Black Cockatoo Habitat Assessment

Pinjarra Racecourse
Shire of Murray

May 2019

Version 1

On behalf of:
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Shire of Murray

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

SUMMARY

This report details the results of a targeted black cockatoo habitat assessment of an area of vegetation located at the Pinjarra Racecourse (the subject site). The subject site has a total area of about 3.6 hectares and is to be cleared to make way for an extension to the existing racecourse. A clearing permit from the Department of Water and Environmental Regulation is to be applied for in the near future and the information provided in this report has been gathered to support the application.

The assessment identified a total of 34 trees with a DBH of ≥50cms, the majority of which did not appear to contain hollows of any size. Eleven trees were observed to contain possible hollows with various sized entrances, but none were considered by the Author to be potentially suitable for black cockatoos to use for nesting purposes. This conclusion was in most cases based on entrances to possible hollows being too small, branches being of an unfavourable orientation and/or hollows being too low or shallow.

Two trees (tree 12 and tree 26) appeared to contain possible large hollows. The hollows in these trees were examined and photographed using a pole mounted camera. The observations made during this inspection strongly suggests that neither tree contains a hollow/s suitable for black cockatoos to use for nesting. None of the above-mentioned hollows showed any evidence of use.

The total extent of foraging habitat within the subject site is very small and would amount to about 0.6 ha, this being the approximate area of flooded gum and marri combined. The quality of this foraging habitat is considered by the Author to be low given flooded gum, which makes up most of the remnant native vegetation is foraged upon only rarely.

Evidence of black cockatoos foraging was observed during the field survey in the form of chewed marri fruits at one location. This evidence was attributed to the forest red-tailed black cockatoo.

No existing roosting trees (trees used at night by black cockatoos to rest) were positively identified during the survey.

Based on available vegetation mapping it is estimated that there is approximately 10,400 ha of native vegetation within 12 km the subject site (~22% of the total area), much of which is very likely to represent potential black cockatoo habitat of some type.

Based on the result of this assessment it is concluded that any clearing within the subject site is unlikely to have any significant direct or indirect impact on black cockatoos.

1. INTRODUCTION

This report details the results of a targeted black cockatoo habitat assessment of an area of vegetation located at the Pinjarra Racecourse (the subject site).

The subject site has a total area of about 3.6 hectares (ha) (Figure1). In addition to open grassland the subject site is mostly comprised of planted non-endemic eucalypts with small areas of remnant flooded gum marri and scattered isolated specimens of a small number of other native tree species.

It is understood that the area is to be cleared to make way for an extension to the existing racecourse and a clearing permit from the Department of Water and Environmental Regulation (DWER) is to be applied for in the near future.

A recent botanical survey identified the presence of several flooded gums with apparent hollows potentially suitable for black cockatoos. The targeted black cockatoo habitat survey reported on here has been carried out to assess the significance of these trees.

2. SCOPE OF WORKS

The scope of works was to:

1. Carry out a targeted survey for black cockatoo habitat/site use (habitat trees, existing and potential nest hollows, foraging and roosting habitat); and

2. Prepare a report detailing methods and results including comments on regional black cockatoo habitat context.

Note: For the purposes of this report the term black cockatoo is in reference to Baudin's black cockatoo *Calyptorhynchus baudinii*, Carnaby's black cockatoo *Calyptorhynchus latirostris* and the forest red-tailed black cockatoo *Calyptorhynchus banksii naso*.

3. METHODS

3.1 VEGETATION UNITS

Del Botanics conducted a reconnaissance flora and vegetation assessment of the subject site in 2019 during which time several vegetation units were identified and mapped (Del Botanics 2019). A summary of these results is provided here.

3.2 BLACK COCKATOO HABITAT ASSESSMENT

The following methods will be employed to comply with the defined scope of works and are based on guidelines published by the federal Department of the Environment and Energy (DotEE) (Commonwealth of Australia 2012) which states that surveys for Carnaby's, Baudin's and forest red-tailed black cockatoo habitat should:

- be done by a suitably qualified person with experience in vegetation or cockatoo surveys, depending on the type of survey being undertaken;
- maximise the chance of detecting the species' habitat and/or signs of use;
- determine the context of the site within the broader landscape—for example, the amount and quality of habitat nearby and in the local region (for example, within 12 kilometres (km));
- account for uncertainty and error (false presence and absences); and
- include collation of existing data on known locations of breeding and feeding birds and night roost locations.

Habitat used by black cockatoos have been placed into three categories by the DotEE (Commonwealth of Australia 2012) these being:

- Breeding Habitat;
- Foraging Habitat; and
- Night Roosting Habitat.

To comply with the requested scope of works and in line with the published guidelines the following will be carried out.

3.2.1 Breeding Habitat

The black cockatoo breeding habitat assessment involved the identification of all suitable breeding trees species within the subject site that have a Diameter at Breast Height (DBH) of equal to or over 50cm. The DBH of each tree will be estimated using a pre-made 50cm "caliper".

Target tree species included marri, jarrah, wandoo and flooded gum or any other *Corymbia/Eucalyptus* species of a suitable size that may have been present. Peppermints, banksia, sheoak and melaleuca tree species (for example) were not assessed as they typically do not develop hollows that are used by black cockatoos.

The location of each tree identified as being over the threshold DBH was recorded with a GPS and details on tree species, number and size of hollows (if any) noted. Trees observed to contain hollows (of any size/type) were marked with "H" using spray paint.

Potential hollows were placed into one of four categories, based on the size of the apparent hollow entrance, these being:

- Small = ~<5cm diametre (i.e. entrance too small for a black cockatoo);
- Medium = ~5cm-10cm diametre (i.e. entrance too small for a black cockatoo);
- Large = ~>10cm diametre (entrance large enough for a black cockatoo but possible hollow appears to be unsuitable for nesting i.e. wrong orientation, too small, too low or too shallow); or
- Large (cockatoo) = ~>10cm diametre (entrance appears big enough to provide access to a possible hollow that maybe suitable for a black cockatoo to use for nesting).

Based on this assessment trees present within the subject site were then placed into one of four categories:

- Tree < 50cm DBH or an unsuitable species;
- Tree ≥50cm DBH, no hollows seen;
- Tree ≥50cm DBH, one or more hollows seen, none of which were considered suitable for black cockatoos to use for nesting; or
- Tree ≥50cm DBH, one or more hollows seen, with at least one considered potentially suitable for black cockatoos to use for nesting.

For the purposes of this assessment a tree containing a potential cockatoo nest hollow was defined as:

Generally, any tree which is alive or dead that contains one or more visible hollows (cavities within the trunk or branches) or possible hollows considered potentially suitable for occupation by a black cockatoo for the purpose of nesting/breeding. Hollows that had an entrance greater than about 10cm in diameter and would allow the entry of a black cockatoo into a suitably orientated and sized branch/trunk were recorded as a "potential black cockatoo nest hollow".

Identified hollows were examined using binoculars for evidence of actual use by black cockatoos (e.g. chewing around hollow entrance, scarring and scratch marks on trunks and branches).

Where possible all identified large hollows were examined/photographed with a wireless pole mounted camera for occupancy/signs of use.

A review of available literature will be carried out to determine the location/extent of any known/likely black cockatoo breeding habitat areas in the vicinity of the subject site.

3.2.2 Foraging Habitat

The location and nature of black cockatoo foraging evidence (e.g. chewed fruits around base of trees) observed during the field survey was recorded. The nature and extent of potential foraging habitat present was also documented irrespective of the presence of any actual foraging evidence.

A review of available literature will also be carried out to determine the location/extent of any known/likely black cockatoo foraging habitat areas in the vicinity of the subject site.

3.2.3 Night Roosting Habitat

Direct and indirect evidence of black cockatoos roosting within trees on site was noted if observed (e.g. branch clippings, droppings or moulted feathers).

A review of available literature will be carried out to determine the location/extent of any known/likely black cockatoo roosting habitat areas in the vicinity of the subject site.

4. SURVEY CONSTRAINTS

No seasonal sampling has been carried out as part of this fauna assessment. The conclusions presented are based upon field data and the environmental monitoring and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of the field assessments. It should also be recognised that site conditions can change with time.

During the black cockatoo habitat survey trees with hollows were searched for. It should be noted that identifying hollows suitable for fauna species from ground level has limitations. Generally, the full characteristics of any hollow seen are not fully evident (e.g. internal dimensions). It is also difficult to locate all hollows within all trees as some are not observable from ground level.

5. RESULTS

5.1 VEGETATION UNITS

Descriptions and example images of the broadly defined vegetation communities within the subject site as identified by Del Botanics are given below.

The subject site has been subject to considerable historical disturbance that has included the clearing of the majority of native vegetation presumably for the purpose of livestock grazing. Subsequently the subject site has been planted with a large number of non-endemic eucalyptus species to act as a buffer around the racecourse. Areas of remnant a native vegetation are now limited to a grove of flooded gums and a small area of regrowth marri (and a few scattered mountain marri specimens). The entire area is

parkland cleared with no native understory or groundcover with a grassland of introduced weeds now dominating.

Table 1 provides some example images of the vegetation remaining within the subject site. The extent of each unit is shown in Figure 3 of Del Botanics (2019) report.

Table 1: Vegetation - Example Images

Description	Example Image
Planted non-endemic eucalypts (e.g. *Eucalyptus botryoides/ Eucalyptus camaldulensis*) over grassland of weeds/open grassland of weeds with scattered trees Total Area = ~3.0 ha (~83.3%)	
Marri (*Corymbia calophylla*) and planted non-endemic eucalypts (*Eucalyptus botryoides*) over grassland of weeds. Total Area = ~0.05 ha (~1.4%)	
Flooded gum (*Eucalyptus rudis*) over grassland of weeds. Total Area = ~0.55 ha (~15.3%)	

5.2 BLACK COCKATOO HABITAT ASSESSMENT

5.2.1 Breeding Habitat

Trees considered potentially suitable for black cockatoos to use as nesting habitat (based on DotEE criteria (i.e. tree with a DBH ≥50cm) though ultimately subject to a suitable hollow being present or forming and a range of other factors) which were found within the subject site are comprised of the following species:

- Marri – *Corymbia calophylla*/Mountain Marri - *Corymbia haematoxylon* (planted?);
- Flooded Gum - *Eucalyptus rudis*;
- Tuart - *Eucalyptus gomphocephala* (planted);
- Planted non-endemic eucalypts (*Eucalyptus botryoides*/*Eucalyptus camaldulensis*).

It should be noted that the planted non-endemic tree species identified within the subject site (*Eucalyptus botryoides* and *Eucalyptus camaldulensis*) are not documented in available literature as having ever been used by black cockatoos for nesting purposes. It is therefore not known if in fact they would have the propensity to develop suitable hollows, but in this case they have been included under precautionary principle.

A summary of the potential black cockatoo breeding trees observed within the subject site is provided in Table 2 and their location shown in Figure 2. Additional details on each tree recorded can be found in Appendix A.

Table 2: Summary of potential cockatoo breeding habitat trees

Total Number of Habitat Trees	Number of Trees with No Hollows Observed	Number of Trees with Hollows Considered Unsuitable for Nesting Black Cockatoos	Number of Trees with Hollows Considered Possibly Suitable for Nesting Black Cockatoos	Tree Species			
				Flooded Gum	Marri	Tuart	Non-endemic Eucalypts
34	23	11	0	21	4	1	8

The assessment identified a total of 34 trees with a DBH of ≥50cms within the subject site. The majority (23, ~67%) of the trees were not observed to contain hollows of any size. Eleven trees (11, ~32%) were observed to contain possible hollows with various sized entrances but none were considered by the Author to be potentially suitable for

black cockatoos to use for nesting purposes. This conclusion was in most cases based on entrances to possible hollows being too small, branches being of an unfavourable orientation and/or hollows being too low or shallow.

Two trees (tree 12 and tree 26) appeared to contain possible large hollows. The hollows in these trees were examined and photographed using a pole mounted camera. The results of this inspection are provided in Appendix B.

The observations made during this inspection strongly suggests that neither tree contains a hollow/s suitable for black cockatoos to use for nesting. The large hollow in tree 12 is only about 2 meters from ground level and is therefore considered to be unattractive to black cockatoos despite possibly being of a suitable size. Tree 26 appeared to contain four possible large hollows, but all were found to be too shallow/open to be suitable. None of the above-mentioned hollows showed any evidence of use.

While there appears to be a paucity of breeding data for the general area this could simply be a consequence of a lack of survey work or a lack of publicly available data.

Based on available vegetation mapping it is however estimated that there is approximately 10, 400 ha of native vegetation within 12 km the subject site (~22% of the total area). These remnants are likely to contain significant areas of "potential" breeding habitat (i.e. suitable tree species with a DBH >50cm).

5.2.2 Foraging Habitat

Following is a list of the flora species recorded within the subject site by Del Bontaics (2019) during their flora survey that are known to be or potentially used as a direct food source (e.g. seeds, flowers, nectar, bark or grubs) by one or more species of black cockatoo:

- Marri – *Corymbia calophylla*/Mountain Marri - *Corymbia haematoxylon* (planted?);
- Flooded Gum - *Eucalyptus rudis*;
- Tuart - *Eucalyptus gomphocephala* (planted); and
- Guildford Grass - *Romulea rosea* (introduced weed).

It should be noted that some of the above-mentioned species (i.e. flooded gum, tuart, Guildford grass) while foraged upon on occasions are only likely to make up a small proportion of a single bird's diet relative to more favoured plant species such as marri. Some tree species are also only represented by a small number of specimens (e.g. tuart – 1 specimen only) and therefore do not contribute to the overall foraging resource to a significant degree in any event.

None of the none-endemic eucalypt species present are known to be used as a foraging resource and therefore are not listed as such. This is primarily based on the fact that they are small fruited species which would be unlikely or at best rarely utilised given the amount of effort that would be required by black cockatoos to extract seeds when compared to other more favourable species.

The total extent of foraging habitat within the subject site would amount to about 0.6 ha, this being the approximate area of flooded gum and marri combined. The quality of this foraging habitat is considered by the Author to be low given flooded gum, which makes up most of the remnant native vegetation is foraged upon only rarely.

Evidence of black cockatoos foraging was observed during the field survey in the form of chewed marri fruits at one location. This evidence was attributed to the forest red-tailed black cockatoo. An example of the foraging evidence observed is provided in Table 3.

Table 3: Foraging Evidence Example

Foraging Evidence Description	Example Image
Marri Fruits – foraging activity attributed to the forest red-tailed black-cockatoo.	

Based on available vegetation mapping it is estimated that there is approximately 10,400 ha of native vegetation within 12 km the subject site (~22% of the total area), much of which is very likely to represent potential black cockatoo foraging habitat of some type. There is also up to 60 ha of pine plantations within 12 km of the subject site, and these areas are likely to represent a significant foraging resource for Carnaby's and Baudin's black cockatoos.

5.3 Night Roosting Habitat

No existing roosting trees (trees used at night by black cockatoos to rest) were positively located within the subject site during the survey.

A review of the 2018 Great Cocky Count database shows no documented roost sites within the subject site. There are two documented roost sites with 12 km of the subject

site. None of these roost sites were monitored during the 2018 Great Cocky Count (April 2018) and there exist no historical records of birds using then in the GCC database which list records since 2010. but none were found to be in use at the time (Peck *et al.* 2018). The results of the 2019 survey are pending.

6. CONCLUSION

The assessment reported on here was carried out to provide information on the extent and quality of black cockatoo habitat present within the subject site.

The assessment identified a total of 34 trees with a DBH of ≥50cms, the majority of which did not appear to contain hollows of any size. Eleven trees were observed to contain possible hollows with various sized entrances, but none were considered by the Author to be potentially suitable for black cockatoos to use for nesting purposes. This conclusion was in most cases based on entrances to possible hollows being too small, branches being of an unfavourable orientation and/or hollows being too low or shallow.

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The total extent of foraging habitat within the subject site is very small and would amount to about 0.6 ha, this being the approximate area of flooded gum and marri combined. The quality of this foraging habitat is considered by the Author to be low given flooded gum, which makes up most of the remnant native vegetation is foraged upon only rarely.

Evidence of black cockatoos foraging was observed during the field survey in the form of chewed marri fruits at one location. This evidence was attributed to the forest red-tailed black cockatoo.

No existing roosting trees (trees used at night by black cockatoos to rest) were positively located within the subject site during the survey.

Based on available vegetation mapping it is estimated that there is approximately 10,400 ha of native vegetation within 12 km the subject site (~22% of the total area), much of which is very likely to represent potential black cockatoo habitat of some type.

Based on the result of this assessment it is concluded that any clearing within the subject site is unlikely to have any significant direct or indirect impact on black cockatoos.

7. REFERENCES

Commonwealth of Australia (2012). *EPBC Act* Referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo (endangered) *Calyptorhynchus latirostris*, Baudin's cockatoo (vulnerable) *Calyptorhynchus baudinii*, Forest red-tailed black cockatoo (vulnerable) *Calyptorhynchus banksii naso*.

Del Botanics (2019). Reconnaissance Flora and Vegetation Survey Pinjarra Racecourse Pinjarra. Unpublished report for Coterra Environment/Shire of Murray.

FIGURES

Legend

Subject Site

0 50 100 150 200 250

Metres

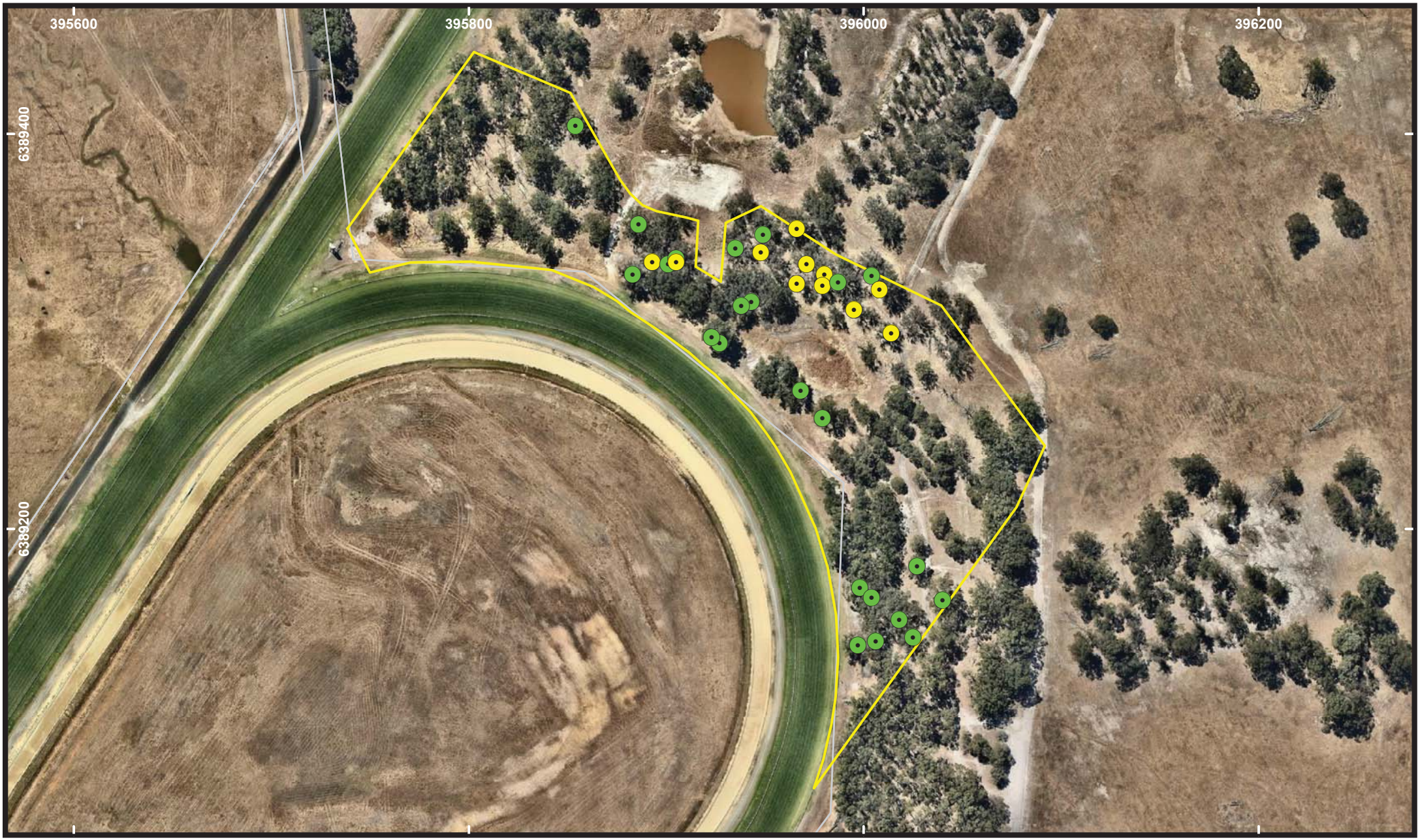
Fauna Survey

Pinjarra Racecourse
Shire of Murray

Aerial Photograph

Drawn: G. Harewood
Date: May 2019
Scale: 1:2,500
Projection/Coordinate System: UTM/MGA Zone 50

Figure: 1



Legend

Subject Site

Habitat Tree - One or more possible hollows considered unsuitable for black cockatoos

Habitat Tree - No hollows seen

0 50 100 150 200 250

Metres

Fauna Survey

Drawn: G. Harewood

Date: May 2019

Scale: 1:2,500

Projection/Coordinate System: UTM/MGA Zone 50

Pinjarra Racecourse
Shire of Murray

Habitat Trees (DBH >50cm)

Figure: 2

APPENDIX A

HABITAT TREE DETAILS

Habitat Trees
DBH >50cm
Datum - GDA94
Entrance Size Ranges - Small = >5cm, Medium = 5 - 10cm, Large = >10cm

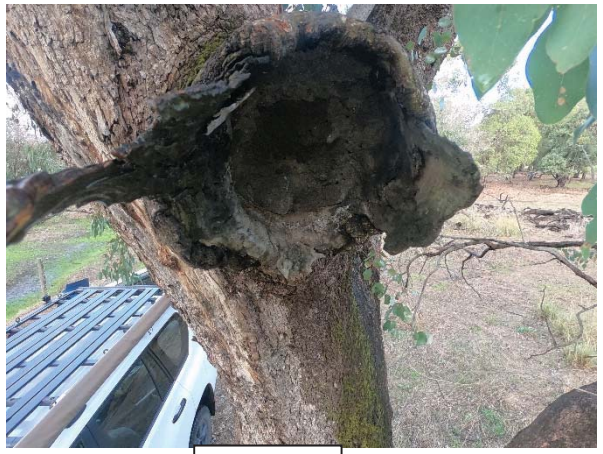
Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Estimated Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt001	50H	396006	6389143	Unknown Eucalypt	20+	>50	0					Planted none-endemic eucalypt
wpt002	50H	395997	6389141	Unknown Eucalypt	15-20	>50	0					Planted none-endemic eucalypt
wpt003	50H	396025	6389145	Marri	15-20	>50	0					
wpt004	50H	396018	6389154	Marri	15-20	>50	0					
wpt005	50H	396040	6389164	Tuart	20+	>50	0					Planted
wpt006	50H	396027	6389181	Marri	15-20	>50	0					
wpt007	50H	395998	6389170	Unknown Eucalypt	15-20	>50	0					Planted none-endemic eucalypt
wpt008	50H	396004	6389165	Marri	15-20	>50	0					
wpt009	50H	395854	6389404	Unknown Eucalypt	15-20	>50	0					Planted none-endemic eucalypt
wpt010	50H	395886	6389354	Unknown Eucalypt	20+	>50	0					Planted none-endemic eucalypt
wpt011	50H	395883	6389329	Flooded Gum	10-15	>50	0					
wpt012	50H	395893	6389335	Flooded Gum	10-15	>50	1	Large	No Signs	No Signs	No	Spout - Appears to be too low
wpt013	50H	395901	6389334	Flooded Gum	15-20	>50	0					
wpt014	50H	395905	6389337	Flooded Gum	15-20	>50	0					
wpt015	50H	395905	6389335	Flooded Gum	5-10	>50	2+	Small & Medium	No Signs	No Signs	No	
wpt016	50H	395935	6389342	Flooded Gum	10-15	>50	0					
wpt017	50H	395948	6389340	Flooded Gum	10-15	>50	2+	Small & Medium	No Signs	No Signs	No	
wpt018	50H	395949	6389349	Flooded Gum	15-20	>50	0					
wpt019	50H	395966	6389352	Flooded Gum	15-20	>50	2+	Small & Medium	No Signs	No Signs	No	
wpt020	50H	395971	6389334	Flooded Gum	15-20	>50	2+	Small & Medium	No Signs	No Signs	No	
wpt021	50H	395980	6389329	Flooded Gum	15-20	>50	2+	Small & Medium	No Signs	No Signs	No	
wpt022	50H	395979	6389323	Flooded Gum	15-20	>50	2+	Small	No Signs	No Signs	No	
wpt023	50H	395987	6389325	Flooded Gum	15-20	>50	0					
wpt024	50H	396004	6389328	Flooded Gum	10-15	>50	0					
wpt025	50H	396008	6389321	Flooded Gum	15-20	>50	2+	Small & Medium	No Signs	No Signs	No	
wpt026	50H	396014	6389299	Flooded Gum	15-20	>50	2+	Medium & Large	No Signs	No Signs	No	Side entry hollows and spout - All appear too low and/or shallow
wpt027	50H	395995	6389311	Flooded Gum	15-20	>50	2+	Small & Medium	No Signs	No Signs	No	
wpt028	50H	395966	6389324	Flooded Gum	15-20	>50	2+	Small	No Signs	No Signs	No	
wpt029	50H	395943	6389315	Flooded Gum	15-20	>50	0					
wpt030	50H	395938	6389313	Flooded Gum	15-20	>50	0					
wpt031	50H	395927	6389294	Unknown Eucalypt	20+	>50	0					Planted none-endemic eucalypt
wpt032	50H	395923	6389297	Unknown Eucalypt	20+	>50	0					Planted none-endemic eucalypt
wpt033	50H	395979	6389256	Unknown Eucalypt	20+	>50	0					Planted none-endemic eucalypt
wpt034	50H	395968	6389270	Flooded Gum	15-20	>50	0					

APPENDIX B

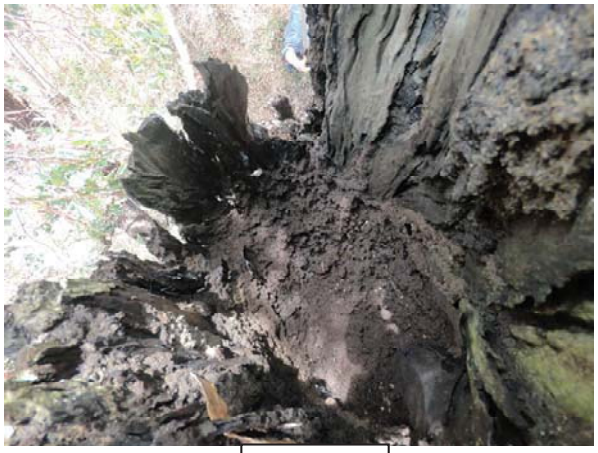
PHOTOS AND DESCRIPTIONS OF LARGE HOLLOWS

ID	Location Data (MGA 94)	395893 mE	6389335 mN	Species	Flooded Gum	Survey Date	16/05/2019
12	**Comments**	Flooded Gum with broken spout. This tree contains one large hollow that appears to have been recently created (in its current from at least) by the breaking of a branch (hence fresh colour of internal wood). While its internal dimensions appear large enough for a black cockatoo it is positioned very low (~2 metres above ground level) and therefore it is considered by the Author to be unlikely, even if suitable in all other ways, to be used by black cockatoos. No evidence of any use.				**Classification**	Unsuitable Hollow

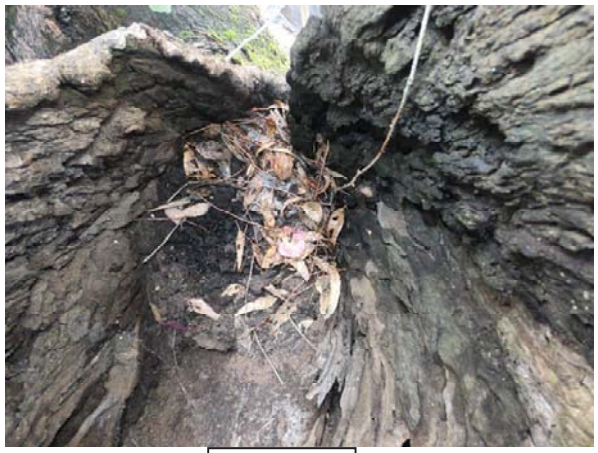
ID	Location Data (MGA 94)	396014 mE	6389299 mN	Species	Flooded Gum	Survey Date	16/05/2019
26	**Comments**	Flooded Gum with four possible hollows. Hollow 1 is a side entry hollow that was found to have no depth. Hollows 2, 3 and 4 are upward facing spouts all of which are considered by the Author to be too shallow/open and therefore highly unlikely to be suitable for black cockatoos to use for nesting purposes. No evidence of any use.				**Classification**	Unsuitable Hollows



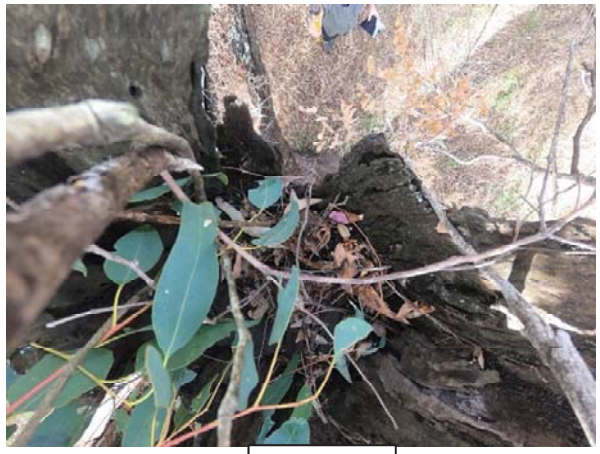
Hollow 1



Hollow 2



Hollow 3



Hollow 4

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The conclusions are based upon field data and the environmental monitoring and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of preparing the report. Also it should be recognised that site conditions, can change with time.

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