



Molonglo NES Plan Superb Parrot Survey

Baseline Survey 2013

Prepared for
Territory and Municipal Services

March 2014



DOCUMENT TRACKING

Item	Detail
Project Name	Molonglo NES Plan Superb Parrot Survey - Baseline Survey 2013
Project Number	13CANECO-0014
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Status	Final
Version Number	1
Last saved on	14 March 2014
Cover photo	Superb Parrot (<i>Polytelis swainsonii</i>) – Bruce Mullins, Central Molonglo 2013

This report should be cited as 'Eco Logical Australia 2014. *Molonglo NES Plan Superb Parrot Survey – Baseline survey 2013*. Prepared for Territory and Municipal Services, ACT Government.'

ACKNOWLEDGEMENTS

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Template 20/11/13

Contents

1	Introduction	5
1.1	Background.....	5
1.1.1	Superb Parrot ecology.....	5
1.2	Study objective	6
1.3	Study area	6
2	Methodology	8
3	Results and discussion	9
3.1	Survey conditions & general comments	9
3.1.1	Weather conditions.....	9
3.2	Superb Parrot observations.....	10
3.2.1	Spring Valley Farm (SVF).....	11
3.2.2	Central Molonglo (CML)	11
3.2.3	Opportunistic observations	12
3.3	Other species of interest.....	12
4	Conclusion and recommendations	17
	References	18
	Appendix A: Superb Parrot observation data	19
	Appendix B: Species list	24
	Appendix C: Species plates	26
	Appendix D: Nest tree plates	28

List of figures

Figure 1 Study area	7
Figure 2: Superb Parrot observations, Spring Valley Farm	13
Figure 3: Superb Parrot observations, Central Molonglo	14
Figure 4: Opportunistic Superb Parrot observations	15
Figure 5 Observations of other species of interest.....	16

List of tables

Table 1: Study areas	6
Table 2 Weather conditions during survey.....	9
Table 3: Summary of Superb Parrot observations, all study areas.....	10
Table 4: Superb Parrot observations, Central Molonglo	11
Table 5: Observations of species of interest	12

Abbreviations

Abbreviation	Description
ARB	Arboretum Woodland (Patches GG & N)
CML	Central Molonglo (Core breeding area)
ELA	Eco Logical Australia
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
KNR	Kama Nature Reserve
KWN	Known Nest Tree
NC Act	Nature Conservation Act 1980
NES	National Environmental Significance
PNT	Potential Nest Tree
RPW	River Park Woodland (Patch D)
RUT	Repeated use Nest Tree
SVF	Spring Valley Farm (Patches M1, M2, L, P1,P3)
TAMS	Territory and Municipal Services, ACT Government
TSC Act	Threatened Species Conservation Act 1995, NSW
WHW	William Hovell Woodland (Patches H & C)

1 Introduction

Eco Logical Australia Pty Ltd (ELA) was commissioned by Design and Development, Territory and Municipal Services Directorate (TAMS), to undertake a baseline survey of Superb Parrot breeding activity within the Molonglo Valley.

1.1 Background

In November 2011, the *Molonglo Valley Plan for the Protection of Matters of National Environmental Significance September 2011 (NES Plan)* was endorsed by the Commonwealth Government as part of a strategic assessment process to assess the potential impacts to Matters of National Environmental Significance (NES) resulting from the development within the Molonglo Valley. The Strategic Assessment process was completed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The NES Plan outlines the ACT Government's commitments in relation to avoidance and mitigation of impacts to matters of NES and required offset measures. Commitments include the preparation and implementation of plans of management (Operation Plans) and adaptive management strategies and the establishment of offset areas (conservation areas), primarily consisting of Box-Gum Woodland and Natural Temperate Grassland. These areas are referred to as NES Patches.

1.1.1 Superb Parrot ecology

The *Polytelis swainsonii* (Superb Parrot) is a characteristic species of the Riverina regions of New South Wales to the south and west of the ACT. In the Riverina, the Superb Parrot is often associated with tall riparian River Red Gum (*Eucalyptus camaldulensis*) Forest where it nests in hollow branches or trunk hollows usually near water (Higgins 1999). The species feeds in woodland patches surrounding River Red Gum Forest and it is thought that connectivity is important in facilitating movement between these two habitat types. In the South West Slopes, the species occurs and breeds in box woodlands away from water (Higgins 1999). The species suffered a contraction in its range following large scale clearance of habitat for agriculture and grazing throughout its range (Higgins 1999) and is now listed as vulnerable under the EPBC Act, the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the ACT *Nature Conservation Act 1980* (NC Act).

The species is known to breed between the Barmah Forest near the NSW/Victoria border through to Cowra, NSW, however, breeding is generally restricted to three disjunct areas within that range (Higgins 1999, Department of the Environment 2013). Until 2005-06, the species was rarely recorded breeding in the ACT where it was considered a rare migrant only (Davey 2012). Since 2005, the species has become increasingly common in areas of the ACT including the Molonglo Valley, Western Belconnen and Gungahlin. The species has been observed over-wintering in parts of Western Belconnen and breeding has now been recorded in both the Molonglo Valley and northern Gungahlin (Davey 2011).

The Superb Parrot is an obligate hollow breeder and as such its ability to survive and thrive in the landscape is closely tied to the availability of suitable hollows for nesting. Research has shown that in the South West Slopes the species has a strong preference for hollows in *Eucalyptus blakelyi* (Blakely's Red Gum) with a large circumference, measured as diameter at breast height (DBH) (Manning et al 2004). The study by Manning et al (2004) shows that the species has a particular preference for trees showing advanced signs of dieback or dead standing trees, and also indicates that the species is likely to utilise the same hollow in subsequent years.

1.2 Study objective

The purpose of this report is to provide a summary of Superb Parrot breeding activity in the Box-Gum Woodland patches identified in the Molonglo Strategic Assessment Area and in the core nesting area identified from previous surveys (Davey 2012) in the central Molonglo area.

The aim of this study is to establish baseline data of Superb Parrot breeding activity in the above-mentioned areas for the purpose of ongoing monitoring as part of the Territory's requirements under the Molonglo NES Plan.

1.3 Study area

The study area comprises six woodland patches situated to the west and north-west of Canberra's CBD within the Molonglo Valley (**Figure 1**). These patches are dominated by either *Eucalyptus melliodora* (Yellow Box) and/or *Eucalyptus blakelyi* (Blakely's Red Gum) and form a component of the nationally listed community "White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grasslands" ecological community, collectively termed Box-Gum Woodland, which is considered to be a matter of NES. These patches were previously identified in the NES Plan prepared for the Molonglo Strategic Assessment and are outlined in **Table 1**.

The study area also includes rural lands in 'Central Molonglo' which have previously been found to be a core nesting area for the Superb Parrot in western Canberra (Davey 2012). Central Molonglo includes three properties located to the north-west of Kama Nature Reserve.

Table 1: Study areas

Study area name	Applicable NES Patch Identification	Abbreviation	Area (ha)
Kama Nature Reserve	B1, B2, B3, O1, O2, O3, O4, A1 & A2)	KNR	154.6
Spring Valley Farm	M1, M2, L, P1,P3	SVF	59.4
River Park Woodland	D only	RPW	17.2
Arboretum Woodland	GG1, N1, N2	ARB	65.0
William Hovell Woodland	H, C	WHW	15.5
Central Molonglo Core breeding area	N/A	CML	137.5

It should be noted that some NES patches were excluded from this study as they do not provide potential habitat for the Superb Parrot, including NES patches T, K, S, R, Q, GG2, N3 & P2. In addition, the West Molonglo NES Patches were not included in this survey as they were recently surveyed in a report prepared by Kevin Mills & Associates, prepared for Riverview Group (refer to *Targeted Bird Surveys and Assessments West Belconnen Project Area*, The Riverview Group prepared by Kevin Mills & Associates 2013).

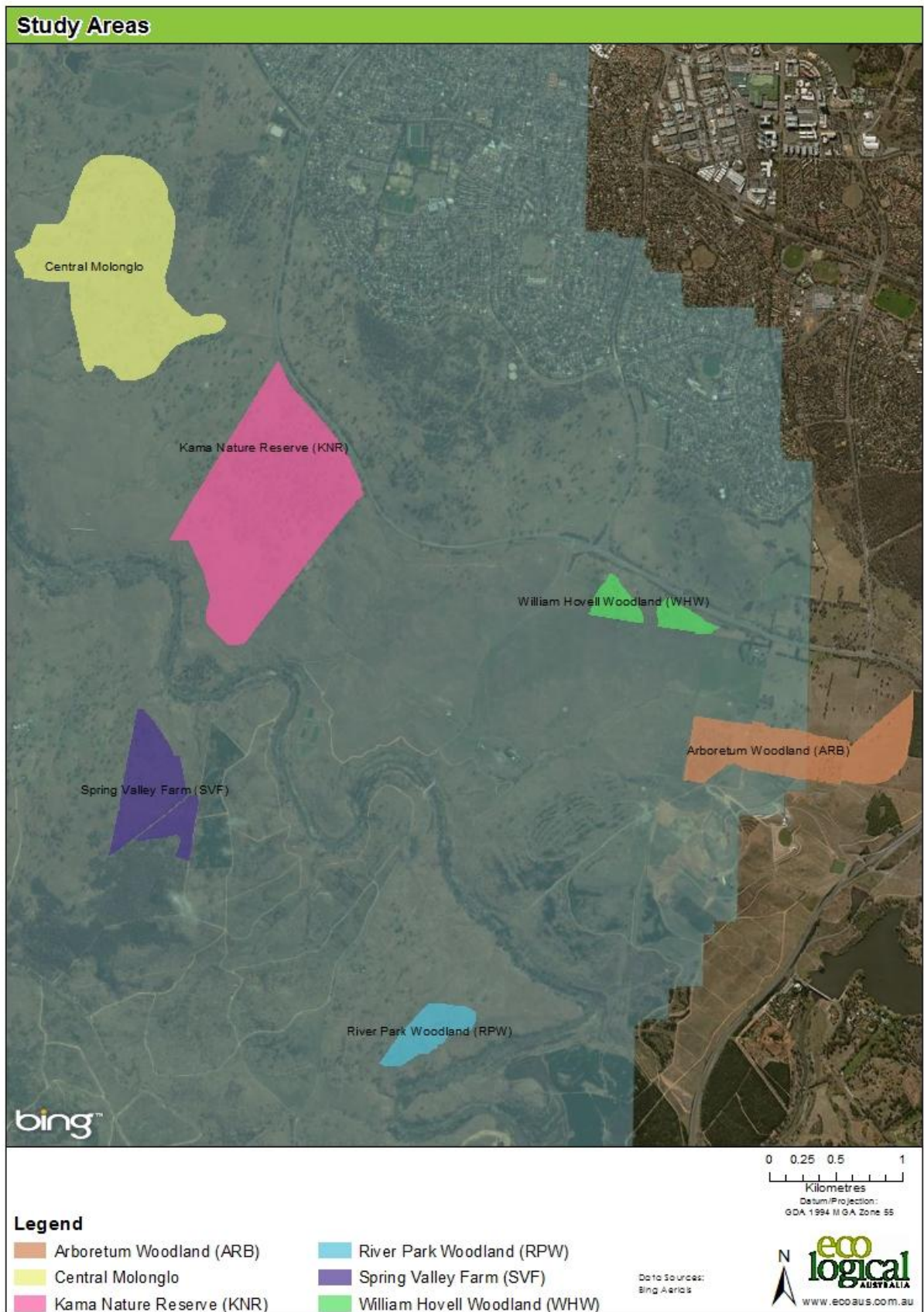


Figure 1 Study area

2 Methodology

Targeted surveys for the Superb Parrot were undertaken in accordance with the ACT *Survey Guidelines for the Superb Parrot* (CPR 2010) at the sites identified in **Figure 1**. Surveys were undertaken by one to two qualified ecologists on four occasions during the known breeding season for the species (October to December) in 2013. Survey 1 was undertaken by a single staff member due to tight timeframes surrounding project initiation, subsequent surveys were undertaken by two staff members. Surveys were undertaken on the following dates:

- 14th-17th October - Survey 1
- 11th-14th November - Survey 2
- 28th-29th November - Survey 3 (Sub-set of sites where breeding was detected)
- 17th-18th December - Survey 4 (Sub-set of sites where breeding was detected)

Two replicate surveys were undertaken during the breeding period to maximise the likelihood of detecting Superb Parrot and breeding activity within the study area. Where breeding behaviour was detected at a site, a further two surveys were undertaken during the remainder of the breeding season.

In accordance with the survey guidelines, surveys were conducted between one hour after sunrise and mid-morning (6:30am – 10:30am), however, high numbers of birds on occasion resulted in survey extending beyond 10:30am. Observers used a combination of visual and aural (listening) survey techniques to detect the presence of the species at each site. All trees considered potential nest trees were checked for signs of breeding pairs. Observations of Superb Parrot or other threatened species were recorded and a GPS location recorded.

Signs of breeding activity could include the following:

- A reluctance of either sex to leave the vicinity of a tree with a suitable hollow
- Female or male entering/leaving a hollow
- Copulation
- Aggressive interactions between pairs with potential nest hollows nearby
- A male “on station” indicated by the presence of a lone bird perched quietly in a tree occasionally making a soft call with a possible nest hollow nearby
- Males feeding females in the vicinity of a suitable hollow.
- Feeding by adult birds of young with short tails and limited capacity of flight, with a possible nest hollow nearby

In the event that a Superb Parrot was observed, the following data was recorded, where possible:

- Number of birds
- Description of the number of each sex and juveniles observed
- Direction of flight (compass bearing) of flying individuals
- Species of tree if nesting behaviour was observed.
- The approximate height, dbh and other notes on potential nest trees

3 Results and discussion

3.1 Survey conditions & general comments

Eco Logical Australia undertook surveys for the Superb Parrot on four occasions between October and December 2013. Superb Parrots were recorded in three of the study areas – Kama Nature Reserve (KNR), Spring Valley Farm (SVF) and Central Molonglo (CML), and evidence of successful breeding was recorded within both SVF and CML. A total of 306 observations were made over the study period (**Table 3**), although it is noted that this most likely includes multiple observations of the same individuals between survey periods.

Trees at which breeding activity was recorded during the surveys were separated into two classes:

- Known nest trees (KWN); and
- Potential Nest Trees (PNT)

Trees which were observed to have definite evidence of breeding activity such as a female repeatedly entering a hollow or a juvenile emerging from a hollow were considered to be KWNs. Where a definitive conclusion could not be made, but it was considered likely that the species is utilising the tree for breeding, the tree was identified as a PNT.

In addition, a comparison between the 2012 and 2013 surveys identified a number of trees that were utilised on repeat occasions. These trees were identified as Repeated Use Nest Tree (RUTs). A total of 6 trees were identified as RUTs during the 2013 season. Studies undertaken by Manning et al (2004) identified that RUTs are typically Blakely's Red Gum.

This study also identified that KWN and PNTs were most often Blakely's Red Gum. These trees generally had a large dbh (80+cm), and appeared in poor health (senescing). Typically these trees had suitable hollows in large dead limbs that were angled upwards, with the hollow entrance as a spout opening or hollow in the side of the limb. Hollows were generally located in the upper half of the tree. **Appendix D** presents all observations of Superb Parrot and KWN and PNTs.

3.1.1 Weather conditions

The weather conditions experienced over the survey period were recorded to range between 11 and 18°C at approximately 8:30-9:30am. Surveys were conducted in overcast to sunny conditions, and were not affected by rain at any point over the survey period. Surveys 1 & 2 were not considered ideal conditions for bird survey due to strong winds.

Table 2 Weather conditions during survey

Survey Period	Date	Temp at 9am (Celsius)	Wind speed (km/h)& Direction
1	14th Oct	8.3	11 SW
	15th Oct	7.6	7 NW
	16th Oct	15.5	22 NW
	17th Oct	19.1	33 NNW
2	11th Nov	9.5	22 SSE
	12th Nov	14.2	17 SSW
	13th Nov	15.4	26 NW
	14th Nov	14.7	20 WNW
3	28th Nov	18.2	2 N

Survey Period	Date	Temp at 9am (Celsius)	Wind speed (km/h)& Direction
4	29th Nov	13.8	22 S
	17th Dec	19.1	4 NNE
	18th Dec	21.4	7 NNW

3.2 Superb Parrot observations

The following table provides a summary of the Superb Parrot observations recorded during the survey period. While the species was recorded as foraging with Kama Nature Reserve (KNR), no evidence of breeding was recorded despite the presence of suitable hollows. As no breeding evidence was observed at KNR, it was not included in the final two survey periods.

Table 3: Summary of Superb Parrot observations, all study areas

Survey Period		Survey 1	Survey 2	Survey 3	Survey 4	Total
Site	Record	(14th-17th Oct)	(11th-14th Nov)	(27th-28th Nov)	(17th-18th Dec)	
KNR	Male	0	2			2
	Female	0	1			1
	Juvenile	0	0			0
	Unknown	0	12			12
	Nest tree	0	0			0
SVF	Male	1	8	4	3	16
	Female	1	5	4	2	12
	Juvenile	0	2	0	1	3
	Unknown	0	4	0	0	4
	Nest tree	1	2	3	3	3
RPW	No records	0	0			0
ARB	No records	0	0			0
WHW	No records	0	0			0
CML	Male	28	30	16	9	83
	Female	19	38	17	9	83
	Juvenile	0	0	18	4	22
	Unknown	15	26	15	12	68
	Nest tree	9	11	2	0	19
Total observations		64	128	74	40	306

hatched cells indicate no survey in survey periods 3 & 4 as no breeding was recorded at those sites in either surveys 1 or 2. KNR = Kama Nature Reserve. SVF = Spring Valley Farm, RPW = River Park Woodland, ARB = Arboretum, WHW = William Hovell Woodland, CML = Central Molonglo.

3.2.1 Spring Valley Farm (SVF)

The Superb Parrot was recorded at SVF during each of the four survey periods (**Figure 2**). The species was observed during the initial surveys displaying breeding behaviours, which included a reluctance to leave the vicinity of a hollow and both the male and female birds entering the hollow for a period of time. Subsequent surveys confirmed that the species was nesting on site and over the course of the surveys one pair reared 3 chicks to fledging (i.e. three juvenile observations). SVF accounted for 35 of the 306 observations recorded (**Table 3**). The population observed at SVF was recorded as comprising approximately 46% males, 34% females, 9% Juveniles and 11% unknown. During the breeding season, it is not unusual to observe mostly male birds as females solely incubate eggs for about 20 days and then warm chicks. The three known or potential nest trees which were identified at SVF, are all located within Patch M1.

The presence of a breeding population of the species at SVF is a new record for the ACT, and extends the known breeding area of the species in the ACT.

One hollow in which Superb Parrot were observed was atypical of hollows used during the survey period. While the hollow was in a large Blakely's Red Gum, the hollow itself was an opening in the fork of a living portion of the tree. The other two nest trees on site were more typical.

3.2.2 Central Molonglo (CML)

Central Molonglo was identified as a core nesting area for the Superb Parrot in 2012 (Davey 2012). The 2013 surveys recorded high numbers of the Superb Parrot at CML during all of the survey periods (**Figure 3**). The number of birds observed during the survey appears comparable, or slightly higher, with the number of birds observed by Chris Davey in 2012. Similarly to surveys conducted in 2012, the peak number of observations appears to be around mid – November to early December, with up to 94 observations being recorded during Survey 3 (**Table 4**).

The lower number of observations during October is considered likely to be due to females attending their nests during the incubation period. As the breeding season progressed, the number of birds observed increased as the females began to leave the nest intermittently once young had hatched and developed feathers. Subsequently, the number of juveniles recorded increased markedly once they fledged.

Based on the data collected, it appears that following the fledging of young, both parents and juveniles leave the core nesting area, presumably to forage in the surrounding region. Opportunistic observations of the species within the surrounding areas of Belconnen support this theory (Section 3.2.3).

Table 4: Superb Parrot observations, Central Molonglo

Survey Period	Survey 1	Survey 2	Survey 3	Survey 4
Observation	(14th-17th Oct)	(11th-14th Nov)	(27th-28th Nov)	(17th-18th Dec)
Male	28	30	16	9
Female	19	38	17	9
Juvenile	0	0	18	4
Unknown	15	26	15	12
Total	62	94	66	34

3.2.3 Opportunistic observations

Over the duration of the survey period, the Superb Parrot was opportunistically observed within the local area. The species was observed feeding on both exotic (*Ulmus* sp.) and native vegetation within the local area along roadsides and in parklands. This suggests that while the Superb Parrot utilises the Molonglo area as a core breeding site, that the species also utilises a much broader area as foraging habitat. The species is known to exhibit similar behavioural characteristics in the Riverina, where it typically makes daily migrations between breeding habitat situated within Riverine forest to forage sources scattered more broadly across the landscape.

Individuals of the species were also observed in Gungahlin during the survey period, however, it is considered likely that these individuals relate to the breeding population at Throsby rather than the Molonglo population.

3.3 Other species of interest

Three other species of interest were observed opportunistically during the surveys (**Table 4**). *Lalage tricolor* (White-winged Triller), which is listed as vulnerable under the *Nature Conservation Act 1980*, was relatively common during the surveys and was observed at all of the study sites during the survey period.

Table 5: Observations of species of interest

Site	Common name	Latin name	Listing status
KNR	White-winged triller	<i>Lalage tricolor</i>	Vulnerable (NC Act)
	Brown Treecreeper	<i>Climacteris picumnus</i>	Vulnerable (NC Act)
	Diamond Firetail	<i>Stagonopleura guttata</i>	Flora and Fauna committee (Insufficiently known working category)
SVF	White-winged triller	<i>Lalage tricolor</i>	Vulnerable (NC Act)
RPW	White-winged triller	<i>Lalage tricolor</i>	Vulnerable (NC Act)
	Rainbow Bee-eater	<i>Merops ornatus</i>	Migratory (EPBC Act)
ARB	White-winged triller	<i>Lalage tricolor</i>	Vulnerable (NC Act)
WHW	White-winged triller	<i>Lalage tricolor</i>	Vulnerable (NC Act)
CML	White-winged triller	<i>Lalage tricolor</i>	Vulnerable (NC Act)
	Diamond Firetail	<i>Stagonopleura guttata</i>	Flora and Fauna committee (Insufficiently known working category)

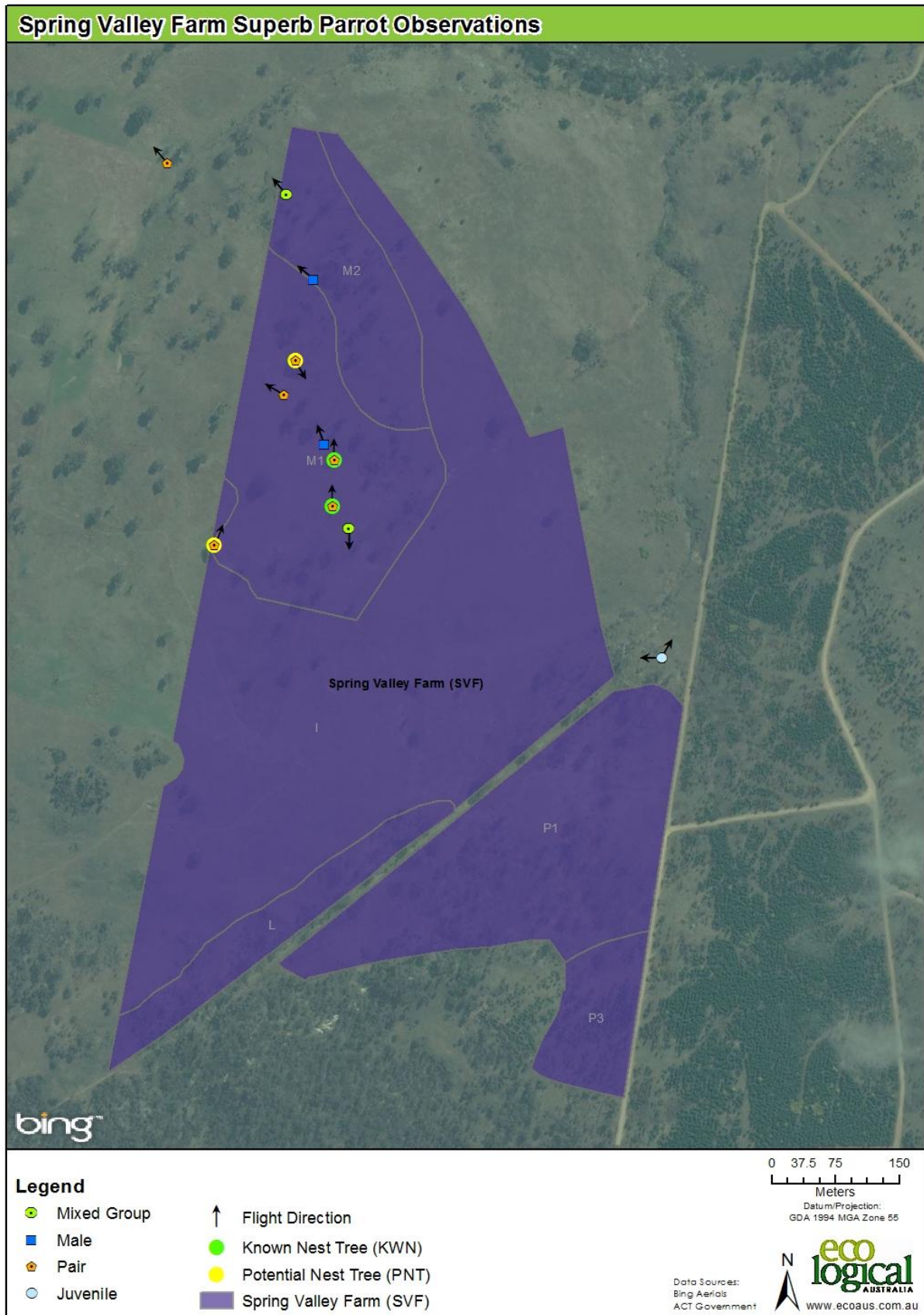


Figure 2: Superb Parrot observations, Spring Valley Farm

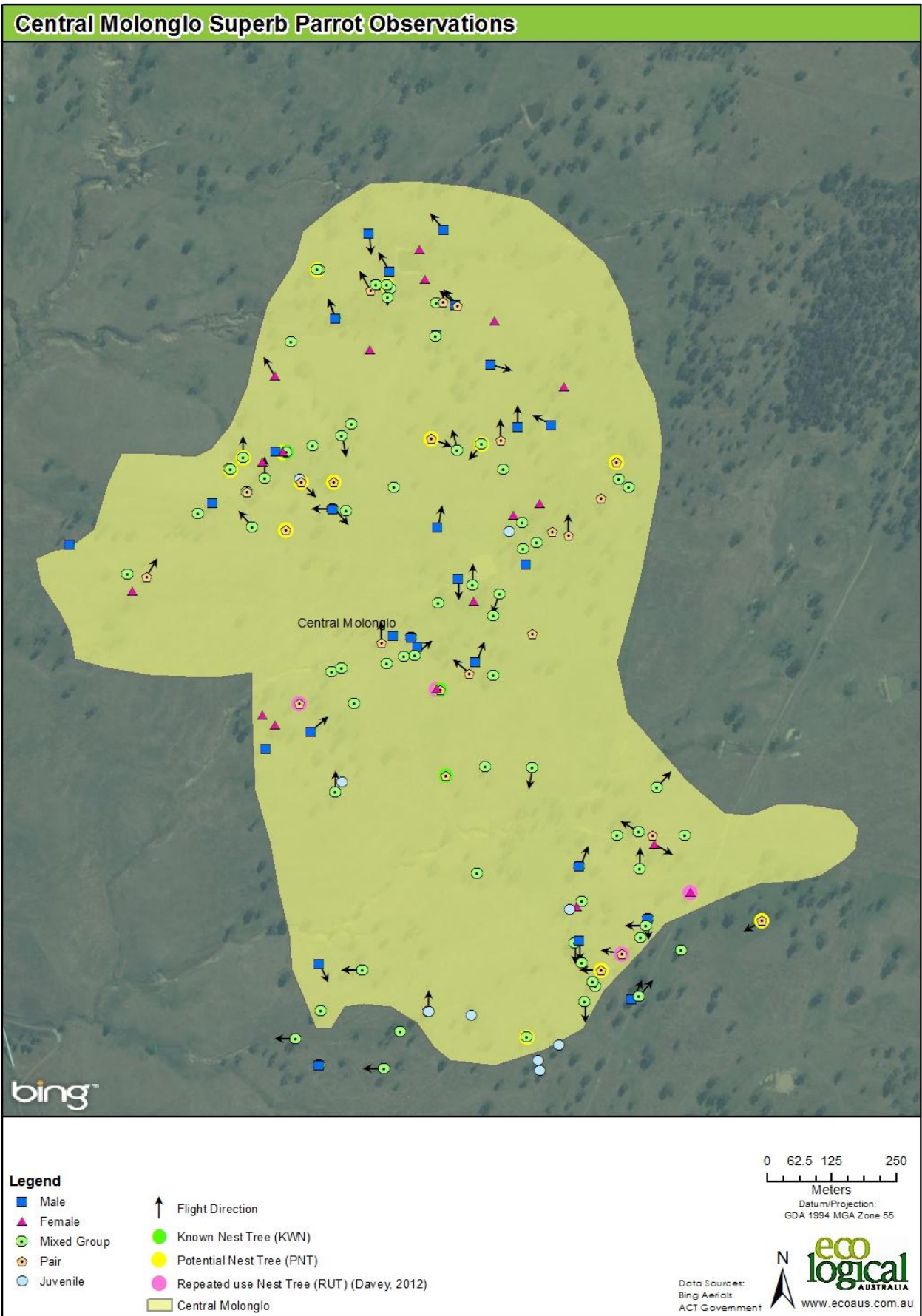


Figure 3: Superb Parrot observations, Central Molonglo

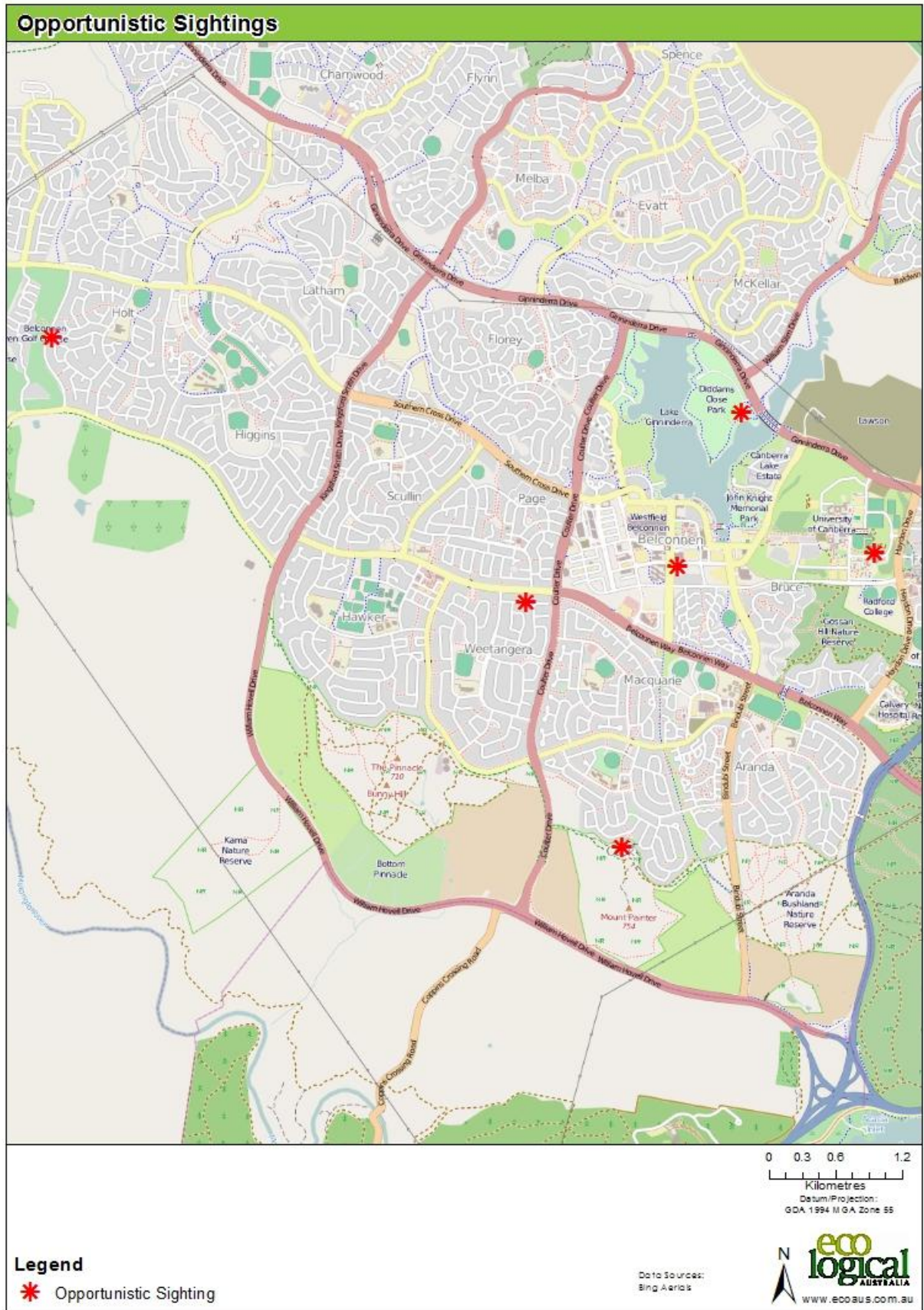


Figure 4: Opportunistic Superb Parrot observations

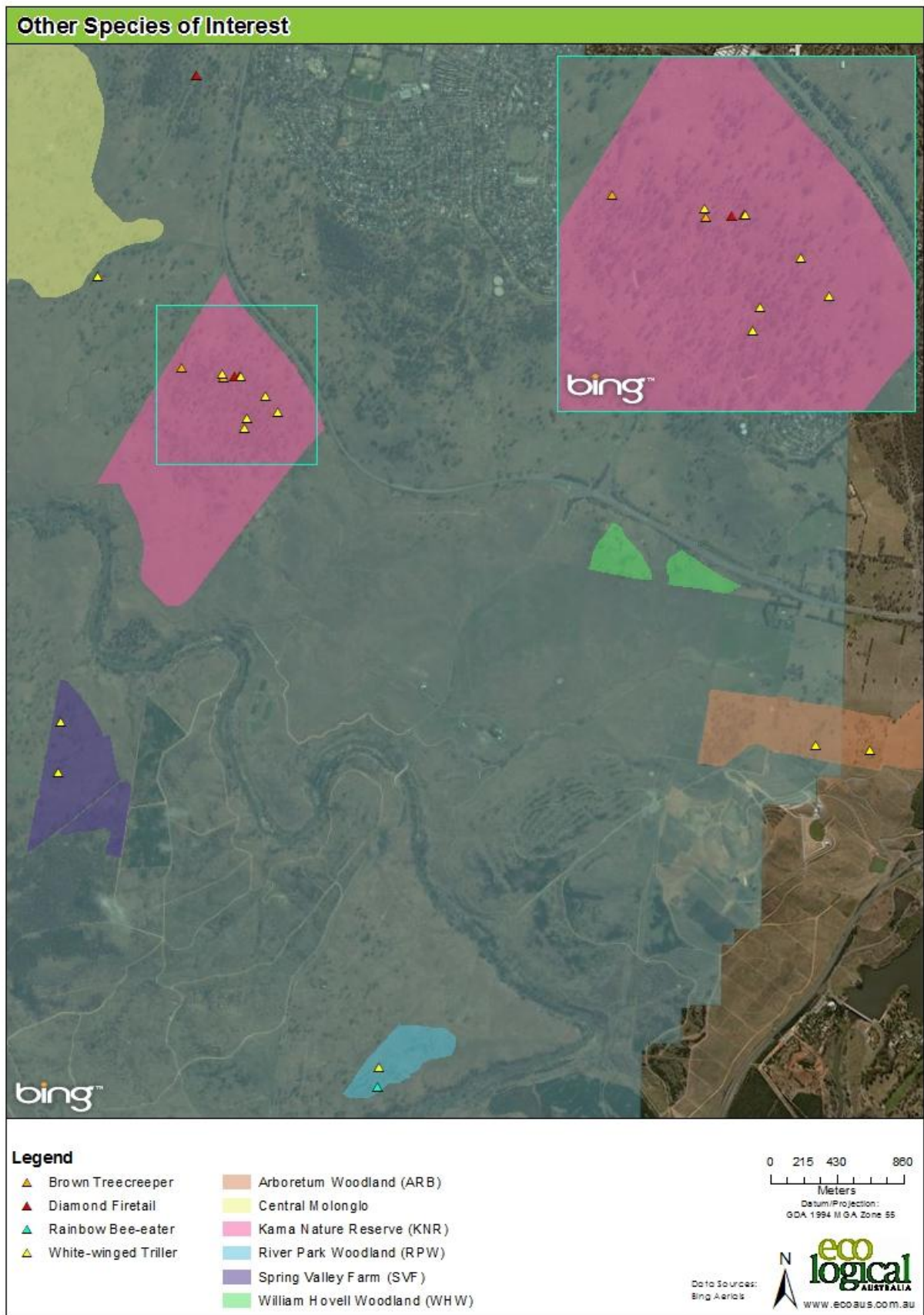


Figure 5 Observations of other species of interest

4 Conclusion and recommendations

The surveys undertaken for Superb Parrot within the Molonglo NES Patches in 2013 have shown that the species is present and breeding within the Molonglo Valley. The survey recorded the species breeding at two locations within the study area; Spring Valley Farm (SVF) and Central Molonglo (CML).

The 2013 surveys confirmed that CML is a core breeding area for the species in the areas surveyed as described in previous surveys in 2012 (Davey 2012), and identified a small number of nest trees which were used during both the 2012 and 2013 surveys. As described by Davey (2012), the presence of a resident breeding population of Superb Parrot within the ACT is a relatively recent phenomenon. The breeding record at SVF is interesting as it is a new record for the ACT and extends the known breeding area of the species in the region.

Within SVF, the breeding records were concentrated within Patch M1, despite the presence of suitable hollows in other sections of the property. It is recommended that the on-going management of Patch M1 and the surrounding woodland be cognisant of the breeding requirements of Superb Parrot, and aim, where possible, to augment the quality of habitat (both foraging and breeding) within the local area. Management of these areas should consider the encouragement of natural regeneration, particularly in areas containing a largely aged canopy as recruitment through regeneration is going to be essential for the retention of suitable habitat trees in the future.

The Superb Parrot was observed foraging within the Kama Nature Reserve as well as within native and non-native vegetation with the broader Belconnen area. The retention of links between CML, SVF and other patches of woodland within the Molonglo Valley is considered to be essential for the persistence of a breeding population of the species in the area. The Superb Parrot is a highly mobile species and is able to take advantage of foraging resources at some distance from their breeding/roosting sites.

Several sections of the study area, such as the Arboretum Woodland, Kama Nature Reserve, and other sections of SVF appear to contain suitable habitat for the species, however, no evidence of breeding was recorded despite potentially suitable nest trees being available. It is not known for certain why these areas are not currently being utilised by the species despite the presence of suitable habitat. It is possible that these areas represent a younger age class of trees which are not showing the same signs of senescence known to be preferred by the species (e.g. Manning et al, 2004). While these areas are currently not being utilised by the species, they do provide the next generation of hollow resources for Superb Parrot and other hollow dependent fauna in the Molonglo Valley.

Studies have shown that hollow development in Eucalypts is a slow process, with many species taking more than 150-200 years to develop a suitably sized hollow (Gibbons & Lindenmayer 2002). This is compounded by the fact that hollow bearing trees and the substantial fauna resources that they represent are currently being lost from the landscape as the trees naturally senesce or are cleared for firewood and grazing. The retention of habitat within the landscape that has the potential to provide hollows in the future, and the promotion of natural regeneration of suitable canopy species will be highly beneficial to the Superb Parrot and other hollow dependent fauna in the long term. It is recommended that on-going monitoring occur within Kama and the Arboretum Woodland to determine if these areas are being used as a forage source or if breeding does occur in these areas in the future as the species develops a greater foothold in the region.

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Appendix A: Superb Parrot observation data

M = male, F = Female, J = Juvenile, U = Unknown, PNT = Potential Nest Tree

ID	WPT	y_proj	x_proj	Position	Bearing	M	F	J	U	PNT
1	388	6088088.6	137610.91	Perched	0	1	1	0	0	Yes
2	389	6091829.8	137256.82	Flying - did not stop	355	0	1	0	0	
3	390	6091987.9	136741.14	Flying - did not stop	190	3	0	0	5	
4	391	6091808	136596.18	Flying - did not stop	0	0	1	0	0	
5	392	6091840.4	136585.57	Flying - to perch	330	1	1	1	0	
6	393	6092057.5	136770.25	Calling	0	0	0	0	1	
7	394	6092014.2	136806.47	Flying - did not stop	240	0	0	0	3	
8	395	6092302.2	137027.43	Calling	0	0	1	0	0	
9	396	6092450.9	136920.31	Perched	0	1	1	1	0	
10	397	6092428.7	137030.55	Flying - did not stop	220	1	0	0	0	
11	398	6092400.3	137150.43	Flying - did not stop	120	0	1	1	0	
12	399	6092000.2	137323.75	Flying - did not stop	330	0	1	0	0	
13	400	6091972.4	137399.73	Flying - did not stop	45	1	1	0	0	
14	401	6091950.5	137371.07	Flying - did not stop	200	0	0	0	1	
15	402	6091511.4	137299.09	Flying - to perch	320	0	0	0	2	
16	357	6087979.6	137475.83	Flying - did not stop	20	1	1	0	0	Yes
17	358	6088425.7	137392.43	Flying - to perch	320	1	1	0	0	
18	359	6091398.9	137628.97	Flying - to perch	90	1	1	0	0	
19	360	6091394.7	137561.2	Perched	0	1	1	3	0	
20	361	6091676.5	136991.69	Perched	0	1	1	2	0	
21	362	6091688.7	137303.72	Flying	180	0	0	0	1	
22	363	6091821.2	137188.32	Flying - did not stop	285	1	1	2	0	
23	364	6091803.2	137296.56	Flying - to perch	190	0	0	0	3	
24	365	6091906.9	137354.13	Flying - to perch	100	1	0	0	0	
25	366	6091936	137345.93	Calling	0	0	0	0	1	
26	367	6091966.8	137315.97	Perched	0	0	0	1	0	
27	368	6092040.3	137089.13	Perched	0	1	1	2	0	Yes
28	369	6091891.7	136471.15	Flying - to perch	100	2	0	0	5	
29	370	6091966.7	136714.64	Flying	240	0	0	0	1	
30	371	6092073.4	136833.18	Perched	0	0	1	0	0	
31	372	6092044.7	136905.19	Perched	0	0	0	1	0	
32	373	6092156.7	136999.82	Perched	0	0	1	2	0	
33	374	6092110	136927.46	Flying	0	0	0	0	3	
34	375	6092095.5	136878.16	Flying - to perch	240	0	1	2	0	Yes
35	376	6092307.6	136873.63	Flying	150	0	0	0	1	

ID	WPT	y_proj	x_proj	Position	Bearing	M	F	J	U	PNT
36	377	6092423.3	137059.58	Flying	110	1	1	1	1	
37	378	6092445	137125.2	Flying	310	0	1	0	0	
38	379	6092501.6	137111.15	Flying	340	0	1	0	0	
39	380	6092338.3	137154.2	Flying	315	1	0	0	0	
40	381	6092402.1	137162.03	Flying	110	1	1	0	0	
41	382	6092372.3	137263.91	Flying	190	0	1	0	0	
42	383	6092042.7	137491.39	Flying - to perch	240	1	1	0	0	
43	384	6092024.8	137371.82	Flying	180	0	1	0	0	
44	385	6091987.1	137342.24	Perched	0	1	0	1	0	
45	386	6092086.5	137299.12	Perched	0	1	0	1	0	
46	387	6091772.4	137373.22	Flying	30	1	1	0	0	
47	1	6096671.7	683398.49	Flying - did not stop	270	0	1	0	0	
48	2	6096461.4	683195.1	Flying - did not stop	90	0	0	1	0	
49	3	6096666	683384.74	Perched	0	0	0	1	0	
50	4	6096911.2	682945.19	Perched	0	0	0	2	0	
51	5	6097153.4	683065.31	Flying	180	0	0	0	1	
52	317	6090102	138181.1	Flying - did not stop	0	0	0	0	1	
53	320	6090490.7	138482.98	Flying - did not stop	0	0	0	0	1	
54	322	6090502.6	138568.76	Feeding	170	1	0	0	0	
55	323	6090700.8	138738.88	Flying - did not stop	20	0	0	0	8	
56	324	6091514.6	137388.87	Flying - did not stop	190	0	0	0	3	
57	325	6091488.7	137223.03	Perched	0	1	1	0	0	Yes
58	326	6091655.1	137202.57	Perched	0	1	1	0	0	Yes
59	327	6091689.4	137256.63	Flying - did not stop	310	1	1	0	0	
60	328	6091734.7	137154.05	Flying - did not stop	230	1	0	0	0	
61	329	6091738.1	137083.78	Flying - to perch	0	1	1	0	0	
62	330	6091684.9	137009.68	Perched	0	0	0	0	3	
63	331	6091617.4	137037.94	Perched	0	2	2	2	0	
64	332	6091698.5	137097.23	Perched	0	2	2	2	0	
65	333	6091838.6	136623.4	Flying - to perch	30	1	1	0	0	
66	334	6091946.8	136820.13	Flying - did not stop	320	1	2	0	0	
67	335	6092041.8	136839.01	Flying - to perch	0	1	1	1	0	
68	336	6092080	136795.16	Flying - to perch	0	2	2	0	0	Yes
69	337	6092054.7	136772.83	Perched	0	2	2	0	0	Yes
70	338	6092133	136982.9	Flying - did not stop	170	0	0	0	7	
71	339	6092239.7	136846.55	Flying - did not stop	330	0	1	0	0	
72	340	6092450.3	136916.41	Perched	0	2	3	0	0	Yes
73	341	6092428.8	137051.61	Flying - to perch	180	0	1	3	0	Yes
74	343	6092398.3	137187.54	Flying - did not stop	310	1	0	0	0	
76	345	6092138.7	137156.39	Flying - to perch	110	1	1	0	0	Yes

ID	WPT	y_proj	x_proj	Position	Bearing	M	F	J	U	PNT
77	346	6092117.7	137206.85	Flying - did not stop	345	0	0	0	3	
78	347	6092114	137516.43	Perched	0	1	1	0	0	Yes
79	349	6091968.1	137432.37	Flying - did not stop	0	1	1	0	0	
80	350	6088160.9	137547.02	Flying - did not stop	300	1	1	0	0	
81	351	6088202.2	137557.75	Flying - to perch	150	1	1	0	0	Yes
82	352	6088033.3	137612.68	Perched	0	1	1	0	0	Yes
83	353	6088105.8	137598.28	Flying - did not stop	340	1	0	0	0	
84	354	6088396.9	137536.07	Flying - did not stop	320	0	0	0	2	
85	355	6088298.8	137573.83	Flying - did not stop	310	1	0	0	0	
86	356	6088008.2	137633.29	Flying - to perch	180	2	1	1	0	
87	215	6091403.5	137601.89	Flying - did not stop	300	0	0	0	1	
88	216	6091380.4	137633.36	Flying - to perch	120	0	1	0	0	
89	217	6091293.1	137708.91	Perched	0	0	1	0	0	Yes
90	218	6091247.2	137849.45	Flying - to perch	240	1	1	0	0	Yes
91	220	6091165.6	137583.63	Flying - to perch	280	1	1	0	0	Yes
92	222	6091132.6	137545.93	Flying - to perch	270	1	1	0	0	Yes
93	223	6091080.9	137607.83	Flying - to perch	25	1	0	0	0	
94	224	6091111.8	137000.02	Flying - to perch	155	1	0	0	0	
96	226	6091559.4	136958.11	Flying - did not stop	50	1	0	0	0	
97	227	6091944.6	136885.15	Perched	0	1	1	0	0	Yes
99	229	6091967.9	137178.95	Flying - did not stop	10	1	0	0	0	
100	230	6091655.2	137196.27	Perched	0	0	1	0	0	Yes
101	231	6091718.4	137150.05	Flying - did not stop	50	0	0	0	4	
102	232	6091491.2	137632.38	Flying - did not stop	40	0	0	0	1	
103	234	6092042.7	136972.21	Perched	0	1	1	0	0	Yes
104	235	6092039.6	136909.69	Flying - to perch	135	1	1	0	0	Yes
105	236	6091990.4	136973.59	Flying - did not stop	270	0	0	0	3	
106	236	6091990.4	136973.59	Flying - did not stop	140	1	0	0	3	
107	237	6092095.6	136858	Perched	0	1	0	0	0	
108	238	6092094.2	136871.1	Perched	0	0	1	0	0	Yes
109	239	6092359.2	136956.28	Flying - did not stop	340	1	0	0	0	
110	239	6092359.2	136956.28	Perched	0	1	1	0	0	
111	239	6092359.2	136956.28	Flying - did not stop	340	1	0	0	0	
112	240	6092417.2	137020.98	Flying - did not stop	330	1	1	0	0	
113	241	6092454.9	137055.85	Flying - did not stop	330	1	0	0	0	
114	242	6092525.8	137011.59	Flying - did not stop	175	1	0	0	0	
115	243	6092542.9	137156.46	Flying - did not stop	320	1	0	0	0	
116	244	6092288.5	137261.9	Flying - did not stop	105	1	0	0	0	
117	245	6092397.7	137190.12	Flying - did not stop	320	1	1	0	0	
118	246	6092133.3	137254.65	Flying - to perch	220	2	2	0	0	Yes

ID	WPT	y_proj	x_proj	Position	Bearing	M	F	J	U	PNT
119	247	6092143.5	137290.72	Flying - to perch	0	1	1	0	0	
120	248	6092170.6	137321.82	Flying - to perch	0	1	0	0	0	
121	250	6092795.9	141307.83	Flying - to perch	0	0	0	0	5	
122	1	6096610.8	683522.81	Perched	0	0	0	0	6	
123	2	6096647.4	683537.38	Flying - did not stop	180	1	0	0	2	
124	3	6096601.6	683396.47	Flying - did not stop	180	0	0	0	1	
125	4	6096420.2	683302.54	Perched	0	1	1	3	0	Yes
126	5	6096526.2	683431.4	Perched	0	0	1	3	1	
127	6	6096487.4	683414.55	Flying - did not stop	180	0	0	0	4	
128	7	6096403.6	683365.09	Perched	0	0	0	1	0	
129	8	6096373.8	683323.96	Perched	0	0	0	2	0	
130	9	6096355.9	683327.52	Perched	0	0	0	3	0	
131	10	6096468.3	683113	Flying - to perch	1	0	0	1	2	
132	11	6096429.6	683058.55	Perched	0	1	1	2	0	
133	12	6096359.2	683028.31	Flying - did not stop	270	0	0	0	2	
134	13	6096364.8	682901.35	Perched	0	1	0	0	3	
135	14	6096416.6	682857.08	Flying - did not stop	270	0	0	0	2	
136	15	6096548.6	682986.19	Flying - did not stop	270	0	0	0	1	
137	16	6096749.6	683404.72	Flying - did not stop	20	2	0	0	9	
138	17	6096681.4	683410.06	1 male, 1 female, 1 juv	0	1	1	1	0	
139	18	6096744.9	683521.92	Flying - did not stop	1	0	0	0	2	
140	19	6096892.5	682934.17	Flying - to perch	1	0	0	0	2	
141	20	6096975.6	682799.29	Perched	0	1	0	0	0	
142	21	6097193.6	683044.54	Perched	0	1	0	0	0	
143	22	6097191.5	683079.22	Perched	0	1	0	0	1	
144	23	6097303.7	683171.26	Flying - did not stop	180	1	0	0	0	
145	24	6097292.1	683199.54	Flying - did not stop	1	0	0	0	2	
146	25	6297100	683100	Flying - did not stop	150	3	0	0	0	
147	26	6097675	683375	Perched	0	0	1	0	0	
148	27	6097480	683500	Perched	0	0	0	0	1	
149	28	6097600	683350	Flying - did not stop	295	1	0	0	0	
150	2	6095297.1	684600.53	Perched	0	1	1	0	0	
151	8	6096498.5	683519.75	Flying - did not stop	40	0	0	0	2	
152	9	6096606.1	683403.97	Flying - did not stop	180	1	0	0	0	
153	10	6096563.2	683409.39	Perched	0	1	2	0	0	
154	11	6096633.7	683533.26	Flying - did not stop	270	0	0	0	3	
155	12	6096735.8	683207.27	Perched	0	0	1	1	0	
156	13	6097041.6	682792.21	Perched	0	0	1	0	0	
157	14	6097021.4	682816.63	Perched	0	0	1	0	0	
158	15	6097063.8	682863.02	Perched	0	1	1	0	0	Yes

ID	WPT	y_proj	x_proj	Position	Bearing	M	F	J	U	PNT
159	16	6097143.1	683203.59	Flying - did not stop	20	1	0	0	0	
160	17	6097274.7	683250.94	Flying - did not stop	200	1	2	0	0	
161	18	6093276.3	683714.09	Flying - did not stop	270	1	1	0	0	
162	18	6093276.3	683714.09	Flying - did not stop	30	0	0	2	0	
163	394	6092014.2	136806.47	Flying - did not stop	140	1	1	0	0	
164	397	6092428.7	137030.55	Flying - did not stop	0	1	0	1	0	

Appendix B: Species list

Common Name	Latin Name	KNR	WHW	SVF	CM	ARB	RPW
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	X					
Australasian Pipit	<i>Anthus novaeseelandiae</i>			X			
Australian Magpie	<i>Gymnorhina tibicen</i>	X	X	X		X	X
Australian Raven	<i>Corvus coronoides</i>	X	X			X	
Australian Wood Duck	<i>Chenonetta jubata</i>			X		X	
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	X	X	X			X
Brown Falcon	<i>Falco berigora</i>			X			X
Brown Treecreeper	<i>Climacteris picumnus</i>			X			
Crested Pigeon	<i>Ocyphaps lophotes</i>	X					
Crimson Rosella	<i>Platycercus elegans</i>	X	X	X		X	X
Diamond Firetail	<i>Stagonopleura guttata</i>			X	X		
Dusky Woodswallow	<i>Artamus cyanopterus</i>					X	
Eastern Rosella	<i>Platycercus adscitus</i>	X	X	X		X	X
European Starling	<i>Sturnus vulgaris</i>	X	X	X		X	
Galah	<i>Eolophus roseicapillus</i>	X	X				X
Goldenheaded Cisticola	<i>Cisticola exilis</i>						X
Grey Butcherbird	<i>Cracticus torquatus</i>			X			
Grey Fantail	<i>Rhipidura albiscapa</i>	X	X	X			X
Grey Shrike-thrush	<i>Colluricincla harmonica</i>			X			
House Sparrow	<i>Passer domesticus</i>		X				
King Parrot	<i>Alisterus scapularis</i>	X					
Nankeen Kestrel	<i>Falco cenchroides</i>						X
Noisy Friarbird	<i>Philemon corniculatus</i>	X				X	
Noisy Miner	<i>Manorina melanocephala</i>	X				X	
Magpie Lark	<i>Grallina cyanoleuca</i>		X				
Pied Butcherbird	<i>Cracticus nigrogularis</i>	X					
Pied Currawong	<i>Strepera graculina</i>	X		X			
Rainbow Bee eater	<i>Merops ornatus</i>		X	X			
Red rumped parrot	<i>Psephotus haematonotus</i>	X		X		X	X
Red Wattlebird	<i>Anthochaera carunculata</i>		X			x	
Red-browed Finch	<i>Neochmia temporalis</i>	X	X	X			X
Rufous Songlark	<i>Cincloramphus mathewsi</i>		X			X	
Rufous Whistler	<i>Pachycephala rufiventris</i>			X			
Southern White-face	<i>Aphelocephala leucopsis</i>						X
Spotted Pardalote	<i>Pardalotus punctatus</i>	X		X			
Striated Pardalote	<i>Pardalotus striatus</i>	X	X	X		X	X
Sulphur Crested Cockatoo	<i>Cacatua galerita</i>	X	X	X		X	X

Common Name	Latin Name	KNR	WHW	SVF	CM	ARB	RPW
Superb Fairy-wren	<i>Malurus cyaneus</i>	X	X			X	X
Superb Parrot	<i>Polytelis swainsonii</i>						
Tree Martin	<i>Petrochelidon nigricans</i>	X		X		X	X
Wedge-tailed Eagle	<i>Aquila audax</i>			X			X
Weebill	<i>Smicronis brevirostris</i>	X		X			
Welcome Swallow	<i>Hirundo neoxena</i>		X				X
White-winged Triller	<i>Lalage tricolor</i>	X	X	X	X	X	X
White-browed Wood-swallow	<i>Artamus superciliosus</i>	X					
White-Plumed Honeyeater	<i>Lichenostomus penicillatus</i>		X				
White-throated Treecreeper	<i>Cormobates leucophaeus</i>			X			
White-winged Chough	<i>Corcorax melanorhamphos</i>					X	
Willy wagtail	<i>Rhipidura leucophrys</i>					X	X
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	X	X	X			X

Appendix C: Species plates

Photo plates - All photos taken by Bruce Mullins unless otherwise indicated.

Plate 1: Male Superb Parrot



Plate 2: Male Superb Parrot



Plate 3: Male & Female Superb Parrot at hollow CML



Plate 4: Male & Female Superb Parrot at hollow SVF



Plate 5: Male Superb Parrot on Station SVF



Plate 6: Female Superb Parrot at Hollow CML



Plate 7: Sulfur-crested Cockatoos nesting



Plate 8: Diamond Firetail



Plate 9: Crimson Rosella nesting



Plate 10: Dusky Woodswallow nesting



Plate 11: Red-rumped Parrots nesting



Plate 12: White-winged Triller



Appendix D: Nest tree plates

PNT = Potential Nest Tree, KWN = Known Nest Tree

Plate 13: CML, PNT at waypoint 217



Plate 14: CML, PNT at waypoint 227



Plate 15: CML, KWN at waypoint 230



Plate 16: CML, PNT at waypoint 234



Plate 17: CML, PNT at waypoint 238



Plate 18: CML, PNT at waypoint 246



Plate 19: CML, KWN at waypoint 325



Plate 20: CML, KWN at waypoint 326



Plate 21: CML, PNT at waypoint 333



Plate 22: CML, PNT at waypoint 336



Plate 23: CML, PNT at waypoint 337



Plate 24: CML, PNT at waypoint 340



Plate 24: CML, KWN at waypoint 341



Plate 25: CML, PNT at waypoint 344



Plate 26: CML, PNT at waypoint 345



Plate 27: CML, PNT at waypoint 347



Plate 27: SVF, KWN at waypoint 351



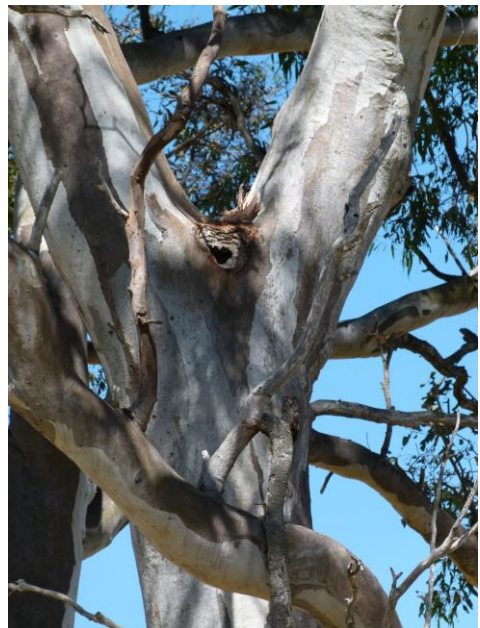
Plate 27: SVF, KWN at waypoint 388



Plate 27: SVF, PNT at waypoint 357



Plate 28: SVF, PNT at waypoint 357 (Hollow)





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