

Fauna Habitat Assessment of Proposed Clearing Areas



**Lot 2626
Jamison's Road
Chapman Hill**

October 2017
Version 1



TABLE OF CONTENTS

SUMMARY

1.	INTRODUCTION	2
2.	SCOPE OF WORKS	2
3.	METHODS	2
3.1	BLACK COCKATOO HABITAT ASSESSMENT	2
3.1.1	Black Cockatoo Breeding Habitat	3
3.1.2	Black Cockatoo Foraging Habitat	4
3.1.3	Black Cockatoo Roosting Habitat	5
3.2	SOUTH-WESTERN BRUSH-TAILED PHASCOGALE SURVEY	5
3.3	OTHER SPECIES OF CONSERVATION SIGNIFICANCE	5
4.	SURVEY CONSTRAINTS	5
5.	RESULTS	6
5.1	BLACK COCKATOO HABITAT ASSESSMENT	6
5.1.1	Black Cockatoo Breeding Habitat	6
5.1.2	Black Cockatoo Foraging Habitat	7
5.1.3	Black Cockatoo Roosting Habitat	8
5.2	SOUTH-WESTERN BRUSH-TAILED PHASCOGALE SURVEY	8
5.3	OTHER SPECIES OF CONSERVATION SIGNIFICANCE	9
6.	CONCLUSION	9
7.	REFERENCES	11

TABLES

TABLE 1: Summary of Potential Black Cockatoo Habitat Trees within the Survey Area

FIGURES

FIGURE 1: Air Photo and Camera Trap Locations

FIGURE 2: Habitat Trees (DBH \geq 50cm)

APPENDICES

APPENDIX A: Black Cockatoo Habitat Tree Details

SUMMARY

This report details the results of a fauna habitat assessment of proposed clearing areas within Lot 2626 Jamison's Road, Chapman Hill (the survey area). The survey area contains about 4.9 hectares of remnant vegetation that is required to be cleared to allow for a proposed extractive industry (gravel) to proceed.

The assessment was undertaken to identify the extent of black cockatoo habitat present with a proposed clearing area, to determine if south-western brush-tailed phascogales are present and to assess the likelihood of any other species of conservation significance occurring.

The assessment has included a daytime survey of the site, carried out on the 15, 19 and 29 September 2017, a camera trap survey (15 to 29 September 2017) and a review of available, relevant literature so as to comply with the requested scope of works and in line with the published guidelines.

The survey area was found to contain 130 potential "black cockatoo breeding habitat trees" (DBH \geq 50cm). Eighteen of these trees appeared to contain hollows of a size possibly suitable for black cockatoos to utilise for nesting with at least one showing some inconclusive evidence of previous use. Some other larger hollows showed evidence of use by Australian wood ducks.

All of the proposed clearing area (~4.9 hectares) represents black cockatoo foraging habitat given the dominance of marri, jarrah and sheoak. No existing roosting trees (trees used at night by black cockatoos to rest) were positively identified during the survey.

No evidence of south western brush-tailed phascogales being present was found despite a detailed camera trap survey and this couple with the fact that habitat appears marginal at best would suggest they were absent from the area surveyed.

Habitat within the survey area also appears unsuitable for other species of concern such as the western ringtail possums and chuditch to utilise. This conclusion is supported by the fact that no evidence of any species of conservation significance (besides black cockatoos) being present was observed during the field assessment.

The results of this assessment should be provided to the relevant regulatory authorities for their consideration during the clearing permit assessment process.

1. INTRODUCTION

This report details the results of a fauna habitat assessment of proposed clearing areas within Lot 2626 Jamisons Road, Chapman Hill (the survey area).

It is understood that a clearing permit has been applied for so as to allow for an extractive industry to proceed. The extent of the proposed clearing is about 4.9 hectares (Figure 1).

2. SCOPE OF WORKS

The scope of works was:

1. Black cockatoo habitat assessment (habitat trees, existing and potential nest hollows, foraging and roosting habitat) over the proposed clearing area;
2. South-western Brush-tailed Phascogale habitat assessment (presence/absence, potential nest hollows and general habitat) over the proposed clearing area;
3. Recording of observations related to the presence of any other fauna species of conservation significance and/or their habitat (e.g. western ringtail possum and chuditch);
4. Report summarising results with management/planning/referral recommendations if required.

Note: For the purposes of this proposal 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

The habitat assessment has included a daytime survey of the site, carried out on the 15, 19 and 29 September 2017, a camera trap survey (15 to 29 September 2017) and a review of available, relevant literature utilising the following methods so as to comply with the requested scope of works and in line with the published guidelines.

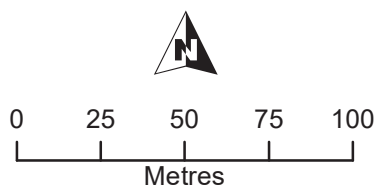
3.1 BLACK COCKATOO HABITAT ASSESSMENT

The following methods were employed to comply with the defined scope of works and are based on guidelines published by the federal Department of the Environment and



Legend

- Cadastral Boundaries
- Proposed Extraction Area (Approx.)
- ⬠ Camera Traps



Drawn: G Harewood
Date: Oct 2017
Scale: 1:2,250

Projection/Coordinate System: UTM/MGA Zone 50

Lot 2626 Jamison's Road
Chapman Hill

Air Photo and Camera Trap Locations

Figure: 1

Energy (DotEE) (SEWPaC 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 10 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 (SEWPaC 2012) these being:

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

3.1.1 Black Cockatoo Breeding Habitat

The black cockatoo breeding habitat assessment has involved the identification of all suitable breeding trees species within the subject site that had a DBH of equal to or over 50cm. The DBH of each tree was estimated using a pre-made 50 cm "caliper".

Target tree species included marri and jarrah and any other *Corymbia/Eucalyptus* species of a suitable size that are present. Peppermints, *banksia*, sheoak and melaleuca tree species (for example) were not be 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 diameter (i.e. entrance too small for a black cockatoo);
- Medium = ~5cm-10cm diameter (i.e. entrance too small for a black cockatoo);

- Large = ~>10cm diameter (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 diameter (entrance appears big enough to provide access to a possible hollow that may be suitable for a black cockatoo to use for nesting).

Based on this assessment trees present within the survey area have then been placed into one of four categories:

- Tree < 50cm DBH or an unsuitable species (not assessed/recorded);
- Tree \geq 50cm DBH, no hollows seen;
- Tree \geq 50cm DBH, one or more hollows seen, none of which appeared suitable for black cockatoos to use for nesting; or
- Tree >50cm DBH, one or more hollows seen, with at least one considered possibly suitable for black cockatoos to use for nesting.

For the purposes of this survey a tree containing a potential cockatoo nest hollow has been defined as:

Generally, any tree which is alive or dead that contains one or more visible hollows (cavities within the trunk or branches) suitable for occupation by black cockatoos 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 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). Trees with possible nest hollows were also scratched and raked with a large stick/pole in attempt to flush any sitting birds from hollows and calls of chicks were also listened for. It should be noted that the survey may have been conducted outside of the main breeding season of one or more of the three species of black cockatoo.

3.1.2 Black Cockatoo 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 was carried out to determine the location/extent of any known/likely black cockatoo foraging habitat areas in the vicinity of the survey area.

3.1.3 Black Cockatoo 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 was also carried out to determine the location/extent of any known/likely black cockatoo roosting habitat areas in the vicinity of the survey area.

3.2 SOUTH-WESTERN BRUSH-TAILED PHASCOGALE SURVEY

Concurrent with the black cockatoo habitat assessment hollows considered suitable for phascogales were recorded. General information on the overall suitability of habitat for this species was also be compiled.

Ten infra-red motion sensing cameras (“camera traps”) were also deployed across the area in an attempt to confirm phascogale activity if they are present. The camera traps were deployed on the 15 September 2017 and retrieved on the 29 September 2017 (140 “camera trap nights”).

3.3 OTHER SPECIES OF CONSERVATION SIGNIFICANCE

Evidence of the presence or likely presence of other species of conservation significance (including suitable habitat) was also searched for and recorded concurrent with the black cockatoo/phascogale habitat assessment. The aim was to obtain sufficient information to make a definitive comment on the likely significance of the proposed clearing areas to other species of conservation significance.

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 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.

The location of observations was recorded using a handheld GPS. The accuracy of the GPS cannot be guaranteed above a level of about 5 to 10 metres, though it should

be noted that in some circumstance the accuracy can increase or decrease beyond this range.

5. RESULTS

5.1 BLACK COCKATOO HABITAT ASSESSMENT

5.1.1 Black Cockatoo Breeding Habitat

Trees considered potentially suitable for black cockatoos to use as nesting habitat (using DotEE criteria - SEWPaC 2012, but ultimately subject to a suitable hollow being present or developing and a range of other factors) which were found within the survey area comprised the following species:

- Marri – *Corymbia calophylla*; and
- Jarrah - *Eucalyptus marginata*.

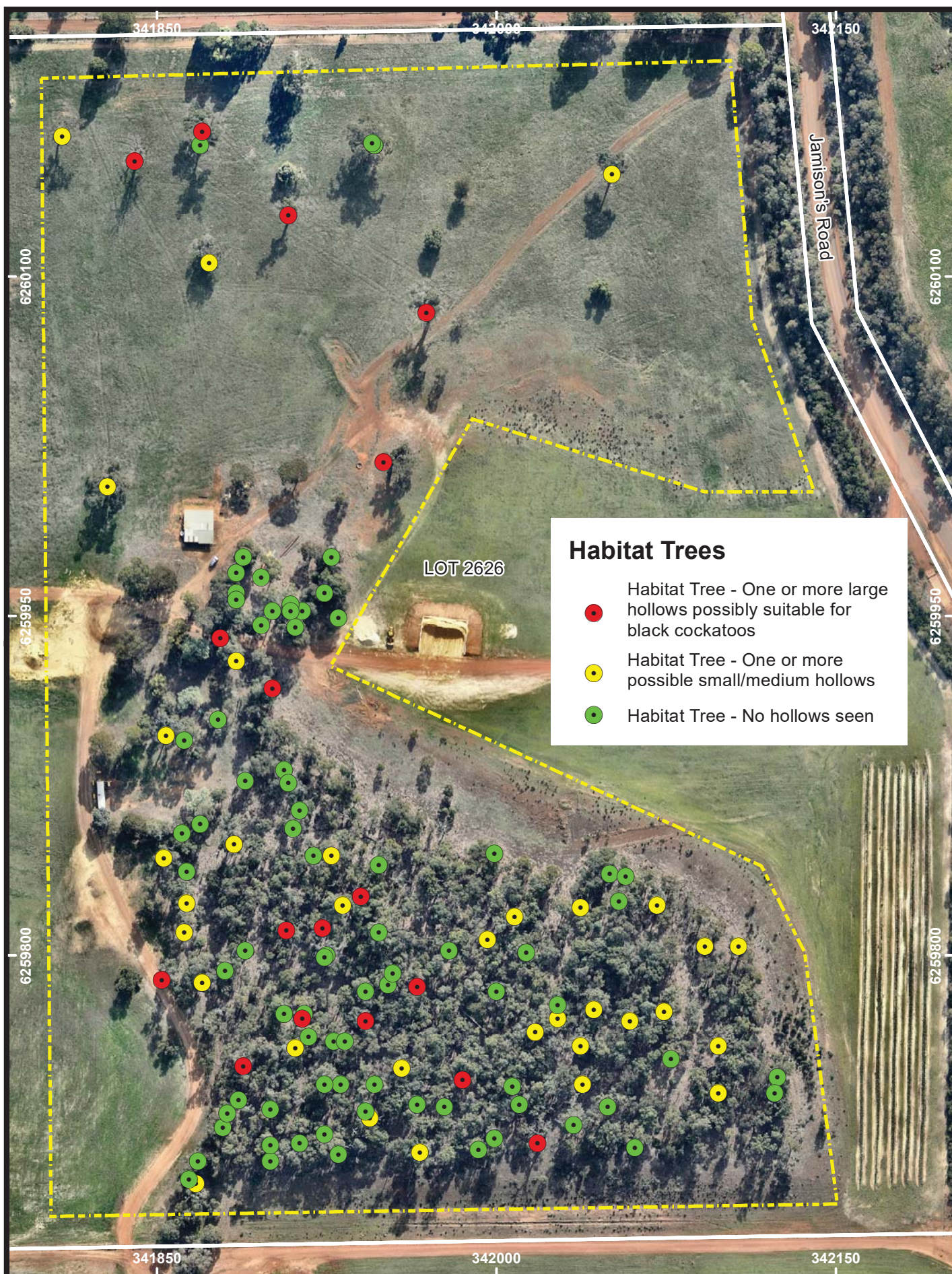
It should be noted that the likelihood of any one particular tree species developing hollows suitable for black cockatoos to use for breeding varies considerably. For example available data suggests that jarrah (*Eucalyptus marginata*) rarely produces hollows large enough for black cockatoos. Kirkby (2009) reports that from a database of 109 confirmed black cockatoo nest trees throughout the jarrah forest only six were located in jarrah trees.

A summary of the potential black cockatoo habitat trees observed within the survey areas is provided in Table 1 below and their location shown in Figure 2.

Table 1: Summary of Potential Black Cockatoo Habitat Trees (DBH \geq 50cm) within the Survey Area

Total Number of Habitat (DBH \geq 50cm) Trees	Number of Trees with <u>No Hollows</u> Observed	Number of Trees with <u>Hollows Considered Unsuitable</u> for Nesting Black Cockatoos	Number of Trees with <u>Hollows Considered Possibly Suitable</u> for Nesting Black Cockatoos	Tree Species	
				Marri	Jarrah
130	79	33	18	97	33

The assessment identified a total of 130 “habitat trees” within the survey area. The majority (79, ~60.8%) of the trees were not observed to contain hollows of any size. Thirty three (~25.4%) of the trees contained one or more “small” hollows (less than

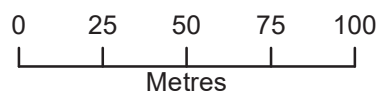


Habitat Trees

- Habitat Tree - One or more large hollows possibly suitable for black cockatoos
- Habitat Tree - One or more possible small/medium hollows
- Habitat Tree - No hollows seen

Legend

- Cadastral Boundaries
- Proposed Extraction Area (Approx.)



Drawn: G Harewood
Date: Oct 2017
Scale: 1:2,250

Projection/Coordinate System: UTM/MGA Zone 50

Lot 2626 Jamison's Road
Chapman Hill

Habitat Trees (DBH >50cm)

~10cm entrance size) considered by the Author not to be suitable for black cockatoos to use for nesting purposes. Eighteen (~13.8%) trees appeared to contain hollows with larger entrances (greater than ~10cm) that appeared big enough to possibly allow the entry of a black cockatoo into a suitably sized and orientated branch/trunk.

One hollow showed some evidence of use, possibly by black cockatoos in the form of chew marks around the hollow entrance, though this evidence was not conclusive. No black cockatoos appeared to be in attendance at this hollow at the time of the survey. Another hollow also showed evidence of use which was attributed at the time to smaller parrots (e.g. galah, corella, Australian ringneck parrot).

Three larger hollows appeared to have recently been used by ducks for nesting (most likely Australian wood ducks) as evidence by the presence of light grey down (feathers) around the hollow entrances, which they use to line their nests (unlike black cockatoos which lay eggs directly on the hollow floor). One large hollow was occupied by feral bees. The remaining 12 “potential nest hollows” showed no evidence of use.

Additional details on each habitat tree observed can be found in Appendix A.

A review of available data revealed no documented breeding records from the vicinity of the study area (i.e. within 10km). The survey area does not fall within the mapped breeding range of Carnaby's black-cockatoo within the most current recovery plan produced by DBCA (DEC 2012). The corresponding DBCA recovery plan for Baudin's and the forest red-tailed black-cockatoo (DEC 2007b) does not specifically define any known breeding areas for either species.

Johnstone and Kirkby (2011) also do not specifically mention breeding areas within the vicinity of the survey area though with respect to Baudin's and the forest red-tailed black-cockatoo, both species are noted as utilising marri trees (and other tree species) for breeding in the south west. So while no breeding data appears to exist for the general area there is potential for breeding to take place given the presence of large numbers of marri trees in remnant vegetation in the Chapman Hill area.

5.1.2 Black Cockatoo Foraging Habitat

Following is a list of the flora species recorded within the survey area during the course of the assessment that are known to be used as a food source by one or more species of black cockatoo:

- Marri - *Corymbia calophylla* – very common;
- Jarrah - *Eucalyptus marginata* – common;
- Sheoak – *Allocasuarina fraseriana* – common; and
- Bull Banksia – *Banksia grandis* – uncommon.

The proposed clearing area is highly degraded and lacks any significant amount of native groundcover, primarily as a consequence of long term grazing by livestock and possibly frequent fires. Despite this fact most of the proposed clearing area (4.9 hectares) represents black cockatoo foraging habitat given the dominance of marri, jarrah and to a lesser extent sheoak.

Other documented foraging species identified during the survey (i.e. *banksia*) are represented by a relatively small number of individual specimens and therefore they do not contribute to the total potential food resource to any significant degree.

Evidence of all three species of black cockatoo foraging onsite was observed during the field assessment. This evidence was in the form of chewed marri fruits (various examples specifically attributed to the forest red-tailed black cockatoo and Baudin's black cockatoo), chewed jarrah fruits (various examples attributed to the forest red-tailed black cockatoo and/or Carnaby's black cockatoo) and chewed sheoak fruits (attributed to the forest red-tailed black cockatoo) at several locations.

A number of Baudin's and/or Carnaby's black-cockatoos were also observed feeding on introduced pasture grasses (*Erodium* sp.?) just outside of the survey area.

Based on vegetation mapping compiled for the South West Biodiversity Project (2007) it is estimated that there is over 10,000 ha of native vegetation within 10 km the study area, much of which is very likely to represent potential black cockatoo foraging habitat of some type. There is also over 2,500 ha of pine plantations within 10km of the site. Pines are likely to be a significant foraging resource for Carnaby's black-cockatoos in this area. The proposed clearing within Lot 2629 represents 0.048% of this total area of potential foraging habitat.

5.1.3 Black Cockatoo Roosting Habitat

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

A review of available data did not reveal any documented roosts sites within 10km of the study area, though as with breeding habitat this could simply be a consequence of a lack of survey work or a lack of publicly available data. Many roosting options for black cockatoos are however likely to be present in the wider area given the relative large areas of remnant native vegetation within nearby state forest areas.

5.2 SOUTH-WESTERN BRUSH-TAILED PHASCOGALE SURVEY

The habitat tree assessment identified the presence of 51 trees with potential hollows of various sizes. A proportion of these are likely to be potentially suitable for phascogales to use for day time refuge. The suitability of the survey area for phascogales is however considerably lessened by the fact that it is relatively small (<5 ha) and isolated from other remnants in the immediate vicinity. Phascogales

occupy large home ranges (typically 20 ha to 40 ha for females, often over 100 ha for males – Van Dyck and Strahan 2008) within continuous areas of suitable habitat and therefore it would appear that in this respect, the survey area doesn't represent suitable habitat for the species despite the presence of trees with hollows.

The conclusion that the survey area lacks suitable habitat for phascogales is supported by the fact that no individuals were recorded during the camera trap survey. The 10 cameras, deployed over a period of 14 nights capture 779 images. Fauna species recorded were:

- Red Fox;
- Western Grey Kangaroo;
- Common Bronzewing Pigeon; and
- Australian Magpie.

5.3 OTHER SPECIES OF CONSERVATION SIGNIFICANCE

No evidence of any other fauna species of conservation significance was found during the course of the field survey. This couple with observations made in the field of habitat quality strongly suggest that the area proposed to be cleared is very unlikely to support individuals or a population of any other species of conservation significance (e.g. western ringtail possums, chuditch) under normal circumstances. The various species known from the wider area are considered unlikely to be present given the fragmented and degraded nature of the remnant vegetation present and/or because their preferred habitat is completely absent.

6. CONCLUSION

The assessment reported on here was undertaken to identify the extent of black cockatoo habitat present with a proposed clearing area, to determine if south-western brush-tailed phascogales are present and to assess the likelihood of any other species of conservation significance occurring.

The survey area was found to contain 130 potential "black cockatoo breeding habitat trees" (DBH \geq 50cm). Eighteen of these trees appeared to contain hollows of a size possibly suitable for black cockatoos to utilise for nesting with at least one showing some inconclusive evidence of previous use. Some other larger hollows showed evidence of use by Australian wood ducks.

All of the proposed clearing area (~4.9 hectares) represents black cockatoo foraging habitat given the dominance of marri, jarrah and sheoak. No existing roosting trees

(trees used at night by black cockatoos to rest) were positively identified during the survey.

No evidence of south western brush-tailed phascogales being present was found despite a detailed camera trap survey and this coupled with the fact that habitat appears marginal at best would suggest they were absent from the area surveyed.

Habitat within the survey area also appears unsuitable for other species of concern such as the western ringtail possums and chuditch to utilise. This conclusion is supported by the fact that no evidence of any species of conservation significance (besides black cockatoos) being present was observed during the field assessment.

The results of this assessment should be provided to the relevant regulatory authorities for their consideration during the clearing permit assessment process.

7. REFERENCES

Department of Environment and Conservation (DEC) (2007). Forest Black Cockatoo (Baudin's Cockatoo - *Calyptorhynchus baudinii*) and Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) Recovery Plan. Department of Environment and Conservation, Perth, Western Australia

Department of Environment and Conservation (DEC) (2012). Carnaby's cockatoo (*Calyptorhynchus latirostris*) Recovery Plan. Department of Environment and Conservation, Perth, Western Australia.

Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) (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*.

Johnstone, R. E. & Kirkby, T. (2011). Carnaby's Cockatoo (*Calyptorhynchus latirostris*), Baudin's Cockatoo (*Calyptorhynchus baudinii*) and the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) on the Swan Coastal Plain (Lancelin–Dunsborough), Western Australia. Studies on distribution, status, breeding, food, movements and historical changes. Report for the Department of Planning, Western Australia.

Kirkby, T. (2009). Results of Black Cockatoo Survey at Lot 2 Dawesville. Unpublished report for WA Limestone.

Van Dyck, S. & Strahan, R. Eds (2008). The Mammals of Australia. Third edition Queensland Museum.

APPENDIX A

BLACK COCKATOO HABITAT TREE DETAILS

Habitat trees (DBH \geq 50cm)

Datum - GDA 94

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	Hollow Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt001	50H	341930	6259949	Marri	20+	>50	0		No Signs	No Signs	No	
wpt002	50H	341924	6259960	Jarrah	15-20	>50	0		No Signs	No Signs	No	
wpt003	50H	341914	6259952	Jarrah	15-20	>50	0		No Signs	No Signs	No	
wpt004	50H	341909	6259955	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt005	50H	341909	6259952	Marri	10-15	>50	0		No Signs	No Signs	No	
wpt006	50H	341911	6259945	Marri	20+	>50	0		No Signs	No Signs	No	
wpt007	50H	341901	6259952	Marri	20+	>50	0		No Signs	No Signs	No	
wpt008	50H	341896	6259946	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt009	50H	341896	6259967	Jarrah	15-20	>50	0		No Signs	No Signs	No	
wpt010	50H	341885	6259969	Marri	20+	>50	0		No Signs	No Signs	No	
wpt011	50H	341885	6259958	Marri	20+	>50	0		No Signs	No Signs	No	
wpt012	50H	341885	6259960	Marri	20+	>50	0		No Signs	No Signs	No	
wpt013	50H	341885	6259957	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt014	50H	341878	6259940	Marri	20+	>50	2+	Small, Medium & Large (Cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt015	50H	341885	6259930	Marri	20+	>50	2+	Small & Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt016	50H	341901	6259918	Marri	20+	>50	2+	Small, Medium & Large (Cockatoo)	Bees	No Signs	Yes	Bees in large hollow
wpt017	50H	341877	6259904	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt018	50H	341862	6259895	Marri	20+	>50	0		No Signs	No Signs	No	
wpt019	50H	341854	6259897	Marri	20+	>50	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt020	50H	341861	6259854	Marri	20+	>50	0		No Signs	No Signs	No	
wpt021	50H	341869	6259858	Marri	20+	>50	0		No Signs	No Signs	No	
wpt022	50H	341884	6259849	Marri	20+	>50	2+	Medium & Large (Cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt023	50H	341863	6259837	Marri	20+	>50	0		No Signs	No Signs	No	
wpt024	50H	341853	6259843	Marri	20+	>50	2+	Small & Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt025	50H	341863	6259823	Marri	20+	>50	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt026	50H	341862	6259810	Marri	20+	>50	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt027	50H	341870	6259788	Marri	20+	>50	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt028	50H	341852	6259789	Marri	20+	>50	2+	Small, Medium & Large (Cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt029	50H	341880	6259793	Marri	20+	>50	0		No Signs	No Signs	No	
wpt030	50H	341888	6259751	Marri	20+	>50	1	Large (Cockatoo)	Ducks	No Signs	Yes	Evidence of used by ducks (feathers/down)
wpt031	50H	341906	6259882	Marri	20+	>50	0		No Signs	No Signs	No	
wpt032	50H	341908	6259876	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt033	50H	341889	6259877	Marri	15-20	>50	0		No Signs	No Signs	No	

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Hollow Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt034	50H	341884	6259849	Marri	20+	>50	1	Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt035	50H	341907	6259811	Dead Jarrah	15-20	>50	2+	Medium & Large (Cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt036	50H	341906	6259774	Marri	20+	>50	0		No Signs	No Signs	No	
wpt037	50H	341828	6260007	Marri	15-20	>50	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt038	50H	341808	6260162	Marri	15-20	>50	1	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt039	50H	341840	6260151	Marri	20+	>50	2+	Medium & Large (Cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt040	50H	341869	6260158	Marri	20+	>50	0		No Signs	No Signs	No	
wpt041	50H	341870	6260164	Marri	15-20	>50	1	Large (Cockatoo)	Ducks	No Signs	Yes	Evidence of used by ducks (feathers/down)
wpt042	50H	341873	6260106	Marri	15-20	>50	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt043	50H	341908	6260127	Marri	15-20	>50	2+	Small, Medium & Large (Cockatoo)	Bees	No Signs	Yes	Internal dimensions of hollows unknown
wpt044	50H	341946	6260158	Marri	20+	>50	0		No Signs	No Signs	No	
wpt045	50H	341946	6260158	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt046	50H	341945	6260159	Marri	20+	>50	0		No Signs	No Signs	No	
wpt047	50H	342051	6260145	Marri	20+	>50	2+	Small & Medium	Parrots	Parrots	No	Evidence of use by parrots?
wpt048	50H	341969	6260084	Marri	20+	>50	2+	Small, Medium & Large (Cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt049	50H	341950	6260018	Marri	20+	>50	2+	Small, Medium & Large (Cockatoo)	Bees	No Signs	Yes	Internal dimensions of hollows unknown
wpt051	50H	341888	6259976	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt052	50H	341927	6259976	Marri	20+	>50	0		No Signs	No Signs	No	
wpt053	50H	341999	6259845	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt054	50H	342008	6259817	Marri	20+	>50	2+	Small & Medium	Parrots	Parrots	No	Evidence of use by parrots?
wpt055	50H	341996	6259807	Marri	15-20	>50	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt056	50H	342013	6259801	Jarrah	15-20	>50	0		No Signs	No Signs	No	
wpt057	50H	342037	6259821	Dead Jarrah	20+	>50	2+	Small & Medium	Bees	No Signs	No	Internal dimensions of hollows unknown
wpt058	50H	342050	6259836	Jarrah	15-20	>50	0		No Signs	No Signs	No	
wpt059	50H	342057	6259835	Marri	20+	>50	0		No Signs	No Signs	No	
wpt060	50H	342054	6259824	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt061	50H	342071	6259822	Marri	15-20	>50	2+	Small & Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt062	50H	342092	6259804	Jarrah	20+	>50	2+	Small & Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt063	50H	342107	6259804	Jarrah	20+	>50	2+	Small & Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt064	50H	342098	6259760	Jarrah	20+	>50	2+	Small & Medium	Parrots	Parrots	No	Evidence of use by parrots
wpt065	50H	342124	6259746	Jarrah	20+	>50	0		No Signs	No Signs	No	
wpt066	50H	342123	6259739	Jarrah	20+	>50	0		No Signs	No Signs	No	
wpt067	50H	342098	6259739	Marri	15-20	>50	2+	Small & Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt068	50H	342077	6259754	Jarrah	20+	>50	0		No Signs	No Signs	No	
wpt069	50H	342074	6259775	Dead Marri	15-20	>50	2+	Small & Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt070	50H	342059	6259771	Jarrah	15-20	>50	2+	Small & Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt071	50H	342043	6259776	Marri	20+	>50	1	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Hollow Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt072	50H	342027	6259772	Jarrah	15-20	>50	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt073	50H	342027	6259778	Jarrah	15-20	>50	0		No Signs	No Signs	No	
wpt074	50H	342037	6259760	Dead Marri	10-15	>50	2+	Small & Medium	Bees	No Signs	No	Internal dimensions of hollows unknown
wpt075	50H	342049	6259733	Jarrah	20+	>50	0		No Signs	No Signs	No	
wpt076	50H	342061	6259715	Jarrah	20+	>50	0		No Signs	No Signs	No	
wpt077	50H	342034	6259725	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt078	50H	342018	6259717	Jarrah	20+	>50	2+	Small, Medium & Large (Cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt079	50H	342010	6259734	Jarrah	20+	>50	0		No Signs	No Signs	No	
wpt080	50H	341999	6259719	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt081	50H	341992	6259714	Dead Jarrah	20+	>50	0		No Signs	No Signs	No	
wpt082	50H	341966	6259713	Marri	20+	>50	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt083	50H	341944	6259728	Jarrah	20+	>50	2+	Small & Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt084	50H	341942	6259731	Marri	20+	>50	0		No Signs	No Signs	No	
wpt085	50H	341931	6259743	Marri	20+	>50	0		No Signs	No Signs	No	
wpt086	50H	341924	6259743	Marri	20+	>50	0		No Signs	No Signs	No	
wpt087	50H	341924	6259721	Marri	20+	>50	0		No Signs	No Signs	No	
wpt088	50H	341930	6259712	Jarrah	15-20	>50	0		No Signs	No Signs	No	
wpt089	50H	341913	6259717	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt090	50H	341900	6259709	Marri	20+	>50	0		No Signs	No Signs	No	
wpt091	50H	341900	6259716	Marri	20+	>50	0		No Signs	No Signs	No	
wpt092	50H	341867	6259699	Marri	20+	>50	2+	Small & Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt093	50H	341864	6259701	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt094	50H	341868	6259709	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt095	50H	341879	6259724	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt096	50H	341881	6259730	Marri	20+	>50	0		No Signs	No Signs	No	
wpt097	50H	341886	6259736	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt098	50H	341900	6259732	Jarrah	20+	>50	0		No Signs	No Signs	No	
wpt099	50H	341911	6259759	Marri	20+	>50	2+	Small & Medium	Parrots	Parrots	No	Evidence of use by parrots
wpt100	50H	341914	6259772	Marri	20+	>50	2+	Small, Medium & Large (Cockatoo)	Ducks	No Signs	Yes	Evidence of used by ducks (feathers/down)
wpt101	50H	341915	6259774	Jarrah	20+	>50	0		No Signs	No Signs	No	
wpt102	50H	341917	6259764	Jarrah	20+	>50	0		No Signs	No Signs	No	
wpt103	50H	341928	6259762	Jarrah	20+	>50	0		No Signs	No Signs	No	
wpt104	50H	341933	6259762	Jarrah	15-20	>50	0		No Signs	No Signs	No	
wpt105	50H	341942	6259771	Marri	20+	>50	2+	Small, Medium & Large (Cockatoo)	No Signs	Cockatoos	Yes	Cockatoo chew marks?
wpt106	50H	341942	6259784	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt107	50H	341952	6259787	Jarrah	20+	>50	0		No Signs	No Signs	No	
wpt108	50H	341965	6259786	Dead Jarrah	15-20	>50	2+	Small, Medium & Large (Cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Hollow Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt109	50H	341979	6259802	Jarrah	15-20	>50	0		No Signs	No Signs	No	
wpt110	50H	342000	6259784	Marri	20+	>50	0		No Signs	No Signs	No	
wpt111	50H	342017	6259766	Marri	15-20	>50	2+	Small & Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt112	50H	342007	6259742	Jarrah	20+	>50	0		No Signs	No Signs	No	
wpt113	50H	342038	6259743	Dead Marri	15-20	>50	2+	Small & Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt114	50H	341985	6259745	Marri	20+	>50	2+	Small, Medium & Large (Cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt115	50H	341958	6259750	Marri	20+	>50	1	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt116	50H	341946	6259743	Marri	20+	>50	0		No Signs	No Signs	No	
wpt117	50H	341965	6259734	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt118	50H	341977	6259733	Jarrah	20+	>50	0		No Signs	No Signs	No	
wpt119	50H	341954	6259792	Marri	20+	>50	0		No Signs	No Signs	No	
wpt120	50H	341948	6259810	Marri	20+	>50	0		No Signs	No Signs	No	
wpt121	50H	341925	6259800	Marri	20+	>50	0		No Signs	No Signs	No	
wpt122	50H	341924	6259799	Marri	10-15	>50	0		No Signs	No Signs	No	
wpt123	50H	341889	6259802	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt124	50H	341910	6259856	Marri	20+	>50	0		No Signs	No Signs	No	
wpt125	50H	341913	6259864	Marri	20+	>50	0		No Signs	No Signs	No	
wpt126	50H	341919	6259844	Marri	15-20	>50	0		No Signs	No Signs	No	
wpt127	50H	341927	6259844	Marri	15-20	>50	2+	Small & Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt128	50H	341948	6259840	Marri	20+	>50	0		No Signs	No Signs	No	
wpt129	50H	341940	6259826	Marri	20+	>50	2+	Medium & Large (Cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt130	50H	341932	6259822	Marri	20+	>50	2+	Small & Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt131	50H	341923	6259812	Marri	20+	>50	2+	Medium & Large (Cockatoo)	Parrots	No Signs	Yes	Evidence of use by parrots?

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