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25 April 2020

Sharee Rasmussen
Land Insights
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Dear Sharee

RE: Lot M1326 Muchea East Rd, Muchea – Black Cockatoo Hollow Inspection

The purpose of this letter is to provide Land Insights with additional information regarding the tree hollows identified at Lot M1326 Muchea East Rd. Primarily this assessment is to determine if the hollows are suitable for black cockatoo species to use for breeding, and to provide additional information regarding their depth and size.

Introduction

In March 2019 Land Insights, on behalf of Midland Brick, commissioned Western Wildlife to undertake a targeted black-cockatoo survey of Lot M1326 Muchea East Rd (Western Wildlife, 2019). Five trees were identified as having large hollows, with one of these tree hollows being discounted as potentially suitable for black cockatoos due to the presence of bees.

The 2019 survey was undertaken in accordance with the *Referral Guidelines for Three Threatened Black-Cockatoo Species* (DSEWPac 2012), with Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksia naso*) and Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*) identified as potentially utilising the study area for foraging and breeding.

As a follow-up to the previous survey, Land Insights has commissioned Red Dog Environmental to further inspect the trees with potentially suitable hollows to further determine their suitability for breeding black cockatoo species.

Methods

Lot M1326 Muchea East Rd, Muchea (the 'study area'), was visited on the 20th of April 2020, where the trees previously identified as having "large hollows" (Western Wildlife, 2019) were inspected from the ground by binocular as well as with a drone.

The drone was used to determine the size and depth of the hollows and to further inspect the entrances for chew marks and other potential signs of use by black cockatoo species. Images and video taken by the drone were over-exposed to determine the depth and internal characteristics of the hollows. Additional measurements were taken using a laser distance measurer to provide reference points and scale.

Carnaby's Black-Cockatoos and other closely related species are known to use a wide variety of sizes of natural hollows with minimum entrance sizes being closely related to the diameter of the species shoulders. Of a sample of sixty-one known nesting hollows previously measured, the minimum hollow size being 13 centimetres (cm) and the maximum being 68 cm (DEC 2010). Nest depth has also been recorded between 0.5 metres(m) and 2 metres.

Limitations

The purpose of this survey was not to determine if black cockatoos were using the hollows for nesting, but to further assess the suitability of the hollows to be used for nesting. Additionally, using drones to examine tree hollows and in determining the depth and shape of hollows can be a cost effective, however they can be limited by hollow angle, curvature, structure of the hollow, as well as of nearby branches and vegetation.

Results and discussion

A total of five trees were inspected with seven hollows examined and measured during the survey. Tree locations can be found in Figure 1. Tree hollows were categorised by their likelihood to support Black Cockatoo species using the known dimensions for suitable tree hollows and identifying features, like chew marks and feathers. Each hollow was given a value of either highly likely, likely, unlikely, or unsuitable. Further information on the category criteria can be found in Table 1.

Of the hollows assessed, two were considered unlikely, with the remaining five considered unsuitable. Measurements and notes for each of the hollows can be found in Table 2. Images of the trees and hollows assessed can be found in Attachment 1.

Table 1: Assessment Categories

Tree hollows that show signs of having been used by black cockatoo species. Hollows are of a suitable size and height with indications like chew marks, which show that they may have been used previously.	Highly Likely
Tree hollows that are of a suitable size and depth, but do not have any indications of black cockatoos having previously used them.	Likely
Tree hollows unlikely to be used. These hollows may be either slightly too small, exposed to predation and weather, or occupied by other native fauna.	Unlikely

Tree hollows that are too shallow, have obstructions like debris, or occupied by Feral Bees.	Unsuitable
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Table 2: Tree Hollow Assessment

Name	Hollow Entrance Size	Estimated Hollow Depth	Note	Suitability for nesting cockatoo
Me01	15cm	>40cm	Hollow narrows very quickly. Holes in the side of hollow. Unlikely to support nesting black cockatoo species.	Unlikely
	40cm	60cm	Open and exposed with a lot leaf litter and debris in the bottom.	Unsuitable
Me07	14cm	50cm	Obstruction in entrance makes hollow unsuitable	Unsuitable
Me10	12cm	>35cm	Some wear on the bottom edge of the hollow entrance, which is likely to be caused by other fauna species using the hollow. Unlikely to be used by black cockatoos due to size of entrance and wear marks inconsistent with usual chew marks at entrance.	Unlikely
Me16	20cm		Jarrah tree with low hollow. Unsuitable due to exposure. Depth not measured due to a lot of debris.	Unsuitable
Me28	20cm	>30cm	Bee seen entering and leaving the hollow	Unsuitable
	50cm	50cm	Open and exposed hollow	Unsuitable

The two trees, Me01 and Me10, each have a hollow which is classified as 'unlikely' for nesting by black cockatoo species. These hollows are at the lower end of the dimensions known to be favoured by black cockatoos (DEC 2010) and therefore have been given the value of 'unlikely'.

The hollow in Me01 has an entrance of 15cm and is over 40cm deep. The entrance to this hollow narrows quickly, which makes it less likely to be used by black cockatoo species. Black cockatoos are known to use hollows as narrow as 13cm diameter with depth as shallow as 50cm (DEC 2010). Additionally, Feral Bees (*Apis mellifera*) were recorded using one of the lower hollows of the tree and may impact on upper hollows as viable nesting hollows.

The tree Me10 has a hollow that is at the lower end of suitable size for black cockatoo species. This tree hollow has signs of wear at the entrance, which is not consistent with chew marks usually left by black cockatoo species. It is likely that this hollow is more suitable and used by smaller *Cacatuidae* species like the Butler's Corella (*Cacatua pastinator butleri*), which was noted to be roosting in the study area.

Summary and Conclusion

The study area is situated within the known breeding area for the Forest Red-tailed Black-Cockatoo and Carnaby's Black Cockatoo with two of the hollows assessed during the survey considered to be of a size and depth for which nesting black cockatoo species are known to use. However, as the hollows entrances are on the lower known range of what black cockatoos will utilise and are less than ideally structurally, they are considered to be 'unlikely' to be used by black cockatoo species.

Although the hollows are considered to unlikely to be used by black cockatoo species, it would be prudent to re-assess the hollow at the time of any clearing to conclusively determine that they are not being used by black cockatoo species and to help minimise impacts to other fauna species.

All other hollows assessed at the study site were considered to unsuitable for black cockatoo nesting.

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Figures



--- Approved Clay Extraction Area

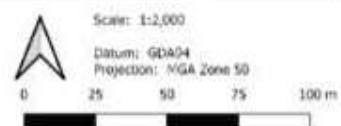
● Tree Locations

--- Fenceline

Date: 24/04/2020
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 Author: MB

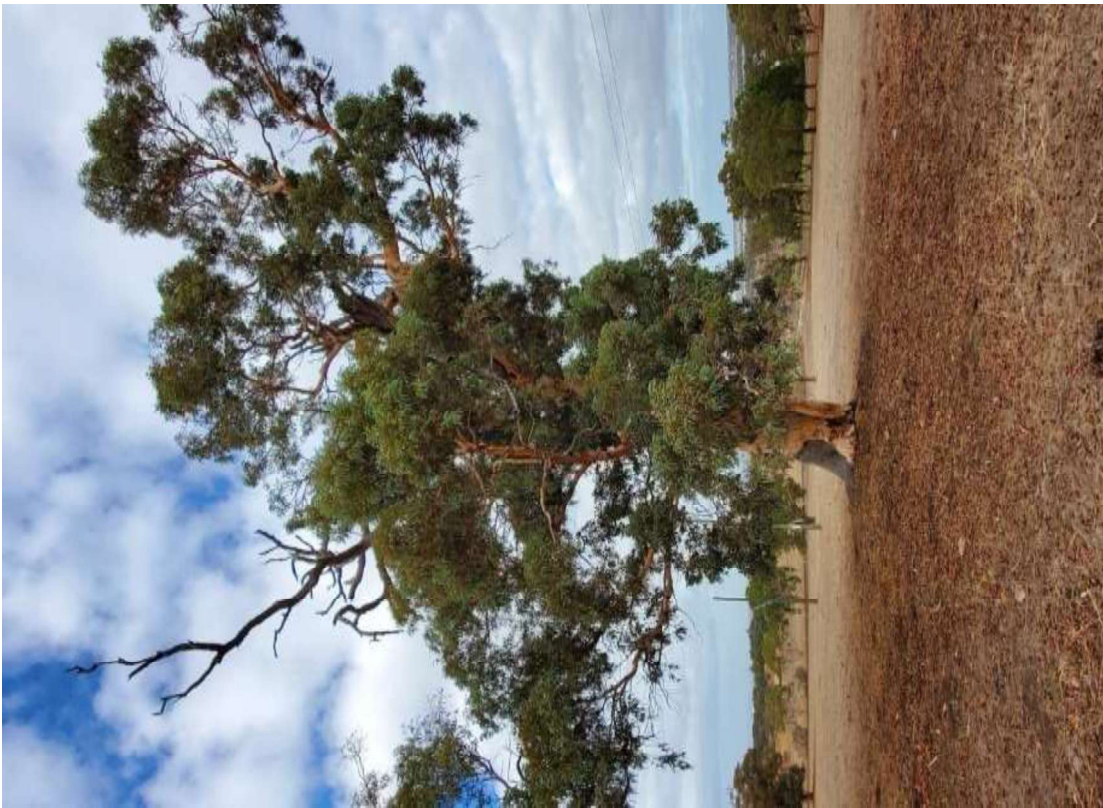

TREE HOLLOW INSPECTION

Lot M1326 Wandena Road, Muchea
 MIDLAND BRICK



Attachment 1

Tree and Hollow Plates

Me01			
Latitude	-31.58326	Longitude	116.01414
			

Me07			
Latitude	-31.58412	Longitude	116.01499
			

Me10			
Latitude	-31.58398	Longitude	116.01559
			

Me28			
Latitude	-31.58324	Longitude	116.01690
