren	2	2	-32.08529	115.765645	Sighting
19/11/2023	Spotted dove	2	2	-32.08529	115.765645	Sighting
19/11/2023	Spotted pardalote	2	2	-32.08529	115.765645	Sighting
19/11/2023	Tawny frogmouth	4	2	-32.08529	115.765645	Sighting
19/11/2023	Western gerygone	1	2	-32.08529	115.765645	Sighting
19/11/2023	White-browed scrubwren	2	2	-32.08529	115.765645	Sighting
19/11/2023	white-cheeked honeyeater	2	2	-32.08529	115.765645	Sighting
19/11/2023	Willie wagtail	1	2	-32.08529	115.765645	Sighting
19/11/2023	Singing honeyeater	1	5	-32.09677	115.767682	Sighting
19/11/2023	Variegated fairy-wren	3	5	-32.09677	115.767682	Sighting
19/11/2023	White-browed scrubwren	1	5	-32.09677	115.767682	Sighting
19/11/2023	Silvereye	3	6	-32.094762	115.766243	Sighting
19/11/2023	White-browed scrubwren	2	6	-32.094762	115.766243	Sighting
20/11/2023	Australian raven	2	2	-32.08529	115.765645	Sighting
20/11/2023	Brown honeyeater	2	2	-32.08529	115.765645	Sighting
20/11/2023	New-holland honeyeater	2	2	-32.08529	115.765645	Sighting
20/11/2023	Rainbow bee-eater	2	2	-32.08529	115.765645	Sighting
20/11/2023	Rainbow lorikeet	4	2	-32.08529	115.765645	Sighting
20/11/2023	Red-tailed Black-cockatoo	2	2	-32.08529	115.765645	Sighting
20/11/2023	Rufous whistler	2	2	-32.08529	115.765645	Sighting
20/11/2023	Silvereye	6	2	-32.08529	115.765645	Sighting
20/11/2023	Singing honeyeater	1	2	-32.08529	115.765645	Sighting
20/11/2023	Western gerygone	2	2	-32.08529	115.765645	Sighting
20/11/2023	White-browed scrubwren	2	2	-32.08529	115.765645	Sighting
20/11/2023	white-cheeked honeyeater	1	2	-32.08529	115.765645	Sighting
20/11/2023	Yellow-rumped thornbill	2	2	-32.08529	115.765645	Sighting
20/11/2023	Australian white ibis	2	3	-32.0943	115.771122	Sighting
20/11/2023	Black swan	3	3	-32.0943	115.771122	Sighting
20/11/2023	Crested pigeon	2	3	-32.091682	115.772377	Sighting
20/11/2023	Eurasian coot	20	3	-32.0943	115.771122	Sighting
20/11/2023	Great egret	2	3	-32.0943	115.771122	Sighting
20/11/2023	Grey teal	20	3	-32.0943	115.771122	Sighting
20/11/2023	Laughing dove	2	3	-32.091682	115.772377	Sighting
20/11/2023	Little corella	6	3	-32.091682	115.772377	Sighting
20/11/2023	Pacific black duck	8	3	-32.0943	115.771122	Sighting
20/11/2023	Pink-eared duck	3	3	-32.0943	115.771122	Sighting
20/11/2023	Red wattlebird	8	3	-32.091682	115.772377	Sighting
20/11/2023	Willie wagtail	1	3	-32.091682	115.772377	Sighting
20/11/2023	Australian magpie	2	4	-32.0901	115.769262	Sighting
20/11/2023	Galah	2	4	-32.0901	115.769262	Sighting
20/11/2023	Grey fantail	1	4	-32.0901	115.769262	Sighting
20/11/2023	Laughing kookaburra	1	4	-32.0901	115.769262	Sighting

Date	Common Name	Observed number	Site number	Lat	Long	Method
20/11/2023	Rainbow lorikeet	2	4	-32.0901	115.769262	Sighting
20/11/2023	Red wattlebird	4	4	-32.0901	115.769262	Sighting
20/11/2023	Rufous whistler	1	4	-32.0901	115.769262	Sighting
20/11/2023	Silvereye	9	4	-32.0901	115.769262	Sighting
20/11/2023	Singing honeyeater	3	4	-32.0901	115.769262	Sighting
20/11/2023	Spotted dove	2	4	-32.0901	115.769262	Sighting
20/11/2023	Striated pardalote	1	4	-32.0901	115.769262	Sighting
20/11/2023	Weebill	2	4	-32.0901	115.769262	Sighting
20/11/2023	Western gerygone	4	4	-32.0901	115.769262	Sighting
20/11/2023	White-browed scrubwren	1	4	-32.0901	115.769262	Sighting
20/11/2023	Silvereye	5	5	-32.09677	115.767682	Sighting
20/11/2023	Singing honeyeater	1	5	-32.09677	115.767682	Sighting
20/11/2023	Australian raven	2	6	-32.094762	115.766243	Sighting
20/11/2023	Rufous whistler	2	6	-32.094762	115.766243	Sighting
20/11/2023	Silvereye	4	6	-32.094762	115.766243	Sighting
20/11/2023	Singing honeyeater	1	6	-32.094762	115.766243	Sighting
20/11/2023	Variegated fairy-wren	3	6	-32.094762	115.766243	Sighting
20/11/2023	Western gerygone	3	6	-32.094762	115.766243	Sighting
20/11/2023	White-browed scrubwren	3	6	-32.094762	115.766243	Sighting
21/11/2023	Australian magpie	3	1	-32.097547	115.770492	Sighting
21/11/2023	Australian raven	1	1	-32.097547	115.770492	Sighting
21/11/2023	Black-faced cuckoo-shrike	1	1	-32.097547	115.770492	Sighting
21/11/2023	Brown honeyeater	3	1	-32.097547	115.770492	Sighting
21/11/2023	Grey fantail	1	1	-32.097547	115.770492	Sighting
21/11/2023	Laughing dove	1	1	-32.097547	115.770492	Sighting
21/11/2023	Rainbow bee-eater	1	1	-32.097547	115.770492	Sighting
21/11/2023	Rainbow lorikeet	2	1	-32.097547	115.770492	Sighting
21/11/2023	Red wattlebird	4	1	-32.097547	115.770492	Sighting
21/11/2023	Rufous whistler	1	1	-32.097547	115.770492	Sighting
21/11/2023	Silvereye	6	1	-32.097547	115.770492	Sighting
21/11/2023	Singing honeyeater	2	1	-32.097547	115.770492	Sighting
21/11/2023	Splendid fairy-wren	3	1	-32.097547	115.770492	Sighting
21/11/2023	Weebill	5	1	-32.097547	115.770492	Sighting
21/11/2023	Western gerygone	2	1	-32.097547	115.770492	Sighting
21/11/2023	Australasian shoveler	2	3	-32.0943	115.771122	Sighting
21/11/2023	Australian pelican	3	3	-32.0943	115.771122	Sighting
21/11/2023	Australian ringneck	2	3	-32.091682	115.772377	Sighting
21/11/2023	Australian shelduck	2	3	-32.0943	115.771122	Sighting
21/11/2023	Australian white ibis	4	3	-32.0943	115.771122	Sighting
21/11/2023	Brown goshawk	1	3	-32.091682	115.772377	Sighting
21/11/2023	Buff-banded rail	1	3	-32.0943	115.771122	Sighting
21/11/2023	Carnaby's cockatoo	2	3	-32.090217	115.772396	Sighting
21/11/2023	Crested pigeon	1	3	-32.0943	115.771122	Sighting
21/11/2023	Dusky moorhen	1	3	-32.0943	115.771122	Sighting
21/11/2023	Eurasian coot	50	3	-32.0943	115.771122	Sighting
21/11/2023	Galah	2	3	-32.091682	115.772377	Sighting
21/11/2023	Great egret	2	3	-32.0943	115.771122	Sighting
21/11/2023	Grey teal	9	3	-32.0943	115.771122	Sighting
21/11/2023	Hoary-headed grebe	1	3	-32.0943	115.771122	Sighting
21/11/2023	Laughing kookaburra	1	3	-32.091682	115.772377	Sighting
21/11/2023	Little black cormorant	2	3	-32.0943	115.771122	Sighting
21/11/2023	Little corella	4	3	-32.091682	115.772377	Sighting
21/11/2023	Magpie-lark	2	3	-32.091682	115.772377	Sighting

Date	Common Name	Observed number	Site number	Lat	Long	Method
21/11/2023	Mistletoebird	1	3	-32.091682	115.772377	Sighting
21/11/2023	Pacific black duck	7	3	-32.0943	115.771122	Sighting
21/11/2023	Pink-eared duck	8	3	-32.0943	115.771122	Sighting
21/11/2023	Purple swamphen	3	3	-32.0943	115.771122	Sighting
21/11/2023	Red-capped parrot	2	3	-32.091682	115.772377	Sighting
21/11/2023	Silver gull	5	3	-32.0943	115.771122	Sighting
21/11/2023	White-faced heron	1	3	-32.0943	115.771122	Sighting
21/11/2023	Willie wagtail	2	3	-32.091682	115.772377	Sighting
21/11/2023	Yellow-billed spoonbill	3	3	-32.0943	115.771122	Sighting
21/11/2023	Australian magpie	2	4	-32.0901	115.769262	Sighting
21/11/2023	Australian raven	3	4	-32.0901	115.769262	Sighting
21/11/2023	Brown honeyeater	5	4	-32.0901	115.769262	Sighting
21/11/2023	Galah	2	4	-32.0901	115.769262	Sighting
21/11/2023	Grey butcherbird	1	4	-32.0901	115.769262	Sighting
21/11/2023	Grey fantail	1	4	-32.0901	115.769262	Sighting
21/11/2023	Little corella	4	4	-32.0901	115.769262	Sighting
21/11/2023	New-holland honeyeater	2	4	-32.0901	115.769262	Sighting
21/11/2023	Rainbow lorikeet	7	4	-32.0901	115.769262	Sighting
21/11/2023	Red wattlebird	4	4	-32.0901	115.769262	Sighting
21/11/2023	Rufous whistler	1	4	-32.0901	115.769262	Sighting
21/11/2023	Silvereye	3	4	-32.0901	115.769262	Sighting
21/11/2023	Singing honeyeater	2	4	-32.0901	115.769262	Sighting
21/11/2023	Striated pardalote	2	4	-32.0901	115.769262	Sighting
21/11/2023	Weebill	2	4	-32.0901	115.769262	Sighting
21/11/2023	Western gerygone	2	4	-32.0901	115.769262	Sighting
21/11/2023	Black-shouldered Kite	1	5	-32.09677	115.767682	Sighting
21/11/2023	Brown goshawk	3	5	-32.09677	115.767682	Sighting
21/11/2023	Silvereye	6	5	-32.09677	115.767682	Sighting
21/11/2023	Splendid fairy-wren	4	5	-32.09677	115.767682	Sighting
21/11/2023	White-browed scrubwren	1	5	-32.09677	115.767682	Sighting
21/11/2023	Australian raven	2	6	-32.094762	115.766243	Sighting
21/11/2023	Rainbow lorikeet	2	6	-32.094762	115.766243	Sighting
21/11/2023	Red wattlebird	2	6	-32.094762	115.766243	Sighting
21/11/2023	Rufous whistler	1	6	-32.094762	115.766243	Sighting
21/11/2023	Silvereye	5	6	-32.094762	115.766243	Sighting
21/11/2023	Singing honeyeater	1	6	-32.094762	115.766243	Sighting
21/11/2023	Tree martin	2	6	-32.094762	115.766243	Sighting
21/11/2023	Western gerygone	1	6	-32.094762	115.766243	Sighting
21/11/2023	White-browed scrubwren	3	6	-32.094762	115.766243	Sighting
22/11/2023	Australian magpie	1	1	-32.097547	115.770492	Sighting
22/11/2023	Australian raven	1	1	-32.097547	115.770492	Sighting
22/11/2023	Brown honeyeater	2	1	-32.097547	115.770492	Sighting
22/11/2023	Grey fantail	1	1	-32.097547	115.770492	Sighting
22/11/2023	Mistletoebird	1	1	-32.097547	115.770492	Sighting
22/11/2023	Rainbow lorikeet	2	1	-32.097547	115.770492	Sighting
22/11/2023	Red wattlebird	2	1	-32.097547	115.770492	Sighting
22/11/2023	Silvereye	4	1	-32.097547	115.770492	Sighting
22/11/2023	Weebill	2	1	-32.097547	115.770492	Sighting
22/11/2023	Western gerygone	2	1	-32.097547	115.770492	Sighting
22/11/2023	White-browed scrubwren	1	1	-32.097547	115.770492	Sighting
22/11/2023	Willie wagtail	1	1	-32.097547	115.770492	Sighting
22/11/2023	Yellow-rumped thornbill	2	1	-32.097547	115.770492	Sighting
22/11/2023	Brown honeyeater	3	2	-32.08529	115.765645	Sighting

Date	Common Name	Observed number	Site number	Lat	Long	Method
22/11/2023	Grey fantail	1	2	-32.08529	115.765645	Sighting
22/11/2023	Rainbow bee-eater	2	2	-32.08529	115.765645	Sighting
22/11/2023	Rainbow lorikeet	2	2	-32.08529	115.765645	Sighting
22/11/2023	Rufous whistler	1	2	-32.08529	115.765645	Sighting
22/11/2023	Silvereye	5	2	-32.08529	115.765645	Sighting
22/11/2023	Singing honeyeater	1	2	-32.08529	115.765645	Sighting
22/11/2023	Western gerygone	1	2	-32.08529	115.765645	Sighting
22/11/2023	White-browed scrubwren	1	2	-32.08529	115.765645	Sighting
22/11/2023	Australasian shoveler	3	3	-32.0943	115.771122	Sighting
22/11/2023	Australian magpie	4	3	-32.091682	115.772377	Sighting
22/11/2023	Australian raven	3	3	-32.091682	115.772377	Sighting
22/11/2023	Australian shelduck	3	3	-32.0943	115.771122	Sighting
22/11/2023	Crested pigeon	2	3	-32.091682	115.772377	Sighting
22/11/2023	Eurasian coot	50	3	-32.0943	115.771122	Sighting
22/11/2023	Galah	5	3	-32.091682	115.772377	Sighting
22/11/2023	Great egret	2	3	-32.0943	115.771122	Sighting
22/11/2023	Grey teal	30	3	-32.0943	115.771122	Sighting
22/11/2023	Hoary-headed grebe	1	3	-32.0943	115.771122	Sighting
22/11/2023	Little black cormorant	2	3	-32.0943	115.771122	Sighting
22/11/2023	Little corella	3	3	-32.091682	115.772377	Sighting
22/11/2023	Pacific black duck	30	3	-32.0943	115.771122	Sighting
22/11/2023	Pied stilt	1	3	-32.09184	115.771378	Sighting
22/11/2023	Pink-eared duck	5	3	-32.0943	115.771122	Sighting
22/11/2023	Silver gull	20	3	-32.0943	115.771122	Sighting
22/11/2023	Straw-necked Ibis	1	3	-32.0943	115.771122	Sighting
22/11/2023	Tree martin	2	3	-32.091682	115.772377	Sighting
22/11/2023	White-faced heron	1	3	-32.0943	115.771122	Sighting
22/11/2023	Willie wagtail	2	3	-32.091682	115.772377	Sighting
22/11/2023	Yellow-billed spoonbill	5	3	-32.0943	115.771122	Sighting
22/11/2023	Australian magpie	4	4	-32.0901	115.769262	Sighting
22/11/2023	Australian raven	3	4	-32.0901	115.769262	Sighting
22/11/2023	Black-faced cuckoo-shrike	1	4	-32.0901	115.769262	Sighting
22/11/2023	Brown goshawk	1	4	-32.0901	115.769262	Sighting
22/11/2023	Brown honeyeater	3	4	-32.0901	115.769262	Sighting
22/11/2023	Galah	4	4	-32.0901	115.769262	Sighting
22/11/2023	Grey butcherbird	1	4	-32.0901	115.769262	Sighting
22/11/2023	Little corella	2	4	-32.0901	115.769262	Sighting
22/11/2023	New-holland honeyeater	2	4	-32.0901	115.769262	Sighting
22/11/2023	Rainbow lorikeet	6	4	-32.0901	115.769262	Sighting
22/11/2023	Red wattlebird	5	4	-32.0901	115.769262	Sighting
22/11/2023	Rufous whistler	2	4	-32.0901	115.769262	Sighting
22/11/2023	Silvereye	9	4	-32.0901	115.769262	Sighting
22/11/2023	Singing honeyeater	2	4	-32.0901	115.769262	Sighting
22/11/2023	Weebill	2	4	-32.0901	115.769262	Sighting
22/11/2023	Western gerygone	3	4	-32.0901	115.769262	Sighting
22/11/2023	White-browed scrubwren	1	4	-32.0901	115.769262	Sighting
23/11/2023	Mistletoebird	1	2	-32.08529	115.765645	Sighting
23/11/2023	Rainbow bee-eater	2	2	-32.08529	115.765645	Sighting
23/11/2023	Rufous whistler	1	2	-32.08529	115.765645	Sighting
23/11/2023	Silvereye	3	2	-32.08529	115.765645	Sighting
23/11/2023	Singing honeyeater	1	2	-32.08529	115.765645	Sighting
23/11/2023	Western gerygone	2	2	-32.08529	115.765645	Sighting
23/11/2023	Australian magpie	4	3	-32.091682	115.772377	Sighting

Date	Common Name	Observed number	Site number	Lat	Long	Method
23/11/2023	Australian raven	5	3	-32.091682	115.772377	Sighting
23/11/2023	Eurasian coot	30	3	-32.0943	115.771122	Sighting
23/11/2023	Grey teal	20	3	-32.0943	115.771122	Sighting
23/11/2023	Little black cormorant	1	3	-32.0943	115.771122	Sighting
23/11/2023	Pacific black duck	20	3	-32.0943	115.771122	Sighting
23/11/2023	Pied stilt	2	3	-32.091751	115.771506	Sighting
23/11/2023	Pink-eared duck	5	3	-32.0943	115.771122	Sighting
23/11/2023	Rainbow bee-eater	2	3	-32.090203	115.770902	Sighting
23/11/2023	Red wattlebird	5	3	-32.091682	115.772377	Sighting
23/11/2023	White-faced heron	1	3	-32.0943	115.771122	Sighting
23/11/2023	Willie wagtail	1	3	-32.091682	115.772377	Sighting
23/11/2023	Australian raven	2	5	-32.09677	115.767682	Sighting
23/11/2023	Australian white ibis	1	5	-32.09677	115.767682	Sighting
23/11/2023	Rainbow lorikeet	3	5	-32.09677	115.767682	Sighting
23/11/2023	Silvereye	4	5	-32.09677	115.767682	Sighting
23/11/2023	Spotted dove	1	5	-32.09677	115.767682	Sighting
23/11/2023	Variegated fairy-wren	5	5	-32.09677	115.767682	Sighting
23/11/2023	White-browed scrubwren	3	5	-32.09677	115.767682	Sighting
23/11/2023	Rufous whistler	3	6	-32.094762	115.766243	Sighting
23/11/2023	Silvereye	6	6	-32.094762	115.766243	Sighting
23/11/2023	Singing honeyeater	2	6	-32.094762	115.766243	Sighting
23/11/2023	Spotted dove	1	6	-32.094762	115.766243	Sighting
23/11/2023	White-browed scrubwren	2	6	-32.094762	115.766243	Sighting

APPENDIX 7. All fauna detected during targeted, spotlighting, motion camera and bat detector surveys at Manning Park

Date	Species	Observed number	Site number	Lat	Long	Method
22/08/2023	*Limnodynastes dorsalis*	5		-32.09375	115.772612	Sighting
22/08/2023	*Limnodynastes dorsalis*	1		-32.091698	115.772383	Sighting
22/08/2023	*Limnodynastes dorsalis*	1		-32.090167	115.772088	Sighting
22/08/2023	*Limnodynastes dorsalis*			-32.091443	115.770158	Sighting
22/08/2023	*Limnodynastes dorsalis*	1		-32.093358	115.770397	Sighting
22/08/2023	*Limnodynastes dorsalis*	1		-32.094252	115.770747	Sighting
22/08/2023	*Litoria adelaidensis*	1		-32.09375	115.772612	Sighting
22/08/2023	*Litoria adelaidensis*	1		-32.091698	115.772383	Sighting
22/08/2023	*Litoria adelaidensis*	1		-32.090167	115.772088	Sighting
22/08/2023	*Litoria adelaidensis*			-32.091443	115.770158	Sighting
22/08/2023	*Litoria adelaidensis*	1		-32.093358	115.770397	Sighting
22/08/2023	*Litoria moorei*			-32.091443	115.770158	Sighting
22/08/2023	*Litoria moorei*	1		-32.094252	115.770747	Sighting
23/08/2023	*Limnodynastes dorsalis*	5		-32.09375	115.772612	Sighting
23/08/2023	*Limnodynastes dorsalis*	2		-32.091698	115.772383	Sighting
23/08/2023	*Limnodynastes dorsalis*	4		-32.090167	115.772088	Sighting
23/08/2023	*Limnodynastes dorsalis*	2		-32.091443	115.770158	Sighting
23/08/2023	*Limnodynastes dorsalis*	2		-32.093358	115.770397	Sighting
23/08/2023	*Limnodynastes dorsalis*	2		-32.094252	115.770747	Sighting
23/08/2023	*Litoria adelaidensis*	2		-32.09375	115.772612	Sighting
23/08/2023	*Litoria adelaidensis*	3		-32.091698	115.772383	Sighting
23/08/2023	*Litoria adelaidensis*	2		-32.090167	115.772088	Sighting
23/08/2023	*Litoria adelaidensis*	5		-32.091443	115.770158	Sighting
23/08/2023	*Litoria adelaidensis*	2		-32.093358	115.770397	Sighting
23/08/2023	*Litoria adelaidensis*	1		-32.094252	115.770747	Sighting
23/08/2023	*Litoria moorei*	1		-32.09375	115.772612	Sighting
23/08/2023	*Litoria moorei*	2		-32.091698	115.772383	Sighting
23/08/2023	*Litoria moorei*	3		-32.091443	115.770158	Sighting
5/09/2023	Red-tailed Black-cockatoo	5		-32.09129	115.769791	Forage
5/09/2023	Red-tailed Black-cockatoo	1		-32.091511	115.76963	Hollow
5/09/2023	Australian kestrel	1				Sighting
5/09/2023	Australian magpie	1				Sighting
5/09/2023	Australian raven	1				Sighting
5/09/2023	Australian ringneck	1				Sighting
5/09/2023	Australian shelduck	1				Sighting
5/09/2023	Black swan	1				Sighting
5/09/2023	Black-faced cuckoo-shrike	1				Sighting
5/09/2023	Brown honeyeater	1				Sighting
5/09/2023	Carnaby's cockatoo	10		-32.087975	115.764618	Sighting
5/09/2023	Carnaby's cockatoo	8		-32.08876	115.764076	Sighting
5/09/2023	Crested pigeon	1				Sighting
5/09/2023	Dusky moorhen	1				Sighting
5/09/2023	Galah	1				Sighting
5/09/2023	Grey teal	1				Sighting
5/09/2023	Hardhead	1				Sighting
5/09/2023	Laughing kookaburra	1				Sighting
5/09/2023	Little corella	1				Sighting
5/09/2023	Magpie-lark	1				Sighting
5/09/2023	Pacific black duck	1				Sighting
5/09/2023	Purple swamphen	1				Sighting
5/09/2023	Rainbow lorikeet	1				Sighting

Date	Species	Observed number	Site number	Lat	Long	Method
5/09/2023	Red wattlebird	1				Sighting
5/09/2023	Red-tailed Black-cockatoo	12		-32.084743	115.766777	Sighting
5/09/2023	Silver gull	1				Sighting
5/09/2023	Singing honeyeater	1				Sighting
5/09/2023	Splendid fairy-wren	1		-32.084568	115.765335	Sighting
5/09/2023	Striated pardalote	1				Sighting
5/09/2023	Weebill	1				Sighting
5/09/2023	Welcome swallow	1				Sighting
5/09/2023	Western gerygone	1		-32.096764	115.770523	Sighting
5/09/2023	white-cheeked honeyeater	1		-32.089138	115.765854	Sighting
5/09/2023	white-cheeked honeyeater	1		-32.086231	115.766228	Sighting
5/09/2023	white-cheeked honeyeater	1		-32.085438	115.766373	Sighting
5/09/2023	white-cheeked honeyeater	1		-32.086376	115.764275	Sighting
5/09/2023	White-faced heron	1				Sighting
5/09/2023	Willie wagtail	1				Sighting
5/09/2023	*Pogona minor*	1		-32.086239	115.766212	Sighting
16/11/2023	*Cryptoblepharus buchananii*	1	1	-32.097569	115.770462	Sighting
16/11/2023	*Pseudonaja affinis*	1	1	-32.097412	115.770554	Sighting
16/11/2023	*Lerista lineata*	1	2	-32.085739	115.765495	Sighting
16/11/2023	*Cryptoblepharus buchananii*	1	4	-32.090065	115.769173	Sighting
16/11/2023	*Austronomus australis*			-32.090095	115.769297	Bat Detector
16/11/2023	*Chalinolobus gouldii*			-32.090095	115.769297	Bat Detector
16/11/2023	*Vespadelus regulus*			-32.090095	115.769297	Bat Detector
16/11/2023	Rainbow bee-eater	1		-32.084908	115.766457	Burrow
16/11/2023	Rainbow bee-eater	1		-32.084923	115.766846	Burrow
17/11/2023	*Austronomus australis*			-32.097452	115.770775	Bat Detector
17/11/2023	*Chalinolobus gouldii*			-32.097452	115.770775	Bat Detector
17/11/2023	*Rainbow bee-eater*	1		-32.08485	115.767021	Burrow
17/11/2023	*Hemiergis quadrilineata*	1		-32.085674	115.76561	Funnel
17/11/2023	Red-tailed Black-cockatoo	3		-32.084644	115.767532	Sighting
17/11/2023	White-browed scrubwren	1		-32.09354	115.766472	Sighting
17/11/2023	White-faced heron	1		-32.096279	115.766571	Sighting
18/11/2023	*Austronomus australis*			-32.08559	115.766382	Bat Detector
18/11/2023	*Chalinolobus gouldii*			-32.08559	115.766382	Bat Detector
18/11/2023	Oryctolagus cuniculus	1		-32.095291	115.764359	Burrow
18/11/2023	Brown goshawk	2		-32.094376	115.766129	Sighting
18/11/2023	Brown goshawk	1		-32.084679	115.765312	Sighting
19/11/2023	*Austronomus australis*			-32.096897	115.7674	Bat Detector
19/11/2023	*Chalinolobus gouldii*			-32.096897	115.7674	Bat Detector
19/11/2023	Carnaby's cockatoo	9		-32.094589	115.772346	Sighting
20/11/2023	*Austronomus australis*			-32.095158	115.766162	Bat Detector
20/11/2023	*Chalinolobus gouldii*			-32.095158	115.766162	Bat Detector
20/11/2023	*Ozimops kitcheneri*			-32.095158	115.766162	Bat Detector
20/11/2023	*Vespadelus regulus*			-32.095158	115.766162	Bat Detector
21/11/2023	*Chalinolobus gouldii*			-32.091512	115.772518	Bat Detector
21/11/2023	*Nyctophilus geoffroyi*			-32.091512	115.772518	Bat Detector
21/11/2023	*Chelodina oblonga*	1		-32.094711	115.771484	Nest
21/11/2023	*Chelodina oblonga*	1		-32.094646	115.77137	Nest
21/11/2023	*Chelodina oblonga*	1		-32.094799	115.772415	Nest
21/11/2023	*Chelodina oblonga*	1		-32.09322	115.773209	Nest
21/11/2023	*Chelodina oblonga*	1		-32.091595	115.772964	Nest
21/11/2023	*Chelodina oblonga*	1		-32.09306	115.773354	Nest
21/11/2023	*Chelodina oblonga*	1		-32.093254	115.773506	Nest

Date	Species	Observed number	Site number	Lat	Long	Method
21/11/2023	*Chelodina oblonga*	1		-32.093479	115.773521	Nest
21/11/2023	*Chelodina oblonga*	1		-32.093491	115.773369	Nest
21/11/2023	*Chelodina oblonga*	1		-32.09425	115.772919	Nest
21/11/2023	*Chelodina oblonga*	1		-32.094376	115.772881	Nest
21/11/2023	*Chelodina oblonga*	1		-32.095219	115.772232	Nest
21/11/2023	*Chelodina oblonga*	1		-32.089912	115.770393	Nest
21/11/2023	Carnaby's cockatoo	1		-32.096409	115.771286	Forage
21/11/2023	Carnaby's cockatoo	1		-32.097752	115.771759	Forage
21/11/2023	Carnaby's cockatoo	1		-32.098221	115.772331	Forage
21/11/2023	Carnaby's cockatoo	1		-32.098461	115.772102	Forage
21/11/2023	Carnaby's cockatoo	1		-32.099754	115.772736	Forage
21/11/2023	Carnaby's cockatoo	1		-32.098518	115.769241	Forage
21/11/2023	Carnaby's cockatoo	1		-32.09832	115.768654	Forage
21/11/2023	Carnaby's cockatoo	1		-32.096706	115.770164	Forage
21/11/2023	Oryctolagus cuniculus	1		-32.09539	115.765541	Scat
21/11/2023	Brown goshawk	1		-32.094551	115.771729	Sighting
21/11/2023	Great egret	1		-32.093723	115.77256	Sighting
21/11/2023	Red-tailed Black-cockatoo	6		-32.094986	115.768394	Sighting
21/11/2023	Red-tailed Black-cockatoo	1		-32.093365	115.773323	Sighting
21/11/2023	Splendid fairy-wren	1		-32.096333	115.766701	Sighting
21/11/2023	White-browed scrubwren	1		-32.09832	115.768555	Sighting
21/11/2023	*Cryptoblepharus buchananii*	1		-32.096981	115.771973	Sighting
21/11/2023	*Cryptoblepharus buchananii*	1		-32.090744	115.772575	Sighting
21/11/2023	*Ctenotus fallens*	1		-32.096981	115.771973	Sighting
21/11/2023	*Ctenotus fallens*	1		-32.097595	115.771873	Sighting
21/11/2023	*Hemiergis quadrilineata*	1		-32.0965	115.7714	Sighting
21/11/2023	*Pseudonaja affinis*	1		-32.094135	115.772705	Sighting
21/11/2023	*Tiliqua rugosa*	1		-32.098515	115.772118	Sighting
21/11/2023	*Heleioporus eyrei*	1		-32.090775	115.772591	Spotlighting
21/11/2023	*Limnodynastes dorsalis*	1		-32.091015	115.770554	Spotlighting
21/11/2023	*Litoria moorei*	1		-32.091064	115.770462	Spotlighting
21/11/2023	*Litoria moorei*	1		-32.090652	115.771065	Spotlighting
21/11/2023	*Litoria moorei*	2		-32.090164	115.772285	Spotlighting
21/11/2023	*Litoria moorei*	1		-32.090511	115.772575	Spotlighting
21/11/2023	*Litoria moorei*	1		-32.090694	115.772545	Spotlighting
21/11/2023	*Litoria moorei*	1		-32.092777	115.773323	Spotlighting
21/11/2023	*Litoria moorei*	1		-32.094303	115.772606	Spotlighting
21/11/2023	Australian boobook	1		-32.095535	115.770523	Spotlighting
21/11/2023	Galah	1		-32.092754	115.769951	Spotlighting
21/11/2023	*Strophurus spinigerus*	1		-32.098549	115.770233	Spotlighting
22/11/2023	*Isoodon fusciventer*	1		-32.094688	115.764015	Digging
22/11/2023	*Isoodon fusciventer*	1		-32.096108	115.7644895	Digging
22/11/2023	*Isoodon fusciventer*	1		-32.0961517	115.7648147	Digging
22/11/2023	Carnaby's cockatoo	1		-32.097939	115.767792	Forage
22/11/2023	Carnaby's cockatoo	1		-32.0978119	115.7676843	Forage
22/11/2023	Carnaby's cockatoo	1		-32.0975714	115.768107	Forage
22/11/2023	Carnaby's cockatoo	1		-32.0926913	115.768934	Forage
22/11/2023	*Chelodina oblonga*	1		-32.093533	115.769257	Nest
22/11/2023	*Oryctolagus cuniculus*	1		-32.095058	115.764114	Scat
22/11/2023	*Oryctolagus cuniculus*	1		-32.095753	115.765556	Scat
22/11/2023	Variegated fairy-wren	1		-32.09269	115.767937	Sighting
22/11/2023	Variegated fairy-wren	1		-32.094303	115.766701	Sighting
22/11/2023	Variegated fairy-wren	1		-32.0927152	115.7678767	Sighting

Date	Species	Observed number	Site number	Lat	Long	Method
22/11/2023	*Menetia greyii*	1		-32.09269	115.767937	Sighting
22/11/2023	*Strophurus spinigerus*	1		-32.096191	115.766342	Sighting
22/11/2023	*Strophurus spinigerus*	1		-32.094868	115.765656	Sighting
22/11/2023	*Strophurus spinigerus*	1		-32.094795	115.765671	Sighting
22/11/2023	Australian boobook	1		-32.094925	115.769463	Spotlighting
22/11/2023	Australian boobook	1		-32.090389	115.766144	Spotlighting
22/11/2023	Oryctolagus cuniculus	2		-32.095684	115.765656	Spotlighting
22/11/2023	*Strophurus spinigerus*	1		-32.09449	115.764175	Spotlighting
22/11/2023	*Strophurus spinigerus*	1		-32.093418	115.76458	Spotlighting
22/11/2023	*Strophurus spinigerus*	1		-32.092567	115.765167	Spotlighting
22/11/2023	*Strophurus spinigerus*	1		-32.090553	115.7658	Spotlighting
22/11/2023	*Strophurus spinigerus*	1		-32.092281	115.767677	Spotlighting
22/11/2023	*Strophurus spinigerus*	1		-32.093662	115.766327	Spotlighting
22/11/2023	*Strophurus spinigerus*	1		-32.094997	115.768845	Spotlighting
23/11/2023	*Oryctolagus cuniculus*	1		-32.092415	115.764938	Digging
23/11/2023	Carnaby's cockatoo	1		-32.092651	115.764435	Forage
23/11/2023	*Chelodina oblonga*	1		-32.091114	115.770195	Nest
23/11/2023	*Chelodina oblonga*	1		-32.090225	115.771271	Nest
23/11/2023	*Chelodina oblonga*	1		-32.09026	115.772446	Nest
23/11/2023	*Chelodina oblonga*	1		-32.09449	115.771194	Nest
23/11/2023	*Chelodina oblonga*	1		-32.094707	115.770912	Nest
23/11/2023	*Chelodina oblonga*	1		-32.093925	115.770164	Nest
23/11/2023	*Chelodina oblonga*	1		-32.093189	115.769844	Nest
23/11/2023	*Chelodina oblonga*	1		-32.092766	115.769821	Nest
23/11/2023	*Chelodina oblonga*	1		-32.092667	115.769547	Nest
23/11/2023	*Chelodina oblonga*	1		-32.092396	115.769485	Nest
23/11/2023	*Chelodina oblonga*	1		-32.092041	115.769447	Nest
23/11/2023	Rainbow bee-eater	1		-32.0902776	115.7660921	Sighting
23/11/2023	Splendid fairy-wren	1		-32.0913952	115.7678467	Sighting
23/11/2023	*Felis catus*	1		-32.084763	115.767548	Sighting
23/11/2023	*Morethia obscura*	1		-32.092579	115.764618	Sighting
23/11/2023	Tawny frogmouth	1		-32.084633	115.765167	Spotlighting
23/11/2023	Tawny frogmouth	1		-32.087482	115.767418	Spotlighting
23/11/2023	*Strophurus spinigerus*	1		-32.08939	115.766182	Spotlighting
23/11/2023	*Strophurus spinigerus*	1		-32.08852	115.763527	Spotlighting
23/11/2023	*Strophurus spinigerus*	1		-32.086414	115.763542	Spotlighting
23/11/2023	*Strophurus spinigerus*	1		-32.085659	115.767532	Spotlighting
23/11/2023	*Strophurus spinigerus*	1		-32.089485	115.768021	Spotlighting
23/11/2023	*Strophurus spinigerus*	1		-32.089539	115.768311	Spotlighting
23/11/2023	*Strophurus spinigerus*	1		-32.089478	115.768784	Spotlighting
24/11/2023	Rainbow bee-eater	1		-32.086895	115.766388	Burrow
24/11/2023	Rainbow bee-eater	1		-32.0868957	115.7663728	Burrow
24/11/2023	*Chelodina oblonga*	1		-32.091492	115.768799	Nest
24/11/2023	*Chelodina oblonga*	1		-32.091377	115.769012	Nest
24/11/2023	*Chelodina oblonga*	1		-32.091171	115.769257	Nest
24/11/2023	*Oryctolagus cuniculus*	1		-32.084045	115.7659	Scat
24/11/2023	Brown goshawk	1		-32.091919	115.769691	Sighting
24/11/2023	Brown goshawk	1		-32.0875038	115.7651811	Sighting
24/11/2023	Carnaby's cockatoo	7		-32.090897	115.768242	Sighting
24/11/2023	Carnaby's cockatoo	2		-32.085533	115.764488	Sighting
24/11/2023	Carnaby's cockatoo	20		-32.0882467	115.7657772	Sighting
24/11/2023	Crested pigeon	1		-32.0862999	115.7675315	Sighting
24/11/2023	Dusky moorhen	1		-32.092476	115.76992	Sighting

Date	Species	Observed number	Site number	Lat	Long	Method
24/11/2023	Red-capped parrot	1		-32.093758	115.772591	Sighting
24/11/2023	Splendid fairy-wren	1		-32.0844711	115.7642556	Sighting
24/11/2023	Variegated fairy-wren	1		-32.0846532	115.7664644	Sighting
24/11/2023	Western gerygone	1		-32.084827	115.766357	Sighting
24/11/2023	Western gerygone	1		-32.084827	115.766357	Sighting
24/11/2023	White-bellied sea-eagle	1		-32.093514	115.771701	Sighting
24/11/2023	White-browed scrubwren	1		-32.088459	115.765312	Sighting
24/11/2023	White-browed scrubwren	1		-32.086979	115.766144	Sighting
24/11/2023	White-browed scrubwren	1		-32.090584	115.766701	Sighting
24/11/2023	white-cheeked honeyeater	1		-32.089531	115.768394	Sighting
24/11/2023	*Felis catus*	1		-32.085491	115.767532	Sighting
24/11/2023	*Cryptoblepharus buchananii*	1		-32.088181	115.767006	Sighting
24/11/2023	*Lerista lineata*	1		-32.091355	115.767877	Sighting
24/11/2023	*Morethia obscura*	1		-32.083366	115.766144	Sighting
24/11/2023	*Pseudonaja affinis*	1		-32.090221	115.766533	Sighting
24/11/2023	*Pseudonaja affinis*	1		-32.086737	115.764899	Sighting
30/11/2023	Buff-banded rail		FA1	-32.094747	115.771775	Motion camera
30/11/2023	*Mus musculus*		FA1	-32.094747	115.771775	Motion camera
30/11/2023	Painted button-quail		FA10	-32.097062	115.767775	Motion camera
30/11/2023	*Mus musculus*		FA10	-32.097062	115.767775	Motion camera
30/11/2023	*Rattus rattus*		FA10	-32.097062	115.767775	Motion camera
30/11/2023	*Tiliqua rugosa*		FA10	-32.097062	115.767775	Motion camera
30/11/2023	Australian raven		FA2	-32.095348	115.766205	Motion camera
30/11/2023	Spotted dove		FA2	-32.095348	115.766205	Motion camera
30/11/2023	*Oryctolagus cuniculus*		FA2	-32.095348	115.766205	Motion camera
30/11/2023	*Rattus rattus*		FA2	-32.095348	115.766205	Motion camera
30/11/2023	*Tiliqua occipitalis*		FA2	-32.095348	115.766205	Motion camera
30/11/2023	*Tiliqua rugosa*		FA2	-32.095348	115.766205	Motion camera
30/11/2023	*Felis catus*		FA6	-32.082982	115.764837	Motion camera
30/11/2023	*Isoodon fusciventer*		FA7	-32.098787	115.771942	Motion camera
30/11/2023	*Tiliqua rugosa*		FA7	-32.098787	115.771942	Motion camera
30/11/2023	*Canis lupus familiaris*		FB1	-32.084433	115.764495	Motion camera
30/11/2023	*Mus musculus*		FB1	-32.084433	115.764495	Motion camera
30/11/2023	*Rattus rattus*		FB1	-32.084433	115.764495	Motion camera
30/11/2023	White-browed scrubwren		FB2	-32.087087	115.766958	Motion camera
30/11/2023	*Felis catus*		FB2	-32.087087	115.766958	Motion camera
30/11/2023	*Rattus rattus*		FB2	-32.087087	115.766958	Motion camera
30/11/2023	*Tiliqua rugosa*		FB2	-32.087087	115.766958	Motion camera
30/11/2023	Laughing dove		FB3	-32.090415	115.768675	Motion camera
30/11/2023	*Rattus rattus*		FB3	-32.090415	115.768675	Motion camera
30/11/2023	*Tiliqua rugosa*		FB3	-32.090415	115.768675	Motion camera
30/11/2023	*Isoodon fusciventer*		FB7	-32.095395	115.764402	Motion camera
30/11/2023	*Oryctolagus cuniculus*		FB7	-32.095395	115.764402	Motion camera
30/11/2023	*Rattus rattus*		FB7	-32.095395	115.764402	Motion camera
30/11/2023	*Tiliqua rugosa*		FB7	-32.095395	115.764402	Motion camera
30/11/2023	*Isoodon fusciventer*		FC2	-32.091493	115.765468	Motion camera
30/11/2023	*Mus musculus*		FC2	-32.091493	115.765468	Motion camera
30/11/2023	*Isoodon fusciventer*		FC3	-32.085635	115.765948	Motion camera
30/11/2023	*Mus musculus*		FC3	-32.085635	115.765948	Motion camera
30/11/2023	*Tiliqua rugosa*		FC3	-32.085635	115.765948	Motion camera
30/11/2023	*Rattus rattus*		FC6	-32.093258	115.76836	Motion camera
30/11/2023	*Tiliqua rugosa*		FC6	-32.093258	115.76836	Motion camera
30/11/2023	*Rattus rattus*		FC8	-32.090743	115.772268	Motion camera

Date	Species	Observed number	Site number	Lat	Long	Method
30/11/2023	*Vulpes vulpes*		FC8	-32.090743	115.772268	Motion camera
30/11/2023	*Mus musculus*		FC9	-32.087735	115.763912	Motion camera
30/11/2023	*Tiliqua occipitalis*		FC9	-32.087735	115.763912	Motion camera
30/11/2023	*Isoodon fusciventer*		FD3	-32.092722	115.765512	Motion camera
30/11/2023	*Oryctolagus cuniculus*		FD3	-32.092722	115.765512	Motion camera
30/11/2023	*Rattus rattus*		FD3	-32.092722	115.765512	Motion camera
30/11/2023	*Tiliqua rugosa*		FD3	-32.092722	115.765512	Motion camera
30/11/2023	Australian magpie		FD6	-32.097613	115.770728	Motion camera
30/11/2023	*Mus musculus*		FD6	-32.097613	115.770728	Motion camera
30/11/2023	*Rattus rattus*		FD6	-32.097613	115.770728	Motion camera
30/11/2023	*Tiliqua rugosa*		FD6	-32.097613	115.770728	Motion camera
1/12/2023	*Oryctolagus cuniculus*	1		-32.093159	115.764763	Burrow
1/12/2023	Carnaby's cockatoo	1		-32.090206	115.76429	Forage
18/12/2023	*Chelodina oblonga*	1		-32.09288	115.769157	Nest
19/12/2023	Square-tailed kite	1		-32.094841	115.766617	Sighting

APPENDIX 8: Raw capture data from the single Quenda captured at Manning Park during current surveys.

Date	Trap	Species	Trap #	Age	Sex	Weight (g)	Re-trap (Y/N)	Comments
19/11/2023	Elliott B	*Isoodon fusciventer*	9	Subadult	female	550	N	Clean pouch

APPENDIX 9: Location and description of tree hollows occupied by feral bees identified at Manning Park during the current survey.

#	Species	Lat	Long	Dead/ Alive	DBH (cm)	# Hollows	Hollow Width (cm)	Comments
4	Redheart	-32.084663	115.765822	Alive	59	1-5	10-15	Bees in 2 hollows and vertical crevice
11	Tuart	-32.084727	115.76665	Alive	100	1-5	10-15	
62	Tuart	-32.090167	115.769065	Alive	>100	1-5	10-15	
63	Tuart	-32.090365	115.769177	Alive	95	1-5	15-20	
90	Tuart	-32.092767	115.769233	Alive	80	1-5	10-30	
91	Tuart	-32.092742	115.76924	Alive	130	1-5	10-15	
110	Tuart	-32.095193	115.769173	Alive	74	1-5	10	
115	Tuart	-32.095207	115.76948	Alive	140	1-5	20-30	
191	Tuart	-32.093455	115.773103	Alive	80	1-5	5-15	Bees in most hollows
192	Tuart	-32.092372	115.773218	Alive	110	1-5	10	
194	Tuart	-32.092112	115.773248	Alive	120	5-10	15-20	

APPENDIX 10. Species, location and measurements of potential habitat trees identified at Manning Park during the current survey.

#	Species	Lat	Long	Dead/ Alive	DBH (cm)	# Hollows	Hollow Width (cm)	Evidence of use	Breeding suitability	Comments
0	*Eucalyptus decipiens*	-32.084642	115.764552	Alive	68				Potential	
1	*Eucalyptus decipiens*	-32.084477	115.764748	Alive	54				Potential	Two trunks (54 & 32cm)
2	*Eucalyptus decipiens*	-32.084447	115.764875	Alive	60				Potential	
3	Tuart (*Eucalyptus gomphocephala*)	-32.084593	115.765417	Alive	88	1-5	1-5		Potential	
4	*Eucalyptus decipiens*	-32.084663	115.765822	Alive	59	1-5	10-15	bees	Suitable	2 hollows/large vertical crevice
5	*Eucalyptus decipiens*	-32.084613	115.765835	Alive	70				Potential	
6	*Eucalyptus decipiens*	-32.08481	115.76586	Alive	60				Potential	
7	Tuart (*Eucalyptus gomphocephala*)	-32.08479	115.766397	Alive	59				Potential	
8	Tuart (*Eucalyptus gomphocephala*)	-32.084815	115.766443	Alive	80				Potential	Two trunks (80 & 61cm)
9	Tuart (*Eucalyptus gomphocephala*)	-32.084828	115.766568	Alive	70	1-5	10-20		Suitable	Two trunks (70 & 55cm)
10	Tuart (*Eucalyptus gomphocephala*)	-32.08522	115.766285	Alive	70	1-5	2-3		Potential	
11	Tuart (*Eucalyptus gomphocephala*)	-32.084727	115.76665	Alive	100	1-5	10-15	bees	Suitable	Two trunks (100 & 95cm)
12	Tuart (*Eucalyptus gomphocephala*)	-32.084758	115.767022	Alive	64				Potential	
13	Tuart (*Eucalyptus gomphocephala*)	-32.084767	115.767192	Alive	50				Potential	Two trunks (50 & 38cm)
14	Tuart (*Eucalyptus gomphocephala*)	-32.084863	115.767213	Alive	58				Potential	
15	Unknown	-32.084662	115.767418	Alive	50				Potential	Red-flowering gum
16	Unknown	-32.084572	115.767483	Alive	60				Potential	Red-flowering gum
17	Unknown	-32.084273	115.767598	Alive	50				Potential	White-gum
18	Tuart (*Eucalyptus gomphocephala*)	-32.085092	115.767058	Alive	50				Potential	
19	Tuart (*Eucalyptus gomphocephala*)	-32.085152	115.767192	Alive	60				Potential	
20	Tuart (*Eucalyptus gomphocephala*)	-32.085205	115.767178	Alive	50				Potential	Two trunks (50 & 41cm)
21	Tuart (*Eucalyptus gomphocephala*)	-32.085195	115.76721	Alive	51				Potential	
22	Tuart (*Eucalyptus gomphocephala*)	-32.085152	115.767378	Alive	82	?			Potential	
23	Tuart (*Eucalyptus gomphocephala*)	-32.08486	115.767623	Alive	51				Potential	
24	Tuart (*Eucalyptus gomphocephala*)	-32.084947	115.767648	Alive	63				Potential	
25	Tuart (*Eucalyptus gomphocephala*)	-32.085027	115.767618	Alive	75				Potential	
26	Tuart (*Eucalyptus gomphocephala*)	-32.085098	115.767618	Alive	69				Potential	
27	Tuart (*Eucalyptus gomphocephala*)	-32.085377	115.767632	Alive	60				Potential	
28	Tuart (*Eucalyptus gomphocephala*)	-32.085902	115.76771	Alive	50				Potential	
29	Tuart (*Eucalyptus gomphocephala*)	-32.086	115.767707	Alive	54				Potential	

#	Species	Lat	Long	Dead/ Alive	DBH (cm)	# Hollows	Hollow Width (cm)	Evidence of use	Breeding suitability	Comments
30	Tuart (*Eucalyptus gomphocephala*)	-32.086187	115.767723	Alive	57				Potential	
31	Tuart (*Eucalyptus gomphocephala*)	-32.086365	115.767743	Alive	58				Potential	
32	Unknown	-32.087737	115.76737	Alive	700	?			Potential	White-gum
33	Tuart (*Eucalyptus gomphocephala*)	-32.087885	115.76728	Alive	110	?			Potential	Three trunks (110, 62 & 60cm)
34	Tuart (*Eucalyptus gomphocephala*)	-32.088198	115.767032	Alive	80				Potential	Four trunks (80, 60, 40 & 30cm)
35	Tuart (*Eucalyptus gomphocephala*)	-32.088295	115.766927	Alive	72	?			Potential	
36	Tuart (*Eucalyptus gomphocephala*)	-32.088192	115.76696	Alive	90	?			Potential	
37	Tuart (*Eucalyptus gomphocephala*)	-32.088233	115.766895	Alive	85	?			Potential	
38	Tuart (*Eucalyptus gomphocephala*)	-32.088053	115.766777	Alive	91	?			Potential	
39	Tuart (*Eucalyptus gomphocephala*)	-32.086933	115.766562	Alive	50				Potential	Three trunks (50, 46 & 39cm)
40	Tuart (*Eucalyptus gomphocephala*)	-32.08651	115.767357	Alive	50				Potential	
41	Tuart (*Eucalyptus gomphocephala*)	-32.086442	115.767308	Alive	70				Potential	
42	Tuart (*Eucalyptus gomphocephala*)	-32.086427	115.767267	Alive	55				Potential	Two trunks (55 & 37cm)
43	Tuart (*Eucalyptus gomphocephala*)	-32.090408	115.769898	Alive	115	?			Potential	
44	Tuart (*Eucalyptus gomphocephala*)	-32.0904	115.769803	Alive	74				Potential	
45	Tuart (*Eucalyptus gomphocephala*)	-32.090335	115.769778	Alive	81	?			Potential	
46	Tuart (*Eucalyptus gomphocephala*)	-32.090335	115.769983	Alive	90	?			Potential	
47	Tuart (*Eucalyptus gomphocephala*)	-32.090287	115.770112	Alive	77				Potential	
48	Tuart (*Eucalyptus gomphocephala*)	-32.09012	115.770242	Alive	110	?			Potential	
49	Tuart (*Eucalyptus gomphocephala*)	-32.089738	115.770273	Alive	64				Potential	Three trunks (64, 63 & 56cm)
50	Tuart (*Eucalyptus gomphocephala*)	-32.089997	115.770212	Alive	60	1	10-15	?	Suitable	Chew marks
51	Tuart (*Eucalyptus gomphocephala*)	-32.090035	115.770145	Alive	59				Potential	
52	Tuart (*Eucalyptus gomphocephala*)	-32.090018	115.77012	Alive	64	?			Potential	
53	Tuart (*Eucalyptus gomphocephala*)	-32.089928	115.76999	Alive	55	?			Potential	Two trunks (55 & 37cm)
54	Tuart (*Eucalyptus gomphocephala*)	-32.090105	115.769913	Alive	90	1	10-15	?	Suitable	
55	Tuart (*Eucalyptus gomphocephala*)	-32.090262	115.770023	Alive	64				Potential	
56	Tuart (*Eucalyptus gomphocephala*)	-32.090197	115.769875	Alive	105	?			Potential	
57	Tuart (*Eucalyptus gomphocephala*)	-32.090022	115.769707	Alive	60				Potential	
58	Tuart (*Eucalyptus gomphocephala*)	-32.090075	115.769642	Alive	50	1	10	?	Suitable	
59	Tuart (*Eucalyptus gomphocephala*)	-32.090123	115.769612	Alive	50				Potential	
60	Tuart (*Eucalyptus gomphocephala*)	-32.090127	115.769363	Alive	110	1-5	10-30	?	Suitable	
61	Tuart (*Eucalyptus gomphocephala*)	-32.090118	115.76918	Alive	74	?			Potential	

#	Species	Lat	Long	Dead/ Alive	DBH (cm)	# Hollows	Hollow Width (cm)	Evidence of use	Breeding suitability	Comments
62	Tuart (*Eucalyptus gomphocephala*)	-32.090167	115.769065	Alive	>100	1-5	10-15	bees	Suitable	
63	Tuart (*Eucalyptus gomphocephala*)	-32.090365	115.769177	Alive	95	1-5	15-20	bees	Suitable	
64	Tuart (*Eucalyptus gomphocephala*)	-32.09045	115.769073	Alive	100	1	5-10	?	Potential	Chew marks
65	Tuart (*Eucalyptus gomphocephala*)	-32.090235	115.76881	Alive	57				Potential	
66	Tuart (*Eucalyptus gomphocephala*)	-32.090572	115.768832	Alive	95	5-10	3-5	?	Potential	
67	Tuart (*Eucalyptus gomphocephala*)	-32.090607	115.768778	Alive	59				Potential	
68	Tuart (*Eucalyptus gomphocephala*)	-32.09067	115.768627	Alive	52				Potential	
69	Tuart (*Eucalyptus gomphocephala*)	-32.090543	115.768517	Alive	88	?			Potential	
70	Tuart (*Eucalyptus gomphocephala*)	-32.090638	115.768458	Alive	100	1-5	10-20	?	Suitable	
71	Tuart (*Eucalyptus gomphocephala*)	-32.090648	115.768402	Dead	56	?			Potential	Narrow vertical cracks and crevices
72	Tuart (*Eucalyptus gomphocephala*)	-32.090723	115.768373	Alive	57				Potential	
73	Tuart (*Eucalyptus gomphocephala*)	-32.090623	115.768313	Alive	63	?			Potential	
74	Tuart (*Eucalyptus gomphocephala*)	-32.090608	115.76833	Alive	72	?			Potential	
75	Tuart (*Eucalyptus gomphocephala*)	-32.090638	115.768255	Alive	74	?			Potential	
76	Tuart (*Eucalyptus gomphocephala*)	-32.090853	115.76816	Alive	100	1-5	10-15	Carnaby's prospecting	Suitable	Three trunks (100, 60 & 34cm). Possible 30cm wide hollow in trunk
77	Tuart (*Eucalyptus gomphocephala*)	-32.090712	115.767797	Alive	110	?			Potential	Two trunks (110 & 80cm)
78	Tuart (*Eucalyptus gomphocephala*)	-32.090995	115.768182	Alive	>150	?			Potential	
79	Tuart (*Eucalyptus gomphocephala*)	-32.09132	115.76816	Alive	64				Potential	
80	Tuart (*Eucalyptus gomphocephala*)	-32.091298	115.768053	Alive	68	1-5	5-10	?	Potential	Four trunks (68, 66, 62 & 38cm)
81	Tuart (*Eucalyptus gomphocephala*)	-32.090282	115.769597	Alive	100	?			Potential	Two trunks (100 & 68cm)
82	Unknown	-32.092192	115.768488	Alive	58				Potential	White-gum
83	Tuart (*Eucalyptus gomphocephala*)	-32.09225	115.768613	Alive	52				Potential	Two trunks (52 & 40cm)
84	Tuart (*Eucalyptus gomphocephala*)	-32.092408	115.768812	Alive	50				Potential	
85	Tuart (*Eucalyptus gomphocephala*)	-32.092413	115.768823	Alive	60				Potential	Two trunks (60 & 48cm)
86	Tuart (*Eucalyptus gomphocephala*)	-32.092638	115.769042	Alive	67				Potential	
87	Tuart (*Eucalyptus gomphocephala*)	-32.092943	115.769127	Alive	66	?			Potential	
88	Tuart (*Eucalyptus gomphocephala*)	-32.092952	115.76915	Alive	61	?			Potential	Two trunks (61 & 52cm)
89	Tuart (*Eucalyptus gomphocephala*)	-32.092905	115.76921	Alive	70	?			Potential	
90	Tuart (*Eucalyptus gomphocephala*)	-32.092767	115.769233	Alive	80	1-5	10-30	bees	Suitable	Two trunks (80 & 71cm). Several 10cm hollows, 1 x large 10x30cm vertical hollow

#	Species	Lat	Long	Dead/ Alive	DBH (cm)	# Hollows	Hollow Width (cm)	Evidence of use	Breeding suitability	Comments
91	Tuart (*Eucalyptus gomphocephala*)	-32.092742	115.76924	Alive	130	1-5	10-15	bees	Suitable	Two trunks (130 & 90cm)
92	Tuart (*Eucalyptus gomphocephala*)	-32.093058	115.76904	Alive	66	?			Potential	
93	Tuart (*Eucalyptus gomphocephala*)	-32.093183	115.768993	Alive	82	1-5	10-15			
94	Tuart (*Eucalyptus gomphocephala*)	-32.093237	115.768993	Alive	81	?			Potential	Two trunks (81 & 44cm)
95	Tuart (*Eucalyptus gomphocephala*)	-32.093438	115.768693	Alive	55				Potential	
96	Tuart (*Eucalyptus gomphocephala*)	-32.09329	115.768355	Alive	60				Potential	Horizontal trunk
97	Tuart (*Eucalyptus gomphocephala*)	-32.093367	115.768365	Alive	94	?			Potential	Three trunks (94, 44 & 37cm)
98	Tuart (*Eucalyptus gomphocephala*)	-32.094082	115.76885	Alive	89				Potential	
99	Tuart (*Eucalyptus gomphocephala*)	-32.094078	115.768963	Alive	100	1	10		Potential	Low down in trunk
100	Tuart (*Eucalyptus gomphocephala*)	-32.094193	115.769137	Alive	50				Potential	
101	Tuart (*Eucalyptus gomphocephala*)	-32.094237	115.769217	Alive	59	1-5	<5cm	?	Potential	
102	Tuart (*Eucalyptus gomphocephala*)	-32.094243	115.769268	Alive	88	1	10	?	Potential	
103	Tuart (*Eucalyptus gomphocephala*)	-32.094827	115.769437	Alive	55	1	10		Potential	2m high
104	Tuart (*Eucalyptus gomphocephala*)	-32.094938	115.769442	Alive	106	?			Potential	
105	Tuart (*Eucalyptus gomphocephala*)	-32.094968	115.769243	Alive	85	?			Potential	
106	Tuart (*Eucalyptus gomphocephala*)	-32.095028	115.769363	Alive	78	?			Potential	
107	Tuart (*Eucalyptus gomphocephala*)	-32.095042	115.769418	Alive	70	?			Potential	Large dead trunk with narrow vertical cracks
108	Tuart (*Eucalyptus gomphocephala*)	-32.095112	115.769408	Alive	61	?			Potential	
109	Tuart (*Eucalyptus gomphocephala*)	-32.095092	115.769363	Alive	75	1-5	10-15	?	Suitable	Chew marks
110	Tuart (*Eucalyptus gomphocephala*)	-32.095193	115.769173	Alive	74	1-5	10	bees	Potential	Two trunks (74 & 62cm)
111	Tuart (*Eucalyptus gomphocephala*)	-32.095348	115.769073	Alive	50				Potential	
112	Tuart (*Eucalyptus gomphocephala*)	-32.09539	115.769022	Alive	58				Potential	
113	Tuart (*Eucalyptus gomphocephala*)	-32.095208	115.769363	Alive	72	?			Potential	
114	Tuart (*Eucalyptus gomphocephala*)	-32.095282	115.769448	Alive	51	1-5	10	?	Potential	Mostly dead. Large dead trunk with several large hollows and cracks
115	Tuart (*Eucalyptus gomphocephala*)	-32.095207	115.76948	Alive	140	1-5	20-30	bees	Suitable	Two trunks (140 & 60cm)
116	*Eucalyptus decipiens*	-32.096613	115.769765	Alive	52				Potential	
117	*Eucalyptus decipiens*	-32.096605	115.76992	Alive	50				Potential	
118	*Eucalyptus decipiens*	-32.096575	115.770068	Alive	50				Potential	Three trunks (50, 48 & 40cm)
119	*Eucalyptus decipiens*	-32.096598	115.770225	Alive	70				Potential	
120	*Eucalyptus decipiens*	-32.097467	115.769998	Alive	58				Potential	

#	Species	Lat	Long	Dead/ Alive	DBH (cm)	# Hollows	Hollow Width (cm)	Evidence of use	Breeding suitability	Comments
121	*Eucalyptus decipiens*	-32.097593	115.76976	Alive	50				Potential	
122	*Eucalyptus decipiens*	-32.097685	115.7691	Alive	52				Potential	
123	*Eucalyptus decipiens*	-32.097773	115.768968	Alive	50				Potential	
124	*Eucalyptus decipiens*	-32.097983	115.76973	Alive	54	1	2		Potential	1.5m from ground
125	*Eucalyptus decipiens*	-32.097965	115.7699	Alive	50				Potential	
126	*Eucalyptus decipiens*	-32.097745	115.769965	Alive	50	1-5	1-3		Potential	
127	*Eucalyptus decipiens*	-32.09787	115.770135	Alive	62				Potential	
128	*Eucalyptus decipiens*	-32.09799	115.770545	Alive	56	1	10		Potential	
129	*Eucalyptus decipiens*	-32.098188	115.770467	Alive	67	?			Potential	Two trunks (67 & 63cm)
130	*Eucalyptus decipiens*	-32.098287	115.770525	Alive	68	?			Potential	
131	*Eucalyptus decipiens*	-32.09817	115.77078	Alive	65	2	2-10	?	Potential	
132	*Eucalyptus decipiens*	-32.097723	115.77099	Alive	72	1-5	3-10	?	Potential	10cm hollow with chew marks
133	*Eucalyptus decipiens*	-32.09779	115.771075	Alive	80	?			Potential	
134	*Eucalyptus decipiens*	-32.098162	115.771393	Dead	50	?			Potential	Two trunks (50 & 36cm)
135	*Eucalyptus decipiens*	-32.098113	115.771562	Alive	50	1	5		Potential	In dead trunk
136	*Eucalyptus decipiens*	-32.09783	115.771392	Alive	70	?			Potential	
137	*Eucalyptus decipiens*	-32.09741	115.771317	Alive	68	?			Potential	
138	*Eucalyptus decipiens*	-32.097308	115.771407	Alive	59	?			Potential	
139	*Eucalyptus decipiens*	-32.09722	115.771497	Alive	70	?			Potential	
140	*Eucalyptus decipiens*	-32.09722	115.771553	Alive	60	?			Potential	
141	*Eucalyptus decipiens*	-32.096885	115.77117	Alive	72	?			Potential	
142	*Eucalyptus decipiens*	-32.096872	115.770942	Alive	55	?			Potential	
143	*Eucalyptus decipiens*	-32.097042	115.770873	Alive	50	?			Potential	
144	*Eucalyptus decipiens*	-32.097035	115.770785	Alive	50	?			Potential	
145	*Eucalyptus decipiens*	-32.09711	115.770775	Alive	50	?			Potential	
146	*Eucalyptus decipiens*	-32.097103	115.770683	Alive	51	?			Potential	
147	*Eucalyptus decipiens*	-32.097178	115.770538	Alive	50	?			Potential	
148	*Eucalyptus decipiens*	-32.097007	115.770218	Alive	72	?			Potential	
149	Unknown	-32.096278	115.771367	Alive	59	0			Potential	White-gum
150	Unknown	-32.096313	115.771393	Alive	51				Potential	
151	Tuart (*Eucalyptus gomphocephala*)	-32.09633	115.771565	Alive	73				Potential	
152	Unknown	-32.09636	115.771933	Alive	51				Potential	

#	Species	Lat	Long	Dead/ Alive	DBH (cm)	# Hollows	Hollow Width (cm)	Evidence of use	Breeding suitability	Comments
153	Tuart (*Eucalyptus gomphocephala*)	-32.096385	115.771958	Alive	69				Potential	
154	Unknown	-32.096373	115.77204	Alive	71				Potential	
155	Unknown	-32.096365	115.772215	Alive	62				Potential	
156	Tuart (*Eucalyptus gomphocephala*)	-32.096458	115.772382	Alive	52				Potential	
157	Tuart (*Eucalyptus gomphocephala*)	-32.09653	115.772443	Alive	64				Potential	
158	Tuart (*Eucalyptus gomphocephala*)	-32.096527	115.77248	Alive	56				Potential	
159	Unknown	-32.096358	115.772323	Alive	59				Potential	White-gum
160	Unknown	-32.096335	115.772393	Alive	78				Potential	
161	Unknown	-32.096297	115.772335	Alive	53				Potential	
162	Unknown	-32.096198	115.77238	Alive	50				Potential	White-gum
163	Unknown	-32.096187	115.772467	Alive	54				Potential	
164	Unknown	-32.096142	115.772538	Alive	80				Potential	White-gum
165	Unknown	-32.096048	115.772625	Alive	88				Potential	
166	Unknown	-32.096038	115.772663	Alive	69				Potential	White-gum
167	Unknown	-32.096015	115.772583	Alive	58				Potential	
168	Unknown	-32.095903	115.772672	Alive	56				Potential	
169	Unknown	-32.095925	115.772738	Alive	70				Potential	
170	Unknown	-32.095825	115.772665	Alive	69				Potential	White-gum
171	Unknown	-32.095795	115.77267	Alive	52				Potential	
172	Unknown	-32.096125	115.770823	Alive	78				Potential	White-gum
173	Unknown	-32.096112	115.77097	Alive	50				Potential	White-gum
174	Unknown	-32.096032	115.770865	Alive	60				Potential	Partly dead
175	Unknown	-32.096098	115.770733	Alive	53				Potential	White-gum
176	Tuart (*Eucalyptus gomphocephala*)	-32.096122	115.770642	Alive	130	?			Potential	Two trunks (130 & 52cm)
177	Unknown	-32.096053	115.7703	Alive	77				Potential	
178	Unknown	-32.095997	115.770243	Alive	59				Potential	
179	Unknown	-32.095855	115.770302	Alive	69				Potential	White-gum
180	Unknown	-32.095825	115.770253	Alive	78				Potential	White-gum
181	Unknown	-32.095673	115.77027	Alive	68				Potential	
182	Unknown	-32.095715	115.77024	Alive	52				Potential	
183	Unknown	-32.095737	115.77032	Alive	50				Potential	
184	Unknown	-32.09565	115.77035	Alive	68				Potential	

#	Species	Lat	Long	Dead/ Alive	DBH (cm)	# Hollows	Hollow Width (cm)	Evidence of use	Breeding suitability	Comments
185	Tuart (*Eucalyptus gomphocephala*)	-32.095782	115.770633	Alive	54				Potential	
186	Tuart (*Eucalyptus gomphocephala*)	-32.095812	115.770663	Alive	56				Potential	Two trunks (56 & 45cm)
187	Tuart (*Eucalyptus gomphocephala*)	-32.095843	115.770653	Alive	50				Potential	Two trunks (50 & 32cm)
188	Tuart (*Eucalyptus gomphocephala*)	-32.095858	115.770803	Alive	58				Potential	
189	Tuart (*Eucalyptus gomphocephala*)	-32.093628	115.773065	Alive	71				Potential	
190	Tuart (*Eucalyptus gomphocephala*)	-32.093597	115.773018	Alive	57				Potential	
191	Tuart (*Eucalyptus gomphocephala*)	-32.093455	115.773103	Alive	80	1-5	5-15	bees	Suitable	Three large, hollow bearing trees in close proximity. Bees in most hollows
192	Tuart (*Eucalyptus gomphocephala*)	-32.092372	115.773218	Alive	110	1-5	10	bees	Suitable	Two trunks (110 & 51cm)
193	Tuart (*Eucalyptus gomphocephala*)	-32.092165	115.773202	Alive	50	?			Potential	
194	Tuart (*Eucalyptus gomphocephala*)	-32.092112	115.773248	Alive	120	5-10	15-20	bees	Suitable	
195	Tuart (*Eucalyptus gomphocephala*)	-32.091737	115.773052	Alive	75				Potential	
196	Tuart (*Eucalyptus gomphocephala*)	-32.091305	115.7726	Alive	86	?			Potential	
197	Tuart (*Eucalyptus gomphocephala*)	-32.09122	115.772543	Alive	88	?			Potential	
198	Tuart (*Eucalyptus gomphocephala*)	-32.090585	115.772538	Alive	67	1-5	10-20		Suitable	Chew marks
199	Tuart (*Eucalyptus gomphocephala*)	-32.090405	115.772453	Alive	55				Potential	
200	Tuart (*Eucalyptus gomphocephala*)	-32.092758	115.769982	Alive	113	10-15	5-15	galah	Suitable	Possibly a larger hollow in tree fork?

APPENDIX 11: Habitat and disturbance characteristics identified during fauna habitat assessment of the study area.

#	Location		Habitat	Landform	Aspect	Slope	Soil	Soil availability	Rocks		Leaf litter	Woody debris	Veg structure	Hollows		Disturbances	Condition
	Lat	Long							Type	Size				Present	>10cm		
1	-32.096474	115.764824	Shrubland	Hillslope	South	Low	Sand	Many large patches	Limestone	Large rocks	Evenly spread	Many small patches	Shrub >1m; Shrub <1m;			F, C, W, T	Disturbed
2	-32.096214	115.766212	Shrubland	Hillcrest/upper slope	SW	Moderate	Loamy sand	Many small patches	Limestone	Boulders	Many small patches	Few small patches	Shrub >1m; Shrub <1m; Herb; Grass;				Very Good
3	-32.094746	115.76535	Shrubland	Hillslope	West	Low	Sand	Evenly spread			Evenly spread	Many small patches	Shrub >1m;			F	Good
4	-32.094265	115.76712	Cleared	Hillslope	West	Moderate	Loamy sand	Few large patches	Limestone	Boulders	Scarce	Few small patches	Grass;			C, T	Completely degraded
5	-32.097858	115.768227	Shrubland	Hillslope	East	Moderate	Loamy sand	Few small patches			Many small patches	Many small patches	Shrub >1m; Shrub <1m; Herb; Grass;			W, T	Good
6	-32.092793	115.768456	Shrubland	Hillslope	NE	Moderate	Loamy sand	Few small patches	Limestone	Boulders	Many large patches	Few small patches	Shrub >1m; Shrub <1m; Grass;			W	Very Good
7	-32.09325	115.766846	Shrubland	Hillcrest/upper slope	SW	Moderate	Loamy sand	Few small patches	Limestone	Boulders	Evenly spread	Many small patches	Shrub >1m; Shrub <1m;			C, T	Very Good
8	-32.094307	115.767105	Shrubland	Hillslope	NE	Moderate	Loamy sand	Few small patches	Limestone	Boulders	Many small patches	Few small patches	Shrub >1m; Shrub <1m; Grass;			W	Very Good
9	-32.093872	115.768036	Shrubland	Hillslope	East	Low	Loamy sand	Evenly spread			Evenly Spread	Few large patches	Shrub >1m; Grass;			W	Disturbed
10	-32.091328	115.766098	Shrubland	Hillcrest/upper slope	NE	Moderate	Loamy sand	Few small patches	Limestone	Boulders	Many small patches	Many small patches	Shrub >1m; Shrub <1m; Grass;			W, T	Very Good
11	-32.092529	115.764633	Shrubland	Hillslope	West	Low	Sand	Few large patches			Many large patches	Many large patches	Shrub >1m;			F, C, W, T	Disturbed
12	-32.091099	115.764488	Shrubland	Hillslope	North	Moderate	Loamy sand	Many small patches	Limestone	Boulders	Many small patches	Many small patches	Shrub >1m; Shrub <1m; Herb; Grass;			F, W, T	Very Good
13	-32.088818	115.765694	Shrubland	Hillslope	South	Low	Loamy sand	Few small patches	Limestone	Large rocks	Many small patches	Many small patches	Shrub >1m;			W, T	Good
14	-32.088509	115.763756	Shrubland	Hillslope	West	Moderate	Loamy sand	Few small patches	Limestone	Large rocks	Few small patches	Few small patches	Shrub >1m;			W, T	Good
15	-32.087379	115.764549	Shrubland	Hillcrest/upper slope	East	Steep	Loamy sand	Few small patches	Limestone	Large rocks	Few small patches	Few small patches	Shrub >1m; Shrub <1m; Grass;			C, W, T	Very Good
16	-32.086857	115.763901	Shrubland	Hillcrest/upper slope	NW	Steep	Loamy sand	Few small patches	Limestone	Large rocks	Few small patches	Few small patches	Shrub >1m; Shrub <1m; Grass;			C, E, T	Disturbed
17	-32.084812	115.766289	Tall woodland	Foot slope	NE	Low	Loamy sand	Few small patches			Evenly spread	Few large patches	Tree > 5m; Herb;	Y	Y	C, W, E, T	Disturbed
18	-32.088184	115.767021	Tall woodland	Foot slope	NE	Low	Loamy sand	Few small patches			Evenly spread	Few large patches	Tree > 5m; Herb;	Y	Y	C, W, E, T	Disturbed
19	-32.093628	115.770294	Wetland	Wetland	Flat	Flat	Clay/sand	Few small patches			Few large patches	Many large patches	Tree > 5m; Tree 2 to 5m; Grass;	Y	Y	F, C, W, T	Good
20	-32.094315	115.771126	Open water	Wetland	Flat	Flat		Scarce			Scarce	Scarce	Tree 2 to 5m; Grass;	Y	Y	F, C, W, T	Disturbed
21	-32.09552	115.764015	Wetland	Wetland	Flat	Flat	Clay/sand	Few large patches			Many small patches	Many large patches	Tree 2 to 5m; Herb; Grass;			F, C, W, T	Good
22	-32.091312	115.77256	Wetland	Wetland	Flat	Flat	Clay/sand	Few small patches			Many large patches	Many large patches	Tree > 5m; Tree 2 to 5m; Grass;	Y	Y	F, C, W, T	Good
23	-32.090446	115.772247	Wetland	Wetland	Flat	Flat	Clay/sand	Few large patches			Many large patches	Many large patches	Tree > 5m; Tree 2 to 5m; Grass;	Y	Y	F, C, W, T	Good
24	-32.097996	115.772346	Shrubland	Low hills and slopes	NE	Moderate	Sand	Many small patches	Limestone	Large rocks	Few small patches	Scarce	Shrub >1m; Shrub <1m; Grass;			C, W	Disturbed
25	-32.097633	115.770462	Low woodland	Plain	North	Flat	Sand	Evenly spread			Evenly spread	Few large patches	Tree > 5m; Shrub <1m; Herb; Grass;	Y	Y	W, T	Good
26	-32.098713	115.771957	Shrubland	Hillslope	East	Low	Sand	Evenly spread			Evenly spread	Few small patches	Shrub >1m; Grass;			W	Very Good
27	-32.098751	115.770393	Shrubland	Hillslope	East	Moderate	Sand	Evenly spread	Limestone	Large rocks	Evenly spread	Many small patches	Shrub >1m; Shrub <1m; Grass;			W	Good
28	-32.098133	115.767662	Shrubland	Hillslope	South	Moderate	Sand	Evenly spread	Limestone	Large rocks	Evenly spread	Few large patches	Shrub >1m; Grass;			W, T	Good
29	-32.096874	115.767403	Shrubland	Hillcrest/upper slope	NE	Steep	Sand	Few small patches	Limestone	Large rocks	Many small patches	Few small patches	Shrub >1m; Shrub <1m; Herb; Grass;			W, T	Very Good

#	Location		Habitat	Landform	Aspect	Slope	Soil	Soil availability	Rocks		Leaf litter	Woody debris	Veg structure	Hollows		Disturbances	Condition
	Lat	Long							Type	Size				Present	>10cm		
30	-32.095776	115.766991	Shrubland	Hillcrest/upper slope	SE	Steep	Loamy sand	Few small patches	Limestone	Large rocks	Many small patches	Few small patches	Shrub >1m; Shrub <1m; Herb; Grass;			W, T	Very Good
31	-32.094822	115.766243	Shrubland	Hillslope	West	Moderate	Loamy sand	Few small patches			Evenly spread	Many large patches	Shrub >1m; Grass;			F, W, T	Good
32	-32.095345	115.765312	Shrubland	Hillslope	West	Moderate	Sand	Few large patches	Limestone	Large rocks	Many large patches	Few large patches	Shrub >1m; Grass;			F, W, T	Disturbed
33	-32.095406	115.764435	Shrubland	Hillslope	West	Low	Loamy sand	Few small patches	Limestone	Large rocks	Evenly spread	Many large patches	Shrub >1m;			F, W, T	Disturbed
34	-32.094318	115.764244	Cleared	Hillslope	West	Low	Sand	Scarce			Scarce	Scarce	Grass;			F, W, T	Completely degraded
35	-32.093498	115.765656	Shrubland	Hillslope	West	Low	Sand	Few small patches			Many large patches	Few small patches	Shrub >1m; Shrub <1m; Grass;			F, W, T	Disturbed
36	-32.092617	115.76548	Shrubland	Hillslope	West	Low	Sand	Few small patches			Evenly spread	Few large patches	Shrub >1m; Grass;			F, W, T	Good
37	-32.091473	115.765526	Shrubland	Hillcrest/upper slope	North	Low	Loamy sand	Many small patches	Limestone	Large rocks	Many large patches	Many small patches	Shrub >1m; Shrub <1m; Grass;			F, W, T, I	Good
38	-32.09013	115.763702	Low woodland	Hillslope	NW	Low	Loamy sand	Scarce			Many large patches	Many small patches	Tree > 5m; Tree 2 to 5m; Shrub <1m; Grass;			C, W, T	Good
39	-32.089581	115.764893	Cleared	Hillslope	SW	Low	Loamy sand	Scarce			Scarce	Scarce	Shrub >1m; Grass;			C, W, T	Completely degraded
40	-32.089561	115.766068	Shrubland	Hillslope	South	Low	Loamy sand	Few small patches	Limestone	Large rocks	Many large patches	Many small patches	Shrub >1m; Grass;			C, W, T	Disturbed
41	-32.088799	115.766586	Shrubland	Hillslope	East	Steep	Sand	Many small patches	Limestone	Large rocks	Many large patches	Many large patches	Shrub >1m; Grass;			W, R	Disturbed
42	-32.08709	115.767021	Shrubland	Hillslope	East	Low	Sand	Scarce			Evenly spread	Many large patches	Shrub >1m;			W	Very Good
43	-32.08559	115.765495	Shrubland	Hillcrest/upper slope	North	Moderate	Loamy sand	Few small patches	Limestone	Large rocks	Many large patches	Many small patches	Shrub >1m; Herb; Grass;			W, T	Very Good
44	-32.087727	115.763901	Shrubland	Hillslope	SW	Moderate	Sand	Scarce	Limestone	Large rocks	Evenly spread	Few small patches	Shrub >1m; Grass;	Y	N	W, T	Very Good
45	-32.084366	115.764603	Low woodland	Hillslope	South	Moderate	Sand	Few small patches	Limestone	Small rocks	Evenly spread	Few large patches	Tree > 5m; Shrub >1m; Grass;	Y	N	W, T	Disturbed
46	-32.083076	115.764908	Shrubland	Hillcrest/upper slope	North	Moderate	Loamy sand	Few small patches	Limestone	Large rocks	Many small patches	Few small patches	Shrub >1m; Shrub <1m; Grass;			C, W	Disturbed
47	-32.083839	115.766182	Cleared	Hillcrest/upper slope	NE	Flat	Sand	Many large patches	Limestone	Large rocks	Few large patches	Few small patches	Shrub >1m; Shrub <1m; Grass;			F, C, W, E, T	Completely degraded
48	-32.083683	115.767532	Shrubland	Hillcrest/upper slope	East	Steep	Loamy sand	Few small patches	Limestone	Large rocks	Many small patches	Few small patches	Shrub >1m; Shrub <1m; Grass;			W, T	Disturbed
49	-32.093246	115.773048	Wetland	Wetland	Flat	Flat	Clay/sand	Scarce			Few large patches	Many large patches	Tree > 5m; Tree 2 to 5m; Grass;	Y	*	W, T	Good
50	-32.095966	115.772018	Parkland	Hillslope	North	Low	Loamy sand	Scarce			Scarce	Scarce	Tree > 5m; Grass;			C, W	Completely degraded
51	-32.096989	115.771713	Shrubland	Hillslope	East	Low	Loamy sand	Many small patches	Limestone	Large rocks	Few large patches	Few small patches	Shrub >1m; Shrub <1m; Grass;			C, W, T	Disturbed
52	-32.096432	115.770508	Cleared	Hillslope	North	Low	Sand	Evenly spread			Few large patches	Many large patches	Tree > 5m; Shrub >1m; Shrub <1m;			C, W, T	Disturbed
53	-32.095783	115.768242	Shrubland	Hillslope	East	Moderate	Loamy sand	Few small patches			Evenly spread	Many small patches	Shrub >1m; Grass;			W, T	Very Good
54	-32.096718	115.768929	Shrubland	Hillslope	East	Steep	Loamy sand	Few small patches	Limestone	Large rocks	Many small patches	Scarce	Shrub >1m; Shrub <1m; Herb; Grass;			W, T	Very Good
55	-32.095207	115.769417	Tall woodland	Hillslope	East	Moderate	Loamy sand	Few small patches	Limestone	Boulders	Evenly spread	Many small patches	Tree > 5m; Shrub <1m;	Y	Y	C, W, T, R	Disturbed
56	-32.093338	115.768486	Tall woodland	Hillslope	SE	Moderate	Loamy sand	Few small patches			Evenly spread	Few small patches	Tree > 5m; Shrub >1m; Grass;	Y	Y	W, T	Good
57	-32.090115	115.769806	Tall woodland	Hillcrest/upper slope	South	Steep	Loamy sand	Few small patches	Limestone	Large rocks	Evenly spread	Many small patches	Tree > 5m; Shrub >1m; Shrub <1m;	Y	Y	W, T	Good
58	-32.090137	115.76857	Shrubland	Hillslope	SE	Moderate	Sand	Few small patches	Limestone	Large rocks	Many large patches	Many small patches	Shrub >1m; Shrub <1m; Grass;			W, T	Good
59	-32.091125	115.767952	Shrubland	Hillslope	East	Moderate	Sand	Few small patches			Evenly spread	Few large patches	Shrub >1m; Grass;			W, T	Good

#	Location		Habitat	Landform	Aspect	Slope	Soil	Soil availability	Rocks		Leaf litter	Woody debris	Veg structure	Hollows		Disturbances	Condition
	Lat	Long							Type	Size				Present	>10cm		
60	-32.08601	115.766701	Shrubland	Hillcrest/upper slope	NE	Low	Loamy sand	Few small patches	Limestone	Large rocks	Many small patches	Few small patches	Shrub >1m; Shrub <1m;			W, T	Very Good
61	-32.087917	115.76548	Shrubland	Hillcrest/upper slope	North	Moderate	Loamy sand	Many small patches	Limestone	Small rocks	Many small patches	Many small patches	Shrub >1m;			W, T	Very Good
62	-32.089931	115.76725	Shrubland	Hillslope	East	Low	Loamy sand	Many small patches	Limestone	Small rocks	Many large patches	Few small patches	Shrub >1m; Grass;			C, W	Good
63	-32.092346	115.766846	Shrubland	Hillcrest/upper slope	SE	Moderate	Loamy sand	Many small patches			Many small patches	Many small patches	Shrub >1m; Grass;			W, T	Very Good
64	-32.090893	115.766113	Shrubland	Hillslope	North	Moderate	Loamy sand	Many small patches	Limestone	Large rocks	Many small patches	Many small patches	Shrub >1m; Grass;			W	Very Good
65	-32.086449	115.765869	Shrubland	Hillcrest/upper slope	NE	Moderate	Loamy sand	Few small patches	Limestone	Large rocks	Many small patches	Few small patches	Shrub >1m; Shrub <1m; Grass;			W, T	Very Good

F = Feral animals, C = Cleared areas, W = Weed infestations, E = Erosion, T = Tracks and paths, R = Revegetated

APPENDIX 12: Conservation significant fauna (including locally significant fauna) known to occur within 5km of Manning Park (excluding marine species)

Species	EPBC Act Status	BC Act/DBCA Status	Habitat/Ecology	Nearby records
Curlew Sandpiper *Calidris ferruginea*	Critically Endangered Migratory/Marine	Critically Endangered	Intertidal mudflats in sheltered coastal areas (Geering et al 2007)	Few. Woodman Pt. Lake Coogee. Nth Coogee
Great Knot *Calidris tenuirostris*	Critically Endangered Migratory/Marine	Critically Endangered	Sandy or muddy estuaries and coasts with broad intertidal mudflats (Geering et al 2007)	Few. Coogee & Nth Coogee. Lake Coogee
Eastern Curlew *Numenius madagascariensis*	Critically Endangered Migratory/Marine	Critically Endangered	Estuaries, beaches, mangrove swamps and salt-marsh, particularly on exposed seagrass beds or mudflats (Geering et. al. 2007)	Few. Woodman Pt. Nth Coogee
Red Knot *Calidris canutus*	Endangered Migratory/Marine	Endangered	Intertidal mud and sandflats, estuaries, bays and inlets (Geering et al 2007)	Few. Woodman Pt. Nth Coogee
Lesser Sand Plover *Charadrius mongolus*	Endangered Migratory/Marine	Endangered	Mudflats, sandy beaches and intertidal mudflats, rarely found inland (Geering et al 2007)	Few. Woodman Pt. Nth Coogee
Baudin's Cockatoo *Zanda baudini*	Endangered	Endangered	Woodlands and forest (Karri, Marri, Jarrah, Wandoo, Bullich & Tuart). Uncommon on SCP, though may breed in the south. Roosts near water, particularly riparian habitats. Feeds on Marri, proteaceous shrubs as well as non-native species (pines) also insects and their larvae (DAEE, 2022).	Known. Few nearby
Carnaby's Cockatoo *Zanda latirostris*	Endangered	Endangered	Common along the SCP. Can forage all year round. Breeds in tree hollows, generally tuart, jarrah & marri but rarely on SCP. Roosts near water, particularly riparian habitats. Forages on proteaceous woodlands and heath, riparian vegetation and some introduced species (pines) (DAEE, 2022)	Known. Many nearby
Greater Sand Plover *Charadrius leschenaultii*	Vulnerable Migratory/Marine	Endangered	Sandy beaches and exposed, intertidal sand and mudflats (Geering et al 2007)	Few. Woodman Pt. Nth Coogee
Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso*	Vulnerable	Vulnerable	Woodlands of Darling Range. Becoming more common on the SCP. May breed where suitable large, suitable tree species occur (i.e. hollow-bearing Marri, Jarrah & Tuart). Will roost in any tall trees, prefers Jarrah, Marri, Blackbutt or Tuart. Feeds on Jarrah & Marri, Tuart or She-oak and also Cape Lilac. (Johnstone et al 2011)	Known. Many nearby
Grey-tailed Tattler *Tringa brevipes*	Migratory/Marine	Migratory Priority 4	Occurs in a variety of sheltered costal habitats, usually reefs and rock platforms or intertidal mudflats (Geering et al 2007)	Many. Woodman Pt
Common Sandpiper *Actitis hypoleucos*	Migratory/Marine	Migratory	Mangrove inlets and muddy edges and rocky shores of coastal or inland wetlands (Geering et al 2007)	Several. Woodman Pt. Lake Coogee
Fork-tailed Swift *Apus pacificus*	Migratory/Marine	Migratory	Non-breeding visitor to Australia, but rare in Western Australia. Almost entirely restricted to flying, mainly in open spaces though will occasionally fly over forests and cities (Pizzey & Knight 1998)	Few. Woodman Pt. Nth Coogee
Ruddy Turnstone *Arenaria interpres*	Migratory/Marine	Migratory	Rocky coastlines, coral and sand islands and sometimes intertidal mudflats (Geering et al 2007)	Several. Woodman Pt. to Fremantle
Sharp-tailed Sandpiper *Calidris acuminata*	Migratory/Marine	Migratory	Muddy edges of shallow, non-tidal (generally inland) fresh or brackish wetlands (Geering et al 2007)	Few. Woodman Pt. Nth Coogee
Sanderling *Calidris alba*	Migratory/Marine	Migratory	Open sandy beaches exposed to surf (Geering et al 2007)	Few. Woodman Pt. Nth Coogee. Lake Coogee

Species	EPBC Act Status	BC Act/DBCA Status	Habitat/Ecology	Nearby records
Pectoral Sandpiper *Calidris melanotos*	Migratory/Marine	Migratory	Solitary, preferring shallow, freshwater to brackish wetlands (Geering et al 2007)	One. Nth Coogee
Red-necked Stint *Calidris ruficollis*	Migratory/Marine	Migratory	Estuarine mudflats but also occurs in a wide range of fresh and saltwater habitats in coastal and inland areas (Geering et al 2007)	Several. Woodman Pt. Lake Coogee. Nth Coogee
Long-toed Stint *Calidris subminuta*	Migratory/Marine	Migratory	Muddy or vegetated edges of freshwater or brackish wetlands (Geering et al 2007)	One. Woodman Point
Bar-tailed Godwit *Limosa lapponica*	Migratory/Marine	Migratory	Found in flocks mainly in coastal areas with intertidal mudflats rarely far from the coast (Geering et. al. 2007)	Few. Woodman Pt. Lake Coogee. Nth Coogee
Black-tailed Godwit *Limosa limosa*	Migratory/Marine	Migratory	Freshwater and muddy coastal habitats. Fresh and brackish wetlands and intertidal mudflats (Geering et. al. 2007)	Inland. Nth Lake/Thomsons Lake
Whimbrel *Numenius phaeopus*	Migratory/Marine	Migratory	Open coastal and estuarine mudflats, particularly with mangroves (Geering et al 2007)	Few. Woodman Point. Nth Coogee
Bridled Tern *Onychoprion anaethetus*	Migratory/Marine	Migratory	A breeding visitor, usually found close to breeding colonies on small rocky islands and cliffs on large rocky islands (Johnstone & Storr 1998)	Few. Woodman Point
Osprey *Pandion haliaetus*	Migratory/Marine	Migratory	Common in sheltered seas on west coasts, islands and lower courses of rivers (Johnstone & Storr 1998)	Several. Woodman Pt. Nth Coogee. Coogee Beach. Lake Coogee
Ruff *Philomachus pugnax*	Migratory/Marine	Migratory	A variety of coastal and inland wetlands (Geering et al 2007)	One. Nth Coogee
Pacific Golden Plover *Pluvialis fulva*	Migratory/Marine	Migratory	Estuaries, intertidal mud and sand flats, costal salt marshes, rocky shores and also open, short grassy areas such as paddocks (Geering et al 2007)	One. Nth Coogee
Grey Plover *Pluvialis squatarola*	Migratory/Marine	Migratory	Predominantly coastal, occurring in small flocks on intertidal mud and sand flats in estuaries and bays (Geering et al 2007).	Several. Woodman Pt. Nth Coogee
Roseate Tern *Sterna dougallii*	Migratory/Marine	Migratory	Scarce to uncommon, occurring along the coast close to land, particularly on islands (Johnstone & Storr 1998)	Few. Woodman Pt. Nth Coogee
Little Tern *Sternula albifrons*	Migratory/Marine	Migratory	Sheltered seas, estuaries and mangrove creeks (Johnstone & Storr 1998)	One. Woodman Point
Wood Sandpiper *Tringa glareola*	Migratory/Marine	Migratory	Favours well-vegetated, shallow freshwater wetlands and rarely on intertidal mudflats (Geering et al 2007)	One. Nth Coogee
Common Greenshank *Tringa nebularia*	Migratory/Marine	Migratory	Occurs in a wide variety of coastal and inland, fresh or saltwater wetlands including intertidal mudflats (Geering et al 2007)	Known. Many nearby incl.

Species	EPBC Act Status	BC Act/DBCA Status	Habitat/Ecology	Nearby records
				Woodman Pt. Lake Coogee
Marsh Sandpiper *Tringa stagnatilis*	Migratory/Marine	Migratory	A variety of brackish and freshwater wetlands, avoiding open beaches (Geering et al 2007)	Few. Lake Coogee. Nth Coogee
Caspian Tern *Hydroprogne caspia*	Migratory/Marine		Uncommon to moderately common where it occurs mainly in sheltered sites such as estuaries and tidal creeks, rarely in fresh waters (Johnstone & Storr 1998)	Several. Woodman Pt. Lake Coogee
Pin-tailed Snipe *Galinago stenura*	Migratory	Migratory	Freshwater wetlands including swamps, soaks, floodwaters and sewerage ponds (Geering et al 2007)	Few. Frederick Baldwin Park
Greater Crested Tern *Sterna bergii*	Migratory	Migratory	Common in most coast and island habitats (Johnstone & Storr 1998)	Known. Many nearby incl. Woodman Pt. Nth Coogee
White-bellied Sea-eagle *Haliaeetus leucogaster*	Marine	Migratory	A rare to uncommon, but casual visitor to rivers and near coastal wetlands on the west coast (Johnstone & Storr 1998)	Known. Few nearby. Woodman Pt. Lake Coogee
Hooded Plover *Thinornis cucullatus*	Marine	Priority 4	Occurs on Sandy beaches, but predominantly on salt-lakes in the south-west of Australia (Geering et al 2007)	Few. Woodman Point
Red-capped plover *Charadrius ruficapillus*	Marine		Occurs in a wide variety of coastal habitats and in bare, open areas of inland wetlands (Geering et al 2007)	Several. Lake Coogee
Pied Stilt *Himantopus himantopus leucocephalus*	Marine		Open coastal and inland fresh and saltwater wetlands and intertidal mudflats (Geering et al 2007)	Known. Many nearby incl. Lake Coogee, eastern Beeliar wetlands
Pacific Gull *Larus pacificus*	Marine		Scarce to common, occurring along the west coast and around islands, towns and saltworks (Johnstone & Storr 1998)	Few. Woodman Point
Rainbow Bee-eater *Merops ornatus*	Marine		Open forests, woodlands and shrublands (Pizzey & Knight 1998)	Known. Many nearby
Red-necked avocet *Recurvirostra novaehollandiae*	Marine		Freshwater, brackish or saline wetlands, intertidal mudflats or sheltered bays (Geering et al 2007)	Few. Woodman Pt. Lake Coogee
Peregrine Falcon *Falco peregrinus*		Specially protected	Scarce on the SCP. Inhabits tall forest and woodland, and cliffs along the coast, breeding on rock ledges, granite outcrops and quarries (Johnstone & Storr 1998)	Known. Several nearby
Glossy Ibis *Plegadis falcinellus*		Migratory	A non-breeding visitor, on well-watered plains, shallows and flats of and surrounding freshwater lakes and swamps, river pools and flooded samphire and sewerage ponds (Johnstone & Storr 1998)	Eastern Beeliar wetlands
Common Tern *Sterna hirundo*		Migratory	Sheltered seas and estuaries (Johnstone & Storr 1998)	One. Woodman Point
Barking Owl (SW) *Ninox connivens connivens*		Priority 3	Dense vegetation, particularly forest, thickets and waterside Melaleuca (Johnstone & Storr 1998). Declining SW (Johnstone & Storr 1998). Thought to be locally extinct on SCP (Government of WA, 2000)	Few. Coogee

Species	EPBC Act Status	BC Act/DBCA Status	Habitat/Ecology	Nearby records
Australian Masked Owl (SW) *Tyto novaehollandiae novaehollandiae*		Priority 3	Forests and woodlands. Locally common in the deep south-west but generally uncommon (Johnstone & Storr 1998)	Few. Munster & Henderson
Blue-billed Duck *Oxyura australis*		Priority 4	Well-vegetated freshwater swamps, large dams and lakes (Pizzey & Knight 1998)	Known. Several nearby. Lake Coogee. Eastern Beeliar wetlands
Western Ringtail Possum *Pseudocheirus occidentalis*	Critically Endangered	Critically Endangered	Coastal areas south of Bunbury in woodlands and forest dominated by Peppermints (*Agonis flexuosa*), including some inland areas of Jarrah, Marri & Wandoo forest (De Tores, 2008a)	Locally extinct
Chuditch *Dasyurus geoffroii*	Vulnerable	Vulnerable	Dry woodlands, sclerophyll forests, heath and mallee shrublands (Serena & Soderquist, 2008)	None nearby
Quokka *Setonix brachyurus*	Vulnerable	Vulnerable	Formerly occurring throughout much of the SW, now largely confined to Rottnest Island and a few mainland localities, it is thought to be locally extinct from much of the SCP (De Tores, 2008b)	Locally extinct
Western False Pipistrelle *Falsistrellus mackenziei*		Priority 4	Mainly occurs in the Karri, Jarrah and Tuart forests of higher rainfall areas of the southwest, but known to inhabit Banksia woodlands on the Swan Coastal Plain (Churchill, 1998)	Few. Harry Waring/Thomson Lake
Water Rat *Hydromys chrysogaster*		Priority 4	Dense vegetation associated with swamps, lakes and waterways (Government of Australia 2000)	Few. Harry Waring/Thomson Lake
Quenda *Isoodon fusciventer*		Priority 4	Forest, woodland, shrubland, heath, wetland habitats on sandy soils and dense low vegetation (Paull, 2008)	Known. Several nearby
Tammar Wallaby *Notomacropus eugenii derbianus*		Priority 4	Coastal scrub, heath, dry sclerophyll forest and dense low thickets in mallee and woodland (Hinds, 2008)	Locally extinct
Carpet Python *Morelia spilota imbricata*		Specially protected	Uncommon, only persisting in large bushland remnants particularly woodlands and coastal limestone (Bush et al 2010)	None nearby
Perth-lined Slider *Lerista lineata*		Priority 3	Occurs in coastal dunes and sandplains supporting Banksia/Eucalypt woodland and heath south of the Swan River where it shelters in leaf litter and soil at the base of shrubs. Much of its habitat has been cleared for developments but can be locally common in small remnants and suburban gardens (Bush et. al. 2010)	Known. Several nearby
Black-striped Snake *Neelaps calonotos*		Priority 3	Occurs in coastal dunes and sandplains supporting Banksia/Eucalypt woodlands and heath throughout the swan coastal plain where it shelters in leaf litter and soil at the base of trees and shrubs (Bush et al 2010).	Few. Woodman Point
Inland Thornbill *Acanthiza apicalis*		Locally significant	Coastal scrubs and heath (Pizzey & Knight, 1998)	Known
Yellow-rumped Thornbill *Acanthiza chrysorrhoa*		Locally significant	Open grassy areas (Pizzey & Knight, 1998)	Known
Western Thornbill *Acanthiza inornata*		Locally significant	Open woodland and coastal scrub (Pizzey & Knight, 1998)	Few. Woodman Pt. Lake Coogee
Hardhead *Aythya australis*		Locally significant	Fresh and brackish waters including farm dams (Johnstone & Storr 1998)	Known
Musk Duck *Biziura lobata*		Locally significant	Well-vegetated freshwater bodies but mainly in brackish and salt waters (Johnstone & Storr 1998)	Known

Species	EPBC Act Status	BC Act/DBCA Status	Habitat/Ecology	Nearby records
Grey Shrike-thrush *Colluricincla harmonica*		Locally significant	Forests, woodlands riparian forest and coastal scrub (Pizzey & Knight, 1998)	Known
Dusky Moorhen *Gallinula tenebrosa*		Locally significant	Well-vegetated wetlands, parks and artificial lakes and lawns (Pizzey & Knight, 1998)	Known
Yellow-plumed Honeyeater *Lichenostomas ornatus*		Locally significant	Coastal forests (Pizzey & Knight, 1998)	Few. Lake Coogee
Pink-eared Duck *Malacorhynchus membranaceus*		Locally significant	Well-watered areas, preferring large fresh or salt waterbodies (Johnstone & Storr 1998)	Known
Variegated Fairy-wren *Malurus lamberti*		Locally significant	Associated with shrublands particularly in dune and coastal vegetation (Pizzey & Knight, 1998)	Known
Splendid Fairy-wren *Malurus splendens*		Locally significant	Dense undergrowth in margins of forests, woodlands and watercourses (Pizzey & Knight, 1998)	Known
Hooded Robin *Melanodryas cucullata*		Locally significant	Banksia dominated coastal scrub and drier woodlands (Pizzey & Knight, 1998)	One near Coogee
Rock Parrot *Neophema petrophila*		Locally significant	Near coastal limestone, coastal dunes and scrub (Pizzey & Knight, 1998)	Few. Coogee, Woodman Pt.
Western Golden Whistler *Pachycephala fuliginosa*		Locally significant	Forests, woodlands riparian forest and coastal scrub (Pizzey & Knight, 1998)	Known
Scarlet Robin *Petroica multicolor*		Locally significant	Open woodlands (Pizzey & Knight, 1998)	Few. Coogee, Woodman Pt.
Common Bronzewing *Phaps chalcoptera*		Locally significant	Forests, woodlands and a range of shrublands, thickets and heaths (Pizzey & Knight, 1998)	Few. Woodman Pt. Lake Coogee
Brush Bronzewing *Phaps elegans*		Locally significant	Woodlands, forests and heaths supporting a dense, scrubby understorey (Pizzey & Knight, 1998)	Few. Eastern Beeliar lakes
White-browed Scrubwren *Sericornis frontalis*		Locally significant	Dense undergrowth in forests, woodlands and shrublands (Pizzey & Knight, 1998)	Known
Weebill *Smicrornis brevirostris*		Locally significant	Dry woodland and Acacia thickets (Pizzey & Knight, 1998)	Known
Australasian Shoveler *Spatula rhynchotis*		Locally significant	Large, deep bodies of water, particularly wooded freshwater lakes and also fresh and brackish swamps (Johnstone & Storr 1998)	Known
Collared Sparrowhawk *Accipiter cirrocephalus*		Locally significant	Forages in and around forests, woodlands and suburban gardens (Pizzey & Knight, 1998)	Known
Brown Goshawk *Accipiter fasciatus*		Locally significant	Forages in and around forests, woodlands and suburban parkland and gardens (Pizzey & Knight, 1998)	Known
Western Wattlebird *Anthochaera lunulata*		Locally significant	Banksia/Eucalypt woodland associations and heathland communities (Pizzey & Knight, 1998)	Known
Wedge-tailed Eagle *Aquila audax*		Locally significant	Forages in a range of open and forested habitats, occasionally over lakes, beaches and towns (Pizzey & Knight, 1998)	Few. Lake Coogee
Black-faced Woodswallow *Artamus cinereus*		Locally significant	Open country, as well as open woodlands, lake margins and wetlands (Pizzey & Knight, 1998)	Several. Woodman Pt.

Species	EPBC Act Status	BC Act/DBCA Status	Habitat/Ecology	Nearby records
Dusky Woodswallow *Artamus cyanopterus*		Locally significant	Open forests and woodlands, and coastal scrub (Pizzey & Knight, 1998)	Known
Brown Falcon *Falco berigora*		Locally significant	Forages in open woodlands, farmlands, roadsides and coastal dunes (Pizzey & Knight, 1998)	Several nearby
Whistling Kite *Haliastur sphenurus*		Locally significant	Open forests, usually near water and near coastal environments (Pizzey & Knight, 1998)	Known
Little Eagle *Hieraaetus morphnoides*		Locally significant	Forages in open habitats, watercourses and lakes (Pizzey & Knight, 1998)	Known
Square-tailed Kite *Lophoictinia isura*		Locally significant	Forages over woodlands, heathlands and forests (Pizzey & Knight, 1998)	Known
White-naped Honeyeater *Melithreptus lunatus*		Locally significant	Forests and woodlands (Pizzey & Knight, 1998)	Few. Woodman Pt.
Nankeen Night Heron *Nycticorax caledonicus*		Locally significant	River margins and wetlands (Pizzey & Knight, 1998)	Known
White-cheeked Honeyeater *Phylidonyris niger*		Locally significant	Coastal thickets and sandplain heaths (Pizzey & Knight, 1998)	Known
New-holland Honeyeater *Phylidonyris novaehollandiae*		Locally significant	Forests and woodlands with a scrubby understorey, coastal scrubs and heaths (Pizzey & Knight, 1998)	Known
Western Rosella *Platycercus icterotis*		Locally significant	Open forest and woodlands including nearby open parks, gardens and open areas (Pizzey & Knight, 1998)	Known
Painted Button-quail *Turnix varius*		Locally significant	Open woodlands and shrublands with a dense understorey and ground debris (Pizzey & Knight, 1998)	Known
Quacking Frog *Crinia georgiana*		Locally significant	Clay-based ephemeral swamps (Bush et. al. 2010)	None nearby. Eastern Beeliar wetlands
Western Grey Kangaroo *Macropus fuliginosus*		Locally significant	Woodland, shrublands, open areas. Requires habitat connectivity and large bushland remnants (Government of WA, 2000)	Few. Eastern Beeliar wetlands
Echidna *Tachyglossus aculeatus*		Locally significant	No particular habitat requirements, however have thought to be lost from the SCP (Government of WA, 2000)	Locally extinct
Honey Possum *Tarsipes rostratus*		Locally significant	Diverse, long-unburnt Banksia woodlands which provide a food source (nectar and pollen) all year round. Scarce on the Swan Coastal Plain around Perth (Bradshaw 2014)	Few. Harry Waring
Keeled Legless Lizard *Pletholax gracilis*		Locally significant	Heath, Banksia/Eucalypt woodlands with low, dense vegetation (Bush et. al. 2010)	Few. Henderson
Western three-lined skink *Acritoscincus trilineatus*		Locally significant	Dense vegetation on lake margins & ephemeral swamps (Bush et. al. 2010)	Few. Lake Coogee
Western Blue-tongue Lizard *Tiliqua occiptalis*		Locally significant	Large, undisturbed habitats. Sandplains and dunes with Bankia/Eucalypt woodland (Bush et. al. 2010)	Known
Southern Heath Monitor *Varanus rosenbergi*		Locally significant	Large, undisturbed bushland. Scarce in Perth region (Bush et. al. 2010)	Few. Nth Lake

Species	EPBC Act Status	BC Act/DBCA Status	Habitat/Ecology	Nearby records
Yellow-faced whipsnake *Demansia reticulata*		Locally significant	Large bushland areas. Scarce in the Perth region (Bush et. al. 2010)	Few. Eastern Beeliar wetlands