

**FAUNA SURVEY FOR LOTS 13, 14 AND 18  
BARFIELD ROAD AND LOTS 48-51 ROWLEY  
ROAD, HAMMOND PARK**

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**GOLD ESTATES AND THE DEPARTMENT OF HOUSING**

Prepared by:

**Ecoscape (Australia) Pty Ltd**

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# Summary

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## Fauna Survey for Barfield and Rowley Roads, Hammond Park

Gold Estates, in partnership with the Department of Housing (DH), are seeking to have the Urban Deferred zoning (under the Metropolitan Regional Scheme) lifted for Lots 13, 14, 18 Barfield Road and Lots 48-51 Rowley Road, Hammond Park, with a view to undertaking future residential development of the area. To facilitate the lifting of the urban deferred zoning and progress future subdivision approval over the area, a Level 1 fauna assessment was conducted in accordance with Ecoscape's interpretation of the EPA Guidance Statement '*Guidance for the Assessment of Environmental Factors No 56: Terrestrial Fauna Surveys for Environmental Impact Assessment* (June 2004)', and '*General Requirements for Terrestrial Biological Surveys Position Statement No. 3* (March 2002)'. The study area covers an area of approximately 33 hectares (ha).

The assessment consisted of a desktop investigation and a targeted field survey for conservation significant fauna and fauna habitat. The results of the desktop assessment determined that:

- 3 Schedule and 6 Priority fauna species, as listed under the *Wildlife Conservation Act (1950)*, were identified through Department of Environment and Conservation (DEC) database searches
- 5 threatened or priority fauna species were identified by the Commonwealth *Environment Protection and Biodiversity Conservation Act (1999)* (EPBC) *Protected Matters Search Tool*.

The results of the field investigation can be summarised as:

- no occurrences of threatened or priority fauna species were identified as occupying the study area from the field survey
- minor evidence of Cockatoo feeding on vegetation was noted but it cannot be said from this evidence which species of Cockatoo were present.

The study area supports excellent habitat values providing shelter and food resources to a variety of fauna species in the local vicinity. While there is an absence of suitable nesting habitat for the larger Cockatoo species, the area provides foraging habitat. The dense understorey also provides good shelter and habitat for the smaller woodland bird and mammal species.

The clearing of foraging habitat for Carnaby's Black Cockatoo will require referral of the proposal to the Department of Environment, Water, Heritage and Arts under *EPBC Act 1999*.

# 1.0 Introduction

## Fauna Survey for Barfield and Rowley Roads, Hammond Park

### 1.1 Background

Ecoscape was engaged by Gold Estates and the Department of Housing to undertake a Level 1 fauna assessment of Lot 13, 14, 18 Barfield Road and Lots 48-51 Rowley Road, Hammond Park. These lots are currently zoned Urban Deferred under the Metropolitan Region Scheme and the clients are seeking to have the Urban Deferred zoning lifted with a view to undertaking future residential development of the area. The site is a zoned Development Zone under the City of Cockburn's Town Planning Scheme No. 3.

The objectives of the assessment were to undertake the following:

- desktop survey of the area to determine the likelihood of any Threatened or Priority species of fauna that may visit or occur in the area with a focus on the vulnerable EPBC Act (1999) listed Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) and the Southern Brown Bandicoot or Quenda (*Isoodon obesulus fusciventor*), priority 5 species listed by the WA Department of Environment and Conservation
- reconnaissance field survey of the site to verify the accuracy of the desktop study (including recording any species opportunistically identified)

The fauna assessment was conducted in accordance with Ecoscape's interpretation of the Environmental Protection Authority's *Guidance for the Assessment of Environmental Factors No 56: Terrestrial Fauna Surveys for Environmental Impact Assessment* (June 2004), and *General Requirements for Terrestrial Biological Surveys Position Statement No. 3* (EPA 2002).

Ecoscape has previously conducted a level 2 flora and vegetation assessment of the study area (Ecoscape, 2009).

### 1.2 Study Area

Lots 13, 14 and 18 Barfield Road and Lots 48-51 Rowley Road, Hammond Park are located within the City of Cockburn (**Figure 1**). The Lots are bounded by Frankland Avenue to the west, rural-residential properties to the north, Kwinana Freeway to the east and Rowley Road to the south. **Figure 1** shows the location of the study area

The study area is approximately 33 hectares and comprises largely intact remnant bushland. Lots 13, 14, 18 and 51 includes residences and sheds, Lot 14 is associated with

areas of clearing relating to soil extraction and rubbish dumping, and Lot 18 is grazed by horses.



**Figure 1: Location of the Study Area.**

## 2.0 Existing Environment

### Fauna Survey for Barfield and Rowley Roads, Hammond Park

#### 2.1.1 Climate

The South-West of Western Australia has a Mediterranean climate of mild, wet winters and warm to hot, dry summers (Bureau of Meteorology 2008).

According to climate data from the Bureau of Meteorology recording station located at Jandakot Airport (approximately 10 km north of the study area) mean maximum temperatures range between 31.2°C in February and 17.8° C in July, and mean minimum temperatures between 16.8° C in February and 6.9° C in July-August. Mean annual rainfall for the station is 842.2 mm, falling predominantly in the May to August period.

#### 2.1.2 Landforms and Soil Types

Churchward and McArthur (1980) land form and soil unit mapping of the Department of Agriculture and Food WA (DAFWA 2007) were reviewed to determine landform and soil types in the study area.

According to Churchward and McArthur (1980) the study area is located at the transition of the **Spearwood** and **Bassendean Dune Systems** of the Swan Coastal Plain. Both systems are of aeolian origin, with the Spearwood System overlying the older Bassendean System that lies to the east (McArthur and Bettenay 1960). The Spearwood Dunes consist of a core of Tamala Limestone with a hard capping of calcite (cap-rock) overlain by a variable depth of yellow to brown sands. The Bassendean Dunes consist of low hills and intervening swampy areas, with iron or humus podzols (McArthur 1991).

A search of the soil-landscape maps (DAFWA 2007) revealed that the Spearwood S1b and Bassendean B1 soil phases occur within the study area. The Spearwood S1b phase is characterised by dune ridges with deep siliceous yellow brown sands or pale sands with yellow-brown subsoil and slopes up to 15%. The Bassendean B1 phase has extremely low to very low relief dunes, undulating sandplain and discrete sand rises, with deep bleached grey sands sometimes with a pale yellow B horizon or a weak iron-organic hardpan at depths generally greater than 2 m.

#### 2.1.3 Vegetation

The Ecoscape Level 2 Vegetation Survey (2009) for the area specified it is within the Beard Vegetation Association '*Banksia* low woodland' in the Bassendean System with a semi-open understorey and a thick layer of leaf litter.

Beard (1981) has determined the vegetation to be part of the Bassendean System that stretches discontinuously for the whole length of the Swan Coastal Plain. It is broadly described as *Banksia* low woodland dominated by *Banksia attenuata*, *B. menziesii*, *B. ilicifolia*, *Eucalyptus todtiana* and *Nuytsia floribunda*, with *Allocasuarina fraseriana* joining the tree layer south of Gingin, and *Eucalyptus marginata* replacing *Eucalyptus todtiana* south of Lake Gnangara. In this case, Beard (1981) vegetation association 1001, medium very sparse woodland; jarrah, with low woodland; *Banksia* & *Allocasuarina*, was the only mapped unit within the study area.

Heddle, Loneragan and Havel (1980) has described the vegetation Complex as the Bassendean Central and South, on the Swan Coastal Plain on aeolian deposits. The vegetation ranges from woodland of *E. marginata* - *C. fraseriana* - *Banksia* spp. to low woodland of *Melaleuca* spp. and sedgeland on the moister sites. This area includes the transition of *E. marginata* to *E. todtiana* in the vicinity of Perth (Heddle et al 1980).

This Heddle Vegetation Complex is listed in *EPA Guidance Statement No 10* (2006) as having 27% remaining on the Swan Coastal Plain (in 2002), with 0.7% reserved (Ecoscape 2009). As more than 400ha of this complex remains it is above the 10% clearing threshold as set by the Environmental Protection Authority (Ecoscape 2009).

## 3.0 Methods

### Fauna Survey for Barfield and Rowley Roads, Hammond Park

#### 3.1 Fauna Assessment

A one-day site inspection was undertaken to verify the accuracy of the desktop investigations and to conduct a significant habitat tree assessment for the presence of nesting hollows and foraging areas for Carnaby's Black Cockatoo, listed as vulnerable under the Commonwealth EPBC Act (1999). The survey also searched for evidence of fauna presence and assessed the general habitat quality on site including identification of suitable habitat for the Quenda.

A desktop study was undertaken to gather information on all vertebrate fauna species potentially inhabiting the study area. The Western Australian Museum (2008) *FaunaBase* database was used to conduct the search and produce list of potential species for the local area. Other information was drawn primarily from:

- A review of the Western Australian Museum and Birds Australia database (2008) to identify potential vertebrate fauna within the area
- A search of the DEC *Threatened and Priority Species* database to identify potential scheduled and threatened species within the region
- A search of the Commonwealth's *Matters of National Significance* database to identify species potentially occurring within the area that are protected under the *EPBC Act 1999*

The conservation status of fauna species is assessed under Commonwealth and State Acts including the *EPBC Act (1999)* and the *Western Australian Wildlife Conservation Act (1950)*. The significance levels for fauna used in the *EPBC Act (1999)* are those recommended by the International Union for the Conservation of Nature and Natural Resources (IUCN). *EPBC Act* categories are listed in **Appendix Three, Table A3-3**. Survey limitations are described in **Section 5.2**.

The *Western Australian Wildlife Conservation Act (1950)* uses a set of Schedules but also classifies species using some of the IUCN categories. DEC Priority categories, which provide special protection to listed fauna and definitions are shown in **Appendix Three, Table A3-4 and A3-5**.

In Western Australia, the DEC has produced a supplementary list of Priority Fauna, listed using priority codes, which are species that are not considered Threatened under the

*Wildlife Conservation Act* but for which the DEC feels there is cause for concern. Some Priority species, however, are also assigned to the IUCN Conservation Dependent category. It is important to recognise that such Priority Lists have no statutory standing, but are used to assist DEC when considering which fauna are most in need of more surveys or other investigations, in order to establish their status in the wild.

The Priority Fauna List for Western Australia includes taxa organised by priority codes that either:

- have recently been removed from the schedule of threatened fauna
- have a restricted range, are uncommon or are declining in range and/or abundance, but which do not meet the criteria for inclusion on the schedule of threatened fauna
- have been nominated for consideration for the schedule of threatened fauna and for which there is insufficient information for the advisory committee to make an assessment of their status
- are otherwise worthy of inclusion on such a list, as determined by DEC

The Priority Fauna List for Western Australia is reviewed by DEC whenever new information on relevant taxa becomes available. Taxa are removed from the list by DEC as they cease to meet the requirements identified above.

The results of the *FaunaBase* search for the local area included many wetland restricted species (i.e. shore and wading birds), therefore only those species considered relevant to the study area have been considered. The relevant and threatened species are listed in **Appendix Four, Table A4-1**.

A search of the DEC threatened fauna databases indicated 3 Scheduled and 6 Priority fauna species recorded within 5km of the study area (**Table 5**).

**Table 5: DEC threatened fauna database search result.**

| Species                                     | Common Name                      | DEC Priority |
|---|----------------------------------|--------------|
| <i>Calyptorhynchus banksii naso</i>         | Forest Red-tailed Black Cockatoo | S1           |
| <i>Dasyurus geoffroii</i>                   | Chuditch                         | S1           |
| <i>Myrmecobius fasciatus</i>                | Numbat                           | S1           |
| <i>Tyto novaehollandiae novaehollandiae</i> | Masked Owl                       | P3           |
| <i>Neelaps calonotos</i>                    | Black-striped Snake              | P3           |
| <i>Lerista lineata</i>                      | Lined Skink                      | P3           |
| <i>Falsistrellus mackenziei</i>             | Western False Pipistrelle        | P4           |
| <i>Isoodon obesulus fusciventer</i>         | Quenda                           | P5           |
| <i>Macropus eugenii derbianus</i>           | Tammar Wallaby                   | P5           |

The EPBC *Protected Matters Search Tool* was reviewed to summarise the Matters of National Significance that may occur in, or may relate to, the study area and its surrounds (**Appendix Two**). This search tool identified five threatened species, listed below in **Table 6**, seven migratory species and one listed marine species (also listed under the migratory species list).

**Table 6: EPBC Protected Matters Search Tool summarised results for Fauna Species.**

| Species                              | Common Name              | EPBC Listing |
|--------------------------------------|--------------------------|--------------|
| <b>Threatened species</b>            |                          |              |
| <i>Calyptorhynchus baudinii</i>      | Baudin's Black Cockatoo  | Vulnerable   |
| <i>Calyptorhynchus latirostris</i>   | Carnaby's Black Cockatoo | Endangered   |
| <i>Dasyurus geoffroii</i>            | Chuditch, Western Quoll  | Vulnerable   |
| <i>Phascogale calura</i>             | Red-tailed Phascogale    | Endangered   |
| <i>Setonix brachyurus</i>            | Quokka                   | Vulnerable   |
| <b>Migratory Terrestrial Species</b> |                          |              |
| <i>Haliaeetus leucogaster</i>        | White-bellied Sea-Eagle  | Migratory    |
| <i>Merops ornatus</i>                | Rainbow Bee-eater        | Migratory    |
| <b>Migratory Wetland Species</b>     |                          |              |
| <i>Ardea alba</i>                    | Great Egret, White Egret | Migratory    |
| <i>Ardea ibis</i>                    | Cattle Egret             | Migratory    |
| <b>Migratory Marine Birds</b>        |                          |              |
| <i>Apus pacificus</i>                | Fork-tailed Swift        | Migratory    |
| <i>Ardea alba</i>                    | Great Egret, White Egret | Migratory    |
| <i>Ardea ibis</i>                    | Cattle Egret             | Migratory    |
| <b>Listed Marine Species</b>         |                          |              |
| <i>Haliaeetus leucogaster</i>        | White-bellied Sea-Eagle  | Listed       |

A fauna reconnaissance survey was undertaken in accordance with EPA (2004) *Guidance Statement No. 56* at a Level 1 survey for the following purposes:

- to verify the accuracy of the desktop study
- to further delineate and characterise the fauna and faunal assemblages present in the target area.

This involved a target area visit to undertake a survey of all fauna and fauna habitat in the study area (survey route on **Map 1**).

## 4.0 Results

### Fauna Survey for Barfield and Rowley Roads, Hammond Park

Based on knowledge of the habitat requirements and known distributions for these species Ecoscape believes it likely that the following species would occur in the vicinity of the study area.

#### ***Calyptorhynchus latirostris***

Carnaby's Black-Cockatoo mainly occurs in uncleared or remnant native eucalypt woodlands, especially those that contain Salmon Gum (*E. salmonophloia*) and Wandoo (*E. wandoo*), and in shrubland or kwongan heathland dominated by *Hakea*, *Dryandra*, *Banksia* and *Grevillea* species. It is a seasonal visitor to plantations of exotic pines (*Pinus* spp.), and sometimes occurs in forests containing Marri (*Corymbia calophylla*), Jarrah (*E. marginata*) or Karri (*E. diversicolor*). Although this species was not identified during a DEC fauna database search a sighting of Carnaby's Black-Cockatoo during the field survey leads Ecoscape to believe the species is likely to utilise the study area for feeding purposes and the excellent quality of foraging habitat within the study area.

The absence of suitable breeding hollows however, and the evidence that the species predominantly breeds in the drier regions of South West WA, predominantly the northern agricultural region between Badgingarra, Dandaragan and Moora its likely to prohibit species from breeding on this site.

Based on knowledge of the habitat requirements and known distributions for these species Ecoscape believes it unlikely that the following species would occur in the vicinity of the study area.

#### ***Calyptorhynchus baudinii***

Baudin's Black-Cockatoo occurs in high-rainfall areas, usually at sites that are heavily forested and dominated by *Corymbia calophylla* (Marri) and Eucalyptus species, especially *E. diversicolor* (Karri) and *E. marginata* (Jarrah). It is claimed that the range of the species during the non-breeding season is determined by the distribution of Marri, and that nesting is confined to areas in which Karri occurs (Saunders 1974). However, as Baudin's Black Cockatoo is found only in the extreme south-west of Western Australia it is unlikely this species occurs near the study area.

#### ***Isoodon obesulus fusciventor***

Quenda prefer dense scrubby, often swampy, vegetation with dense cover up to one metre high, often feeding in adjacent forest and woodland that is burnt on a regular basis and in areas of pasture and cropland lying close to dense cover. Populations inhabiting Jarrah and

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Wandoo forests are usually associated with watercourses. Quendas will thrive in more open habitat subject to exotic predator control. For example, quenda have become abundant in Lake Magenta Nature Reserve (Western Australia) in Mallee scrub and woodland following fox control. On the Swan Coastal Plain, quendas are often associated with wetlands (DEC 2008a).

The study area supports the dense vegetation that this species prefers however it does not possess the swampy, wetland associated habitat often preferred by the species on the Swan Coastal Plain. Therefore it is not likely to occur on the study site. Predation by fox, domestic dogs, feral cats and rabbits would also limit its presence in this area.

#### ***Dasyurus geoffroii***

The Chuditch is now known only from Western Australia where it predominantly occurs in Jarrah (*E. marginata*) forest (Australian Government 2008). It is therefore unlikely that Chuditch are present in the area. There has been recent evidence to suggest that Chuditch may occur in the nearby locality of Wandj, however the Kwinana Freeway isolates Hammond Park from this area and therefore the Chuditch remains unlikely to occupy the study area.

#### ***Macropus irma***

The Western Brush Wallaby's optimum habitat is open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets. It is also found in some areas of mallee and heathland, and is uncommon in karri forest (DEC 2008b). The lack of suitable habitat is likely to preclude this species from occurring within the study area.

#### ***Myrmecobius fasciatus***

There are currently two remnant native populations of Numbat at Dryandra and Perup, WA and several reintroduced populations including Boyagin Nature Reserve, Tutanning Nature Reserve, Batalling block and Karroun Hill Nature Reserve (Friend & Thomas 1995). There have been no recent records of this species on the Swan Coastal Plain and is very unlikely this species occurs near the study area.

#### ***Phascogale calura***

Extant populations of the Red-tailed Phascogale are restricted to remnants of native vegetation throughout the wheat belt of south-western Western Australia (Kitchener 1981). There are no known recent records of this species on the Swan Coastal Plain and therefore it is unlikely that it occurs within the study area.

**Setonix brachyurus**

The present distribution of the Quokka includes two offshore islands, Rottnest and Bald Island, and a number of sites on the south-west Western Australian mainland, ranging from just south of Perth to the Hunter River and including Two Peoples Bay Nature Reserve, Torndirrup National Park, Mt Manypeaks National Park and Stirling Range National Park (Maxwell, Burbidge & Morris 1996; Sinclair 1998). It is extremely unlikely that this species is present in the local area.

**Remaining Listed Species**

The remaining species are all migratory and unlikely to occur in the vicinity except for the Rainbow Bee-eater which has a wide-spread distribution and prefers a variety of habitats. However, this species may only be in the local area for a few short months over summer and is not considered under threat by the DEC.

There was an observation of Carnaby's Black Cockatoo in a fly-over sighting but no other observations of Priority or Scheduled fauna species during the field survey.

**Table 7** lists fauna species observed directly (by sight or sound) or indirectly (by other signs such as tracks and scats). Carnaby's Black Cockatoo was the only species of conservation significance observed in the study area.

**Table 7: Fauna observations**

| Species                                   | Common Name               | Observation Type |
|---|---------------------------|------------------|
| <b>Mammals</b>                            |                           |                  |
| <i>*Oryctolagus cuniculus</i>             | Rabbit                    | Scats, diggings  |
| <b>Birds</b>                              |                           |                  |
| <i>Anthochaera carunculata</i>            | Red wattlebird            | Observed         |
| <i>Phylidonyris nigra</i>                 | White-cheeked honeyeater  | Observed         |
| <i>Rhipidura leucophrys</i>               | Willie wagtail            | Observed         |
| <i>Cracticus tibicen</i>                  | Australian magpie         | Observed         |
| <i>Calyptorhynchus latirostris</i>        | Carnaby's Black Cockatoo  | Fly-over         |
| <i>Platycercus zonarius semitorquatus</i> | Twenty eight parrot       | Observed         |
| <i>Lichenostomus virescens</i>            | Singing honeyeater        | Observed         |
| <i>Lichmera indistincta</i>               | Brown honeyeater          | Observed         |
| <i>Coracina novaehollandiae</i>           | Black-faced Cuckoo-shrike | Observed         |
| <i>Petroica multicolor</i>                | Scarlet Robin             | Observed         |
| <i>Acanthorhynchus superciliosus</i>      | Western Spinebill         | Observed         |
| <i>Turnix varia</i>                       | Painted Button-Quail      | Observed         |
| <i>Menetia greyii</i>                     | Common Dwarf Skink        | Observed         |
| <i>Macropus fuliginosus</i>               | Western Grey Kangaroo     | Observed         |
| <i>Cryptoblepharus plagiocephalus</i>     | Fence Skink               | Observed         |
| <i>Corvus coronoides</i>                  | Australian Raven          | Observed         |
| <i>Acanthiza chrysorrhoa</i>              | Yellow-rumped Thornbill   | Observed         |

\* = Introduced species

***Other Environmental Observations***

The following environmental observations were made during the field survey:

- the vegetation in the study area was in excellent condition
- signs of cockatoo feeding were seen across all lots
- signs of rabbits were seen across all lots (diggings and scats)
- signs of Western Grey Kangaroos were seen across all lots (scats)

# 5.0 Discussion and Conclusions

## Fauna Survey for Barfield and Rowley Roads, Hammond Park

### 5.1 General Conclusions

#### 5.1.1 Desktop Investigation

The vegetation is broadly described as *Banksia* low woodland dominated by *Banksia attenuata*, *B. menziesii*, *B. ilicifolia*, *Eucalyptus todtiana* and *Nuytsia floribunda*, with *Allocasuarina fraseriana* joining the tree layer south of Gingin, and *Eucalyptus marginata* replacing *Eucalyptus todtiana* south of Lake Gngara (Beard 1981). Heddle et al (1980) describes the vegetation as the Bassendean Central and South Complex, ranging from woodland of *E. marginata* - *C. fraseriana* - *Banksia spp.* to low woodland of *Melaleuca spp.* and sedgelands on the moister sites. This area includes the transition of *E. marginata* to *E. todtiana* in the vicinity of Perth (Heddle et al 1980).

A search of the DEC threatened fauna databases indicated 3 Scheduled and 6 Priority fauna species recorded within 5km of the study area. A search of the Commonwealth EPBC *Protected Matters Search Tool* identified five threatened species, seven migratory species and one listed marine species (also listed under the migratory species list).

#### 5.1.2 Field Assessment

The entire site was traversed on foot by two Ecoscape zoologists experienced with conducting fauna surveys on the SCP (**Plates 1-6**). Surveys on each lot were conducted by walking a direct line through the block and sighting fauna (mainly birds) and fauna habitat from these points.

The Fauna Assessment of Lots 13, 14, 18 Barfield Road and Lots 48-51 Rowley Road, Hammond Park has determined that the relevant environmental factors of the site are:

- The vegetation across all lots was in excellent good condition
- The majority of the study area showed evidence of Cockatoo feeding or was determined to support excellent quality foraging habitat
- signs of rabbits were seen across all lots (diggings, scats or warrens)
- signs of Western Grey Kangaroos were seen across all lots (scats)

There was an observation of Carnaby's Black Cockatoo in a fly-over sighting but no other observations of Priority or Scheduled fauna species during the field survey. Carnaby's Black Cockatoo was the only species of conservation significance observed in the study area.

## 5.2 Limitations

The EPA *Guidance for Assessment of Environmental Factors: Terrestrial Fauna Surveys for Environmental Impact Assessments in Western Australia, No. 56* (2004) suggests that fauna surveys may be limited by many variables. Limitations associated with each of these variables are assessed in **Table 8**.

This Level 1 Fauna Assessment is based on Western Australian Museum records made available through *FaunaBase*, Birds Australia database, unpublished information from surveys surrounding the study area, a search of the DEC Threatened and Priority Fauna lists, the known habitat preferences for each species and Ecoscape's experience in conducting fauna surveys in the area. These databases do not provide comprehensive coverage of the state and are not adequate to provide species lists for small-scale areas. Large search areas are therefore used to generate species lists for small areas. The *FaunaBase* list is likely to include numerous species that are not likely to be found at any specific location within the search area.

Conclusions about the vertebrate faunal diversity in the region have been made based on results from previous surveys in the area and comparisons of the results from searches of available databases and regional reports. Given no trapping within the study area occurred, comments on the fauna assemblage are based on fauna surveys and habitat preference of species from the region. No invertebrate assessment was conducted during the survey.

**Table 8. Fauna Survey Limitations and Constraints**

| Aspect  | Constraint<br>(Yes/No) | Comment  |
|---|------------------------|--|
| Competency/experience of the consultant carrying out the survey | No                     | The zoologists conducting the fauna assessment had had appropriate training and experience in conducting Level 1 vertebrate fauna assessments.                     |
| Scope   | No                     | All components required for a Level 1 fauna assessment have been completed.  |
| Proportion of fauna identified, recorded and/or collected       | No                     | Fauna was identified through evidence of scats, tracks and direct observations within the study area.  |
| Sources of information  | Yes<br>Negligible      | Vertebrate fauna information was available using the WA Museum fauna database, DEC threatened and Priority species lists, other surveys of the Swan Coastal Plain. |
| Proportion of the task achieved                                 | No                     | The conservation value for fauna in the study area had been demonstrated by this fauna assessment.   |
| Timing/weather/season /cycle                                    | No                     | Weather was fine and warm during the field assessment.   |

| Aspect   | Constraint<br>(Yes/No) | Comment   |
|--|------------------------|---|
| Disturbances which affected results of survey        | No                     | Access was sufficient to survey the entire site.  |
| Intensity of survey effort                           | No                     | The intensity of the assessment was sufficient for a Level 1 fauna assessment.  |
| Completeness   | No                     | The entire study area was traversed on foot.  |
| Resources  | No                     | Adequate resources were available.  |
| Remoteness and/or access problems                    | No                     | There were no access or remoteness issues.  |
| Availability of contextual information on the region | Yes<br>Negligible      | WA Museum fauna database, Birds Australia database, DEC Threatened and Priority species lists, other surveys of the Swan Coastal Plain. |

### 5.3 Recommendations

The study area provides sufficient habitat, in size and quality, to support a significant feeding resource for Carnaby's Black-Cockatoo. Clearing of this habitat will require referral of the proposal to the Department of Environment, Water, Heritage and Arts under the *EPBC Act 1999*. Ecoscape believe the referral will be deemed to be a controlled action and is likely to be assessed on preliminary documentation.

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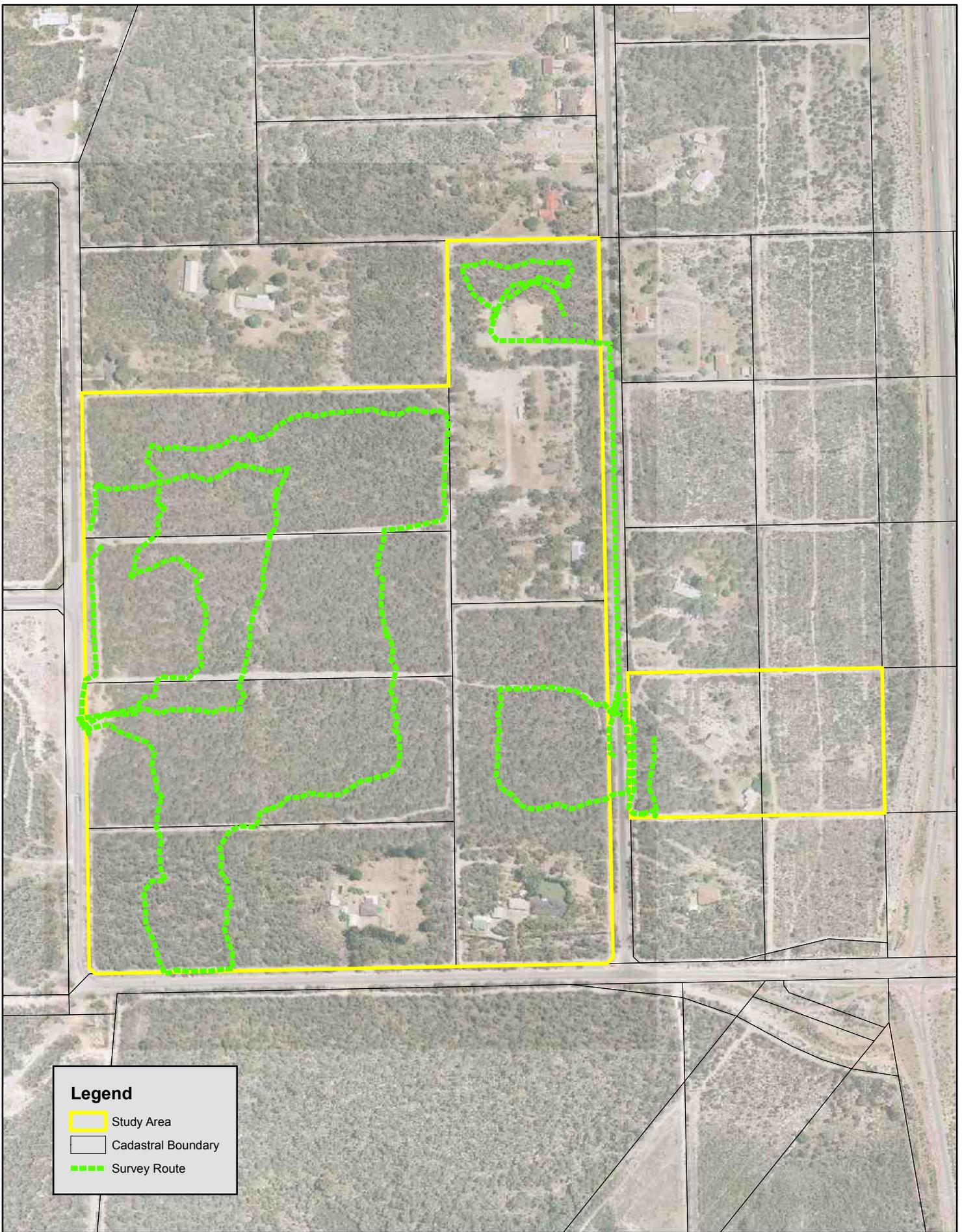
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# Appendix One: Maps

Fauna Survey of Barfield and Rowley Roads, Hammond Park



**Map 1**

**Fauna Assessment, Hammond Park**  
**Fauna Survey Route**

May 2009

prepared for Gold Estates  
0 150 300  
Metres



Project No. 2244-09



# Appendix Two: Photographs

Fauna Survey for Barfield and Rowley Roads, Hammond Park



*Plate 1: Vegetation in Lot 14.*



*Plate 2: Vegetation in Lot 18.*



***Plate 3: Vegetation in Lot 48.***



***Plate 4: Vegetation in Lot 49.***



*Plate 5: Vegetation in Lot 50.*



*Plate 6: Evidence of Cockatoo feeding activity, Lot 50.*

# Appendix Three: Definitions & Criteria

## Fauna Survey for Barfield and Rowley Roads, Hammond Park

*Table A3-1: Definitions and criteria for Threatened Ecological Communities and Priority Ecological Communities (DEC 2007 -)*

| Criteria                                 | Definition   |
|--|--|
| <b>Threatened Ecological Communities</b> |  |
| <b>Presumed Totally Destroyed (PD)</b>   | <p>An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.</p> <p>An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies ( A or B):</p> <p>A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or</p> <p>B) All occurrences recorded within the last 50 years have since been destroyed</p> |

| Criteria                                 | Definition   |
|--|--|
| <p><b>Critically Endangered (CR)</b></p> | <p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.</p> <p>An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):</p> <p>A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii):</p> <p>i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years);</p> <p>ii) modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated.</p> <p>B) Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <p>i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years);</p> <p>ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes;</p> <p>iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes.</p> <p>C) The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).</p> |

| Criteria               | Definition   |
|------------------------|--|
| <b>Endangered (EN)</b> | <p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.</p> <p>An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C):</p> <p>A) The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii):</p> <ul style="list-style-type: none"> <li>i) the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years);</li> <li>ii) modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated.</li> </ul> <p>B) Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <ul style="list-style-type: none"> <li>i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years);</li> <li>ii) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes;</li> <li>iii) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes.</li> </ul> <p>C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).</p> |

| Criteria                               | Definition  |
|--|---|
| <b>Vulnerable (VU)</b>                 | <p>An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.</p> <p>An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C):</p> <p>A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.</p> <p>B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.</p> <p>C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.</p> |
| <b>Priority Ecological Communities</b> |   |
| <b>Priority One</b>                    | Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.  |
| <b>Priority Two</b>                    | Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, state forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities, but do not meet adequacy of survey requirements, and / or are not well defined, and appear to be under threat from known threatening processes.  |

| Criteria              | Definition   |
|-----------------------|--|
| <b>Priority Three</b> | <p>i. Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or;</p> <p>ii. Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or;</p> <p>iii. Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes.</p> <p>Communities may be included if they are comparatively well known from several localities, but do not meet adequacy of survey requirements and / or are not well defined, and known threatening processes exist that could affect them.</p>              |
| <b>Priority Four</b>  | <p>Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.</p> <p>a. <b>Rare.</b> Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change These communities are usually represented on conservation lands.</p> <p>b. <b>Near Threatened.</b> Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.</p> <p>c. Ecological communities that have been removed from the list of threatened communities during the past five years.</p> |
| <b>Priority Five</b>  | <p><i>Conservation Dependent Ecological Communities</i></p> <p>Ecological Communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.</p>  |

**Table A3-2: DEC conservation codes and definitions for flora**

| Conservation Code   | Definition  |
|---|---|
| <b>X</b><br><b>Declared Rare Flora - Presumed Extinct</b> | Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee   |
| <b>R</b><br><b>Declared Rare Flora - Extant</b>           | Taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee. (= Threatened Flora = Endangered + Vulnerable)  |
| <b>P1</b><br><b>Priority One - Poorly Known</b>           | Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey |
| <b>P2</b><br><b>Priority Two - Poorly Known</b>           | Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey  |
| <b>P3</b><br><b>Priority Three - Poorly Known</b>         | Taxa which are known from several populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey   |
| <b>P4</b><br><b>Priority Four - Rare</b>                  | Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years  |

**Table A3-3: EPBC Act categories**

| EPBC Act Category            | Definition  |
|------------------------------|---|
| <b>Extinct</b>               | A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.   |
| <b>Extinct in the wild</b>   | A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time: <ul style="list-style-type: none"> <li>(a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or</li> <li>(b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.</li> </ul> |
| <b>Critically Endangered</b> | A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.   |
| <b>Endangered</b>            | A native species is eligible to be included in the endangered category at a particular time if, at that time: <ul style="list-style-type: none"> <li>(a) it is not critically endangered; and</li> <li>(b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.</li> </ul>   |
| <b>Vulnerable</b>            | A native species is eligible to be included in the vulnerable category at a particular time if, at that time: <ul style="list-style-type: none"> <li>(a) it is not critically endangered or endangered; and</li> </ul>  |

| EPBC Act Category             | Definition   |
|-------------------------------|--|
|                               | (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.  |
| <b>Conservation Dependent</b> | <p>A native species is eligible to be included in the conservation dependent category at a particular time if, at that time:</p> <p>(a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or</p> <p>(b) the following subparagraphs are satisfied:</p> <ul style="list-style-type: none"> <li>(i) the species is a species of fish;</li> <li>(ii) the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised;</li> <li>(iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory;</li> <li>(iv) cessation of the plan of management would adversely affect the conservation status of the species.</li> </ul> |

Table A3-4: DEC schedules and definitions

| Schedule          | Definition  |
|-------------------|---|
| <b>Schedule 1</b> | Fauna that is rare or likely to become extinct, are declared to be fauna that is in need of special protection  |
| <b>Schedule 2</b> | Fauna that is presumed to be extinct, are declared to be fauna that is in need of special protection  |
| <b>Schedule 3</b> | Birds that are subject to an agreement between the Governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is in need of special protection |
| <b>Schedule 4</b> | Declared to be fauna that is in need of special protection, otherwise than for the reasons mentioned in paragraphs (a), (b) and (c)- immediately below  |

**Table A3-5: DEC definitions of Priority Codes for fauna**

| <b>Priority</b> | <b>Definition</b>   |
|-----------------|---|
| <b>One</b>      | <b>Taxa with few, poorly known populations on threatened lands</b> , defined as:<br>Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.   |
| <b>Two</b>      | <b>Taxa with few, or poorly known populations on conservation lands</b> , defined as:<br>Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna. |
| <b>Three</b>    | <b>Taxa with several, poorly known populations, some on conservation lands</b> , defined as:<br>Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.  |
| <b>Four</b>     | <b>Taxa in need of monitoring</b> , defined as:<br>Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.   |
| <b>Five</b>     | <b>Taxa in need of monitoring</b> , defined as:<br>Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.   |

# Appendix Four: Fauna Search Results

## Fauna Survey for Barfield and Rowley Roads, Hammond Park

**Table A4-1: FaunaBase search results for Fauna Species in the local area (\* denotes introduced species).**

| Species                                | Common Name                      | DEC Schedule | DEC Conservation Priority | EPBC Listing |
|--|----------------------------------|--------------|---------------------------|--------------|
| <b>Mammals</b>                         |                                  |              |                           |              |
| <i>Felis catus</i> *                   | Feral Cat                        |              |                           |              |
| <i>Isoodon obesulus fusciventer</i>    | Quenda, Southern Brown Bandicoot |              | P5                        |              |
| <i>Mus musculus</i> *                  | European House Mouse             |              |                           |              |
| <i>Nyctophilus geoffroyi</i>           | Lesser Long-eared Bat            |              |                           |              |
| <i>Rattus rattus</i> *                 | Black Rat                        |              |                           |              |
| <i>Trichosurus vulpecula vulpecula</i> | Brushtail Possum                 |              |                           |              |

| Species                                   | Common Name                         | DEC Schedule | DEC Conservation Priority | EPBC Listing |
|---|-------------------------------------|--------------|---------------------------|--------------|
| <b>Reptiles</b>                           |                                     |              |                           |              |
| <i>Christinus marmoratus</i>              | Marbled Gecko                       |              |                           |              |
| <i>Ctenotus australis</i>                 | -                                   |              |                           |              |
| <i>Ctenotus gemmula</i>                   | -                                   |              |                           |              |
| <i>Notechis scutatus</i>                  | Tiger Snake                         |              |                           |              |
| <i>Pseudonaja affinis affinis</i>         | Dugite                              |              |                           |              |
| <i>Rankinia adelaidensis</i>              | Heath Dragon                        |              |                           |              |
| <i>Rankinia adelaidensis adelaidensis</i> | -                                   |              |                           |              |
| <i>Tiliqua rugosa rugosa</i>              | Bobtail Lizard                      |              |                           |              |
| <i>Pogona minor minor</i>                 | Dwarf Bearded Dragon                |              |                           |              |
| <i>Chelodina oblonga</i>                  | Narrow-Breasted Snake-Necked Turtle |              |                           |              |
| <i>Brachyurophis semifasciata</i>         | Southern Shovel-nosed Snake         |              |                           |              |
| <i>Demansia psammophis reticulata</i>     | Yellow-faced Whipsnake              |              |                           |              |
| <i>Elapognathus coronatus</i>             | -                                   |              |                           |              |
| <i>Neelaps bimaculatus</i>                | Black-naped Snake                   |              |                           |              |
| <i>Neelaps calonotos</i>                  | Black-striped Snake                 |              |                           |              |
| <i>Parasuta gouldii</i>                   | Gould's hooded snake                |              |                           |              |
| <i>Parasuta nigriceps</i>                 | Black-backed snake                  |              |                           |              |
| <i>Diplodactylus polyophthalmus</i>       | -                                   |              |                           |              |
| <i>Gehyra variegata</i>                   | Variegated Tree Dtella              |              |                           |              |
| <i>Underwoodisaurus milii</i>             | Thick tailed or Barking gecko       |              |                           |              |
| <i>Aprasia pulchella</i>                  | Pink-tailed Legless Lizard          |              |                           | Endangered   |
| <i>Aprasia rupens</i>                     | -                                   |              |                           |              |
| <i>Delma fraseri fraseri</i>              | Fraser's Legless Lizard             |              |                           |              |
| <i>Delma grayii</i>                       | Side-barred <b>Delma</b>            |              |                           |              |
| <i>Lialis burtonis</i>                    | Burton's legless lizard             |              |                           |              |
| <i>Pletholax gracilis gracilis</i>        | Keeled Legless Lizard               |              |                           |              |
| <i>Pygopus lepidopodus</i>                | Common Scaly Foot                   |              |                           |              |
| <i>Acritoscincus trilineatum</i>          | Southwestern Cool Skink             |              |                           |              |
| <i>Cryptoblepharus plagiocephalus</i>     | Callose-palmed Snake-eyed Skink     |              |                           |              |
| <i>Ctenotus delii</i>                     | -                                   |              |                           |              |

| Species                              | Common Name                   | DEC Schedule | DEC Conservation Priority | EPBC Listing |
|--------------------------------------|-------------------------------|--------------|---------------------------|--------------|
| <i>Ctenotus impar</i>                | -                             |              |                           |              |
| <i>Ctenotus labillardieri</i>        | Red-legged Skink              |              |                           |              |
| <i>Egernia napoleonis</i>            | South western Crevice skink   |              |                           |              |
| <i>Hemiergis initialis initialis</i> | Five-toed Earless Skink       |              |                           |              |
| <i>Hemiergis quadrilineata</i>       | Two-toed Earless Skink        |              |                           |              |
| <i>Lerista distinguenda</i>          | Southwestern Four-toed        |              |                           |              |
| <i>Lerista elegans</i>               | -                             |              |                           |              |
| <i>Lerista lineata</i>               | -                             |              |                           |              |
| <i>Menetia greyii</i>                | Common Dwarf Skink            |              |                           |              |
| <i>Morethia lineoocellata</i>        | Western Pale-flecked Morethia |              |                           |              |
| <i>Morethia obscura</i>              | Woodland Flecked Skink        |              |                           |              |
| <i>Tiliqua occipitalis</i>           | Western Blue-tongued Lizard   |              |                           |              |
| <i>Tiliqua rugosa rugosa</i>         | -                             |              |                           |              |
| <i>Ramphotyphlops australis</i>      | Blind Snake                   |              |                           |              |
| <i>Ramphotyphlops pinguis</i>        | Long Tailed Blindsnakes       |              |                           |              |
| <i>Ramphotyphlops waitii</i>         | Long Tailed Blindsnakes       |              |                           |              |
| <i>Varanus tristis tristis</i>       | Black Headed Monitor          |              |                           |              |

| Species                       | Common Name               | DEC Schedule | DEC Conservation Priority | EPBC Listing |
|-------------------------------|---------------------------|--------------|---------------------------|--------------|
| <b>Amphibians</b>             |                           |              |                           |              |
| <i>Crinia georgiana</i>       | Quaking Frog              |              |                           |              |
| <i>Crinia glauerti</i>        | Glauert's Froglet         |              |                           |              |
| <i>Crinia insignifera</i>     | Western Sign-bearing Frog |              |                           |              |
| <i>Heleioporus eyrei</i>      | Moaning Frog              |              |                           |              |
| <i>Limnodynastes dorsalis</i> | Western Banjo Frog        |              |                           |              |
| <i>Litoria moorei</i>         | Motorbike Frog            |              |                           |              |
| <i>Myobatrachus gouldii</i>   | Turtle Frog               |              |                           |              |
| <i>Pseudophryne guentheri</i> | Guenther's Toadlet        |              |                           |              |

#### A4-2. Bird Data Atlas Search Results

| Species                            | Common Name           | DEC Schedule | DEC Conservation Priority | EPBC Listing |
|------------------------------------|-----------------------|--------------|---------------------------|--------------|
| <b>Birds</b>                       |                       |              |                           |              |
| <i>Dromaius novaehollandiae</i>    | Emu                   |              |                           |              |
| <i>Coturnix pectoralis</i>         | Stubble Quail         |              |                           |              |
| <i>Coturnix ypsilophora</i>        | Brown Quail           |              |                           |              |
| <i>Pavo cristatus</i>              | Indian Peafowl        |              |                           |              |
| <i>Phasianus colchicus</i>         | Common Pheasant       |              |                           |              |
| <i>Biziura lobata</i>              | Musk Duck             |              |                           |              |
| <i>Stictonetta naevosa</i>         | Freckled Duck         |              |                           |              |
| <i>Cygnus atratus</i>              | Black Swan            |              |                           |              |
| <i>Tadorna tadornoides</i>         | Australian Shelduck   |              |                           |              |
| <i>Chenonetta jubata</i>           | Australian Wood Duck  |              |                           |              |
| <i>Malacorhynchus membranaceus</i> | Pink-eared Duck       |              |                           |              |
| <i>Anas rhynchos</i>               | Australasian Shoveler |              |                           |              |
| <i>Anas gracilis</i>               | Grey Teal             |              |                           |              |
| <i>Anas castanea</i>               | Chestnut Teal         |              |                           |              |
| <i>Anas platyrhynchos</i>          | Northern Mallard      |              |                           |              |
| <i>Anas superciliosa</i>           | Pacific Black Duck    |              |                           |              |

| Species                          | Common Name                   | DEC Schedule | DEC Conservation Priority | EPBC Listing |
|----------------------------------|-------------------------------|--------------|---------------------------|--------------|
| <i>Aythya australis</i>          | Hardhead                      |              |                           |              |
| <i>Oxyura australis</i>          | Blue-billed Duck              |              |                           |              |
| <i>Columba livia</i>             | Rock Dove                     |              |                           |              |
| <i>Streptopelia senegalensis</i> | Laughing Dove                 |              |                           |              |
| <i>Streptopelia chinensis</i>    | Spotted Dove                  |              |                           |              |
| <i>Phaps chalcoptera</i>         | Common Bronzewing             |              |                           |              |
| <i>Phaps elegans</i>             | Brush Bronzewing              |              |                           |              |
| <i>Ocyphaps lophotes</i>         | Crested Pigeon                |              |                           |              |
| <i>Podargus strigoides</i>       | Tawny Frogmouth               |              |                           |              |
| <i>Eurostopodus argus</i>        | Spotted Nightjar              |              |                           |              |
| <i>Aegotheles cristatus</i>      | Australian Owlet-nightjar     |              |                           |              |
| <i>Apus pacificus</i>            | Fork-tailed Swift             |              |                           |              |
| <i>Pachyptila salvini</i>        | Salvin's Prion                |              |                           |              |
| <i>Pachyptila belcheri</i>       | Slender-billed Prion          |              |                           |              |
| <i>Ardenna pacifica</i>          | Wedge-tailed Shearwater       |              |                           |              |
| <i>Ardenna carneipes</i>         | Flesh-footed Shearwater       |              |                           |              |
| <i>Ardenna grisea</i>            | Sooty Shearwater              |              |                           |              |
| <i>Puffinus huttoni</i>          | Hutton's Shearwater           |              |                           |              |
| <i>Puffinus assimilis</i>        | Little Shearwater             |              |                           |              |
| <i>Lugensa brevirostris</i>      | Kerguelen Petrel              |              |                           |              |
| <i>Pterodroma mollis</i>         | Soft-plumaged Petrel          |              |                           |              |
| <i>Pterodroma macroptera</i>     | Great-winged Petrel           |              |                           |              |
| <i>Eudyptula minor</i>           | Little Penguin                |              |                           |              |
| <i>Morus serrator</i>            | Australasian Gannet           |              |                           |              |
| <i>Ixobrychus dubius</i>         | Australian Little Bittern     |              |                           |              |
| <i>Ardea pacifica</i>            | White-necked Heron            |              |                           |              |
| <i>Accipiter fasciatus</i>       | Brown Goshawk                 |              |                           |              |
| <i>Accipiter cirrocephalus</i>   | Collared Sparrowhawk          |              |                           |              |
| <i>Circus assimilis</i>          | Spotted Harrier               |              |                           |              |
| <i>Circus approximans</i>        | Swamp Harrier                 |              |                           |              |
| <i>Aquila audax</i>              | Wedge-tailed Eagle            |              |                           |              |
| <i>Hieraetus morphnoides</i>     | Little Eagle                  |              |                           |              |
| <i>Falco cenchroides</i>         | Nankeen Kestrel               |              |                           |              |
| <i>Falco berigora</i>            | Brown Falcon                  |              |                           |              |
| <i>Falco longipennis</i>         | Australian Hobby              |              |                           |              |
| <i>Falco peregrinus</i>          | Peregrine Falcon              |              | P4                        |              |
| <i>Porphyrio porphyrio</i>       | Purple Swamphen               |              |                           |              |
| <i>Gallirallus philippensis</i>  | Buff-banded Rail              |              |                           |              |
| <i>Porzana pusilla</i>           | Baillon's Crake               |              |                           |              |
| <i>Porzana fluminea</i>          | Australian Spotted Crake      |              |                           |              |
| <i>Porzana tabuensis</i>         | Spotless Crake                |              |                           |              |
| <i>Tribonyx ventralis</i>        | Black-tailed Native-hen       |              |                           |              |
| <i>Gallinula tenebrosa</i>       | Dusky Moorhen                 |              |                           |              |
| <i>Fulica atra</i>               | Eurasian Coot                 |              |                           |              |
| <i>Burhinus grallarius</i>       | Bush Stone-curlew             |              |                           |              |
| <i>Haematopus longirostris</i>   | Australian Pied Oystercatcher |              |                           |              |
| <i>Haematopus fuliginosus</i>    | Sooty Oystercatcher           |              |                           |              |
| <i>Himantopus himantopus</i>     | Black-winged Stilt            |              |                           |              |

| Species                              | Common Name               | DEC Schedule | DEC Conservation Priority | EPBC Listing |
|--------------------------------------|---------------------------|--------------|---------------------------|--------------|
| <i>Recurvirostra novaehollandiae</i> | Red-necked Avocet         |              |                           |              |
| <i>Cladorhynchus leucocephalus</i>   | Banded Stilt              |              |                           |              |
| <i>Pluvialis fulva</i>               | Pacific Golden Plover     |              |                           |              |
| <i>Pluvialis squatarola</i>          | Grey Plover               |              |                           |              |
| <i>Charadrius dubius</i>             | Little Ringed Plover      |              |                           |              |
| <i>Charadrius ruficapillus</i>       | Red-capped Plover         |              |                           |              |
| <i>Charadrius mongolus</i>           | Lesser Sand Plover        |              |                           |              |
| <i>Charadrius leschenaultii</i>      | Greater Sand Plover       |              |                           |              |
| <i>Elseynornis melanops</i>          | Black-fronted Dotterel    |              |                           |              |
| <i>Thinornis rubricollis</i>         | Hooded Plover             |              |                           |              |
| <i>Erythrogonys cinctus</i>          | Red-kneed Dotterel        |              |                           |              |
| <i>Vanellus tricolor</i>             | Banded Lapwing            |              |                           |              |
| <i>Vanellus miles</i>                | Masked Lapwing            |              |                           |              |
| <i>Limosa limosa</i>                 | Black-tailed Godwit       |              |                           |              |
| <i>Limosa lapponica</i>              | Bar-tailed Godwit         |              |                           |              |
| <i>Numenius phaeopus</i>             | Whimbrel                  |              |                           |              |
| <i>Numenius madagascariensis</i>     | Eastern Curlew            |              |                           |              |
| <i>Xenus cinereus</i>                | Terek Sandpiper           |              |                           |              |
| <i>Actitis hypoleucos</i>            | Common Sandpiper          |              |                           |              |
| <i>Tringa brevipes</i>               | Grey-tailed Tattler       |              |                           |              |
| <i>Tringa nebularia</i>              | Common Greenshank         |              |                           |              |
| <i>Tringa stagnatilis</i>            | Marsh Sandpiper           |              |                           |              |
| <i>Tringa glareola</i>               | Wood Sandpiper            |              |                           |              |
| <i>Arenaria interpres</i>            | Ruddy Turnstone           |              |                           |              |
| <i>Calidris tenuirostris</i>         | Great Knot                |              |                           |              |
| <i>Calidris canutus</i>              | Red Knot                  |              |                           |              |
| <i>Calidris alba</i>                 | Sanderling                |              |                           |              |
| <i>Calidris minuta</i>               | Little Stint              |              |                           |              |
| <i>Calidris ruficollis</i>           | Red-necked Stint          |              |                           |              |
| <i>Calidris subminuta</i>            | Long-toed Stint           |              |                           |              |
| <i>Calidris melanotos</i>            | Pectoral Sandpiper        |              |                           |              |
| <i>Calidris acuminata</i>            | Sharp-tailed Sandpiper    |              |                           |              |
| <i>Calidris ferruginea</i>           | Curlew Sandpiper          |              |                           |              |
| <i>Limicola falcinellus</i>          | Broad-billed Sandpiper    |              |                           |              |
| <i>Philomachus pugnax</i>            | Ruff                      |              |                           |              |
| <i>Phalaropus lobatus</i>            | Red-necked Phalarope      |              |                           |              |
| <i>Turnix varius</i>                 | Painted Button-quail      |              |                           |              |
| <i>Stercorarius antarcticus</i>      | Brown Skua                |              |                           |              |
| <i>Stercorarius pomarinus</i>        | Pomarine Jaeger           |              |                           |              |
| <i>Stercorarius parasiticus</i>      | Arctic Jaeger             |              |                           |              |
| <i>Anous stolidus</i>                | Common Noddy              |              |                           |              |
| <i>Onychoprion anaethetus</i>        | Bridled Tern              |              |                           |              |
| <i>Sternula albifrons</i>            | Little Tern               |              |                           |              |
| <i>Sternula nereis</i>               | Fairy Tern                |              |                           |              |
| <i>Gelochelidon nilotica</i>         | Gull-billed Tern          |              |                           |              |
| <i>Hydroprogne caspia</i>            | Caspian Tern              |              |                           |              |
| <i>Chlidonias hybrida</i>            | Whiskered Tern            |              |                           |              |
| <i>Chlidonias leucopterus</i>        | White-winged Black Tern   |              |                           |              |
| <i>Sterna dougallii</i>              | Roseate Tern              |              |                           |              |
| <i>Calyptorhynchus banksii</i>       | Red-tailed Black-Cockatoo |              |                           |              |
| <i>Calyptorhynchus latirostris</i>   | Carnaby's Black-Cockatoo  | Schedule 1   | Endangered                | Endangered   |
| <i>Calyptorhynchus baudinii</i>      | Baudin's Black-Cockatoo   | Schedule 1   | Vulnerable                | Vulnerable   |

| Species                              | Common Name               | DEC Schedule | DEC Conservation Priority | EPBC Listing |
|--------------------------------------|---------------------------|--------------|---------------------------|--------------|
| <i>Eolophus roseicapillus</i>        | Galah                     |              |                           |              |
| <i>Cacatua tenuirostris</i>          | Long-billed Corella       |              |                           |              |
| <i>Cacatua pastinator</i>            | Western Corella           |              |                           |              |
| <i>Cacatua sanguinea</i>             | Little Corella            |              |                           |              |
| <i>Cacatua galerita</i>              | Sulphur-crested Cockatoo  |              |                           |              |
| <i>Nymphicus hollandicus</i>         | Cockatiel                 |              |                           |              |
| <i>Trichoglossus haematodus</i>      | Rainbow Lorikeet          |              |                           |              |
| <i>Glossopsitta porphyrocephala</i>  | Purple-crowned Lorikeet   |              |                           |              |
| <i>Polytelis anthopeplus</i>         | Regent Parrot             |              |                           |              |
| <i>Platycercus icterotis</i>         | Western Rosella           |              |                           |              |
| <i>Barnardius zonarius</i>           | Australian Ringneck       |              |                           |              |
| <i>Purpureicephalus spurius</i>      | Red-capped Parrot         |              |                           |              |
| <i>Neophema elegans</i>              | Elegant Parrot            |              |                           |              |
| <i>Neophema petrophila</i>           | Rock Parrot               |              |                           |              |
| <i>Chalcites basalis</i>             | Horsfield's Bronze-Cuckoo |              |                           |              |
| <i>Chalcites lucidus</i>             | Shining Bronze-Cuckoo     |              |                           |              |
| <i>Cacomantis pallidus</i>           | Pallid Cuckoo             |              |                           |              |
| <i>Cacomantis flabelliformis</i>     | Fan-tailed Cuckoo         |              |                           |              |
| <i>Ninox novaeseelandiae</i>         | Southern Boobook          |              |                           |              |
| <i>Tyto novaehollandiae</i>          | Masked Owl                |              |                           |              |
| <i>Tyto javanica</i>                 | Eastern Barn Owl          |              |                           |              |
| <i>Dacelo novaeguineae</i>           | Laughing Kookaburra       |              |                           |              |
| <i>Todiramphus sanctus</i>           | Sacred Kingfisher         |              |                           |              |
| <i>Merops ornatus</i>                | Rainbow Bee-eater         |              | P4                        |              |
| <i>Climacteris rufa</i>              | Rufous Treecreeper        |              |                           |              |
| <i>Malurus splendens</i>             | Splendid Fairy-wren       |              |                           |              |
| <i>Malurus lamberti</i>              | Variiegated Fairy-wren    |              |                           |              |
| <i>Malurus elegans</i>               | Red-winged Fairy-wren     |              |                           |              |
| <i>Stipiturus malachurus</i>         | Southern Emu-wren         |              |                           |              |
| <i>Sericornis frontalis</i>          | White-browed Scrubwren    |              |                           |              |
| <i>Smicrornis brevirostris</i>       | Weebill                   |              |                           |              |
| <i>Gerygone fusca</i>                | Western Gerygone          |              |                           |              |
| <i>Acanthiza chrysorrhoa</i>         | Yellow-rumped Thornbill   |              |                           |              |
| <i>Acanthiza inornata</i>            | Western Thornbill         |              |                           |              |
| <i>Acanthiza apicalis</i>            | Inland Thornbill          |              |                           |              |
| <i>Pardalotus punctatus</i>          | Spotted Pardalote         |              |                           |              |
| <i>Pardalotus striatus</i>           | Striated Pardalote        |              |                           |              |
| <i>Acanthorhynchus superciliosus</i> | Western Spinebill         |              |                           |              |
| <i>Lichenostomus virescens</i>       | Singing Honeyeater        |              |                           |              |
| <i>Lichenostomus ornatus</i>         | Yellow-plumed Honeyeater  |              |                           |              |
| <i>Manorina flavigula</i>            | Yellow-throated Miner     |              |                           |              |
| <i>Anthochaera lunulata</i>          | Western Wattlebird        |              |                           |              |
| <i>Anthochaera carunculata</i>       | Red Wattlebird            |              |                           |              |
| <i>Epthianura albifrons</i>          | White-fronted Chat        |              |                           |              |
| <i>Glyciphila melanops</i>           | Tawny-crowned Honeyeater  |              |                           |              |
| <i>Lichmera indistincta</i>          | Brown Honeyeater          |              |                           |              |
| <i>Phylidonyris novaehollandiae</i>  | New Holland Honeyeater    |              |                           |              |
| <i>Phylidonyris niger</i>            | White-cheeked Honeyeater  |              |                           |              |
| <i>Melithreptus brevirostris</i>     | Brown-headed Honeyeater   |              |                           |              |
| <i>Melithreptus lunatus</i>          | White-naped Honeyeater    |              |                           |              |
| <i>Daphoenositta chrysoptera</i>     | Varied Sittella           |              |                           |              |
| <i>Coracina novaehollandiae</i>      | Black-faced Cuckoo-shrike |              |                           |              |
| <i>Lalage sueurii</i>                | White-winged Triller      |              |                           |              |

| Species                          | Common Name                         | DEC Schedule | DEC Conservation Priority | EPBC Listing |
|----------------------------------|-------------------------------------|--------------|---------------------------|--------------|
| <i>Pachycephala pectoralis</i>   | Golden Whistler                     |              |                           |              |
| <i>Pachycephala rufiventris</i>  | Rufous Whistler                     |              |                           |              |
| <i>Colluricincla megarhyncha</i> | Little Shrike-thrush                |              |                           |              |
| <i>Colluricincla harmonica</i>   | Grey Shrike-thrush                  |              |                           |              |
| <i>Artamus cinereus</i>          | Black-faced Woodswallow             |              |                           |              |
| <i>Artamus cyanopterus</i>       | Dusky Woodswallow                   |              |                           |              |
| <i>Cracticus torquatus</i>       | Grey Butcherbird                    |              |                           |              |
| <i>Cracticus nigrogularis</i>    | Pied Butcherbird                    |              |                           |              |
| <i>Cracticus tibicen</i>         | Australian Magpie                   |              |                           |              |
| <i>Strepera versicolor</i>       | Grey Currawong                      |              |                           |              |
| <i>Rhipidura albiscapa</i>       | Grey Fantail                        |              |                           |              |
| <i>Rhipidura leucophrys</i>      | Willie Wagtail                      |              |                           |              |
| <i>Corvus coronoides</i>         | Australian Raven                    |              |                           |              |
| <i>Corvus bennetti</i>           | Little Crow                         |              |                           |              |
| <i>Myiagra inquieta</i>          | Restless Flycatcher                 |              |                           |              |
| <i>Grallina cyanoleuca</i>       | Magpie-lark                         |              |                           |              |
| <i>Microeca fascians</i>         | Jacky Winter                        |              |                           |              |
| <i>Petroica boodang</i>          | Scarlet Robin                       |              |                           |              |
| <i>Petroica goodenovii</i>       | Red-capped Robin                    |              |                           |              |
| <i>Melanodryas cucullata</i>     | Hooded Robin                        |              |                           |              |
| <i>Eopsaltria griseogularis</i>  | Western Yellow Robin                |              |                           |              |
| <i>Eopsaltria georgiana</i>      | White-breasted Robin                |              |                           |              |
| <i>Acrocephalus australis</i>    | Australian Reed-Warbler             |              |                           |              |
| <i>Megalurus gramineus</i>       | Little Grassbird                    |              |                           |              |
| <i>Cincloramphus mathewsi</i>    | Rufous Songlark                     |              |                           |              |
| <i>Cincloramphus cruralis</i>    | Brown Songlark                      |              |                           |              |
| <i>Zosterops lateralis</i>       | Silvereye                           |              |                           |              |
| <i>Cheramoeca leucosterna</i>    | White-backed Swallow                |              |                           |              |
| <i>Hirundo neoxena</i>           | Welcome Swallow                     |              |                           |              |
| <i>Petrochelidon ariel</i>       | Fairy Martin                        |              |                           |              |
| <i>Petrochelidon nigricans</i>   | Tree Martin                         |              |                           |              |
| <i>Dicaeum hirundinaceum</i>     | Mistletoebird                       |              |                           |              |
| <i>Stagonopleura oculata</i>     | Red-eared Firetail                  |              |                           |              |
| <i>Lonchura castaneothorax</i>   | Chestnut-breasted Mannikin          |              |                           |              |
| <i>Passer domesticus</i>         | House Sparrow                       |              |                           |              |
| <i>Anthus novaeseelandiae</i>    | Australasian Pipit                  |              |                           |              |
| <i>Carduelis carduelis</i>       | European Goldfinch                  |              |                           |              |
|                                  | Domestic Goose                      |              |                           |              |
|                                  | Greylag Goose                       |              |                           |              |
|                                  | Domestic/Feral Duck                 |              |                           |              |
|                                  | Black Duck-Mallard hybrid           |              |                           |              |
|                                  | Muscovy Duck                        |              |                           |              |
|                                  | Tattler species                     |              |                           |              |
|                                  | White-tailed Black-Cockatoo species |              |                           |              |
|                                  | Corella species                     |              |                           |              |
|                                  | Ring-necked Parakeet                |              |                           |              |
|                                  | Crow & Raven species                |              |                           |              |