Black Cockatoo Habitat Assessment of Proposed Clearing Area

(CPS 7171/1)

Lot 393 - Morris Road

Gwindinup

December 2016

Version 1

On behalf of:
Mario Giacci
c/- Thompson Surveying Consultants
PO Box 1719
BUNBURY WA 6231

Prepared by:
Greg Harewood
Zoologist
PO Box 755
BUNBURY WA 6231
M: 0402 141 197
E: gharewood@iinet.net.au

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

SUMMARY

This report details the results of a black cockatoo habitat assessment of a proposed clearing areas (Clearing Application CPS 7171/1) within Lot 393 Morris Road, Gwindinup (the survey area) (Figures 1 and 2).

The landowner (Mr Mario Giacci) has applied for an Area Permit to clear 34.2 hectares of native vegetation within Lot 393 for the purpose of extractive industry (Figure 2).

A preliminary site assessment of the survey area was completed by Department of Environment Regulation (DER) officers on 8 September 2016 and it was concluded that "the application area may contain significant roosting and foraging habitat, and may include nesting hollows, for black cockatoos". Based on this information, the Department of Parks and Wildlife (DPaW) have requested that a survey is conducted to identify trees with a diameter at breast height of greater than 500 millimetres and trees that may contain suitable nesting hollows for black cockatoos (DER 2016a).

The black cockatoo habitat assessment of the survey area was carried out on the 30 November and 3 December 2016 by Greg Harewood (Zoologist).

The assessment identified 156 trees within the survey area with a DBH of ≥50cm (Figure 3). Most (147 – ~94%) of these trees did not appear to contain hollows of any size or contained apparent hollows that appeared unlikely to be suitable for black cockatoos to use for nesting.

Nine trees (9 – ~6%) appeared to contain hollows possibly large enough for black cockatoos to use for nesting, though this assessment was based on the size of the entrance into an apparent hollow only. Eight of these apparent hollows showed no actual evidence of being used by black cockatoos for nesting (currently or previously), suggesting they have in fact not been used for this purpose.

One tree contained an apparent large hollow with significant rub marks around its entrance. This evidence can be attributed to black cockatoos using the hollow for some purpose, possibly as a "drink" tree (given absence of actual chew marks – a tree where the hollow contains rainwater used by black cockatoos to drink) or possibly for nesting, in the recent past.

The survey area was also found to contain foraging habitat though evidence of use seems low give the paucity of marri trees which are a favoured food source for all three species of black cockatoos. No evidence of black cockatoos roosting within the survey area was found.

It is recommended that this report be forward to the DER/DPaW for review so as to allow for the assessment of the clearing permit application to proceed.

Based on their comments and as indicated in their recent letter (DER 2016a) it may be necessary to provide information on how the proposed activity will be carried out to avoid or minimise the potential impacts on the black cockatoo habitat identified, if it is assessed as likely to be significant. Once the proposal is finalised it may also be necessary to refer it to the

federal DoTEE for assessment under the *Environment Protection and Biodiversity Conservation Act 1999* with respect to impact on black cockatoo habitat.

The following recommendations are provided for consideration during ongoing planning. This listing is not exhaustive and management actions should be finalised after liaison with relevant regulatory authorities.

- Future planning for the proposed development should aim to minimise the need to clear areas of native vegetation as much as reasonable and practicable so as to reduce potential impacts and therefore simplify the approval process.

- Consideration should be given to modifying the application area to avoid some or all those trees identified as having large hollows possibly suitable for black cockatoos and in particular the tree containing a hollow observed to be in recent or current use by black cockatoos (Figure 3).

- In addition to any fauna management requirements which may from part of the clearing permit when/if granted by the DER, it is recommended that a suitably qualified “fauna specialist” (or “fauna spotter”) be present during clearing operations to supervise any animal handling and the capture of injured fauna if required with particular attention being paid to the potential hollow bearing trees identified during this assessment.

- All hollow bearing trees should be felled, if possible, in a manner that minimises the chance of any fauna species inhabiting the hollows being injured or killed. This should include felling trees in a direction where hollow entrances are facing upwards and pushing trees over as slow as possible.

- Hollows within felled trees should be examined for fauna species immediately after felling and any animals captured should be relocated to nearby retained habitat.

- If possible, clearing should be undertaken to avoid the breeding season of black cockatoos. The breeding season for the three black cockatoo species generally occurs between July and February (which includes an incubation period of ~29 days and a nesting period of ~70 to ~75 days).

- It is however possible for breeding to take place outside of this period and therefore, irrespective of when clearing is undertaken, and within a week prior to clearing commencing identified tree hollows should be inspected for evidence of black cockatoo breeding activity and the appropriate action taken.

- Any proposed re-vegetation and rehabilitation strategies should utilised a high percentage of local, dieback resistant native species commonly used by black cockatoos. In this instance, it is recommended that marri (*Corymbia calophylla*) be the main species. Peppermint (*Agonis flexuosa*) trees should also be considered given that western ringtail possums area, known to persist in nearby areas and will benefit from additional planting in this area where currently habitat is general very

marginal. Plantings should be at a density that ultimately creates canopy connectivity between trees.

- Once all facets of the proposal to clear vegetation from the site are finalised and agreeable to the DER, consideration should also be given to referring the proposal to the DotEE to ensure compliance with the *EPBC Act*.

1. INTRODUCTION

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2. SCOPE OF WORKS

To comply with DPaW's request the scope of works has been defined as:

1. Carry out a black cockatoo habitat assessment (habitat trees, existing and potential nest hollows, foraging and roosting habitat) of trees within the proposed clearing area; and

2. Provide a report summarising results.

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

3.1 FAUNA HABITATS

The vegetation communities, soils and landforms observed during the site reconnaissance survey have been used as the basis for a classification of the survey area into broad fauna habitat types.

3.2 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 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.

So as to comply with the requested scope of works and in line with the published guidelines, the black cockatoo habitat assessment has included a daytime reconnaissance survey of the site (carried out on the 30 November and 3 December 2016 by Greg Harewood (Zoologist)) and a review of available literature utilising the following methods.

3.2.1 Black Cockatoo Breeding Habitat

The black cockatoo breeding habitat assessment has involved the identification of all suitable breeding trees species within the survey area that have a Diameter at Breast Height (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. Non-endemic, planted trees were also not assessed (i.e. blue-gums), as these also do not typically develop hollows that are then 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 may be suitable for a black cockatoo to use for nesting).

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

- Tree < 50cm DBH or an unsuitable species (not assessed/recorded);
- 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 suitable for black cockatoos to use for nesting.

For the purposes of this study 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 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, was 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).

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 survey area.

3.2.2 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.

3.2.3 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.

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 FAUNA HABITATS

Descriptions and examples images of the fauna habitats/dominant vegetation types present within the subject site are provided in Table 1. The density and extent of the remnant vegetation present can also be seen in Figure 2.

In general terms the fauna habitats present are all highly degraded, a consequence of historical clearing, presumably several decades ago, followed by livestock grazing and then

the planting of plantation timber. There is also evidence of some previous small scale gravel/sand extraction.

Remnant native vegetation within the survey area is now represented by scattered trees of various species amongst blue-gums over a parse groundcover of introduced grasses/weeds. There is little or no native understory is now present. Many of the native trees present are relatively small in size, suggesting they are regrowth from the historical clearing event.

Table 1: Example Images of the Fauna Habitats within the Survey Area

Fauna Habitat Description	Example Image
Totally Cleared Almost completely cleared areas with only a small number of scattered trees. Groundcover is dominated by sparse pasture grasses/weeds.	
Bluegum Plantation Bluegums are the most common tree species and are present in various densities across almost the entire survey area. They are densest in the northern half of the property where native trees (mostly jarrah) are absent or present as widely scattered specimens only. In the south bluegums are represented by more scattered individuals, with native trees being more common. Groundcover is dominated by pasture grasses/weeds.	

Fauna Habitat Description	Example Image
Jarrah (and Marri) Open Woodland Jarrah and a small number of marri trees are present in most vegetated areas to some degree but are most common in the southern half of the property where they form a sparse open woodland. Also present are scattered woody pear trees and occasional bluegums. Peppermint and WA Christmas trees are represented by only a few specimens. Groundcover is dominated by pasture grasses/weeds.	

Overall the fauna biodiversity likely within the subject site would be very low, however given the presence of woodland vegetation and trees with hollows, the remnants still have value for some fauna species able to persist in degraded habitats of this type. Most of the fauna species likely to be present would however be common, widespread species (mainly birds), with a few exceptions (e.g. black cockatoos).

5.2 BLACK COCKATOO HABITAT ASSESSMENT

5.2.1 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:

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

It should be noted that the likelihood of 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. As an example, 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 “black cockatoo habitat” trees observed within the survey area is provided in Table 1 below. The location of each habitat tree recorded is shown in Figure 3.

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

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		
				Jarrah	Marri	Dead Unidentified
156	89	58	9	140	10	6

The assessment identified 156 trees within the survey area with a DBH of ≥50cm. Most (89 – ~57%) of these trees did not appear to contain hollows of any size. Fifty-eight trees (~37%) were assessed as possibly having hollows, but of a size too small for black cockatoos to utilise. Nine trees (9 – ~6%) appeared to contain hollows possibly large enough for black cockatoos to use for nesting, though this assessment was based on the size of the entrance into an apparent hollow only. Eight of these apparent hollows showed no actual evidence of being used by black cockatoos for nesting (currently or previously), suggesting they have in fact not been used for this purpose.

One tree contained an apparent large hollow with significant rub marks around its entrance. This evidence can be attributed to black cockatoos using the hollow for some purpose, possibly as a “drink” tree (given absence of actual chew marks – a tree where the hollow contains rainwater used by black cockatoos to drink) or possibly for nesting in the recent past.

Additional details of each tree can be found in Appendix A.

A review of available data revealed no documented breeding records from the vicinity of the subject site (i.e. within 10km). The subject site does however fall within the mapped breeding range of Carnaby’s black-cockatoo as depicted in the most current recovery plan produced by DPaW (Figure 2 - DEC 2012).

The corresponding DPaW recovery plan for Baudin’s and the forest red-tailed black-cockatoo (DEC 2007) does not specifically define any known breeding areas for either species. Johnstone and Kirkby (2011) also do not specifically mention breeding areas of either species within the area though both are noted as utilising marri trees (and other tree species) for breeding in the south west.

While no breeding data appears to exist 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 15,100 ha of native

vegetation within 10 km the survey area. Given this fact, there is significant potential for breeding to take place in the wider area (assuming the presence of suitable trees).

5.2.2 Black Cockatoo Foraging Habitat

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

- Jarrah - *Eucalyptus marginata*;
- Marri - Corymbia calophylla; and
- Common Grass Tree - *Xanthorrhoea preissii* (only a few specimens present).

It should be noted that the degree to which black cockatoos feed on these respective plant species varies. Marri, for example, is the most favoured food source for all three species of black cockatoo in this area of their range. Marri is, compared to jarrah relatively rare in the survey area. Other plant species such as the common grass tree would make up only a small proportion of any one birds diet and in the case of some species are not foraged upon at all.

Very little evidence of black cockatoos foraging with the survey area was observed during the field assessment. The only evidence seen was all in the form of a small amount of chewed marri fruits at one location. Based on the marks left on the fruit body this activity was attributed to Baudin's black-cockatoo.

Based on available vegetation mapping it is estimated that there is approximately 15,100 ha of native vegetation within 10 km the survey area (~44% of total area), much of which is very likely to represent potential black cockatoo foraging habitat of some type. It is not possible to accurately calculate the actual extent of foraging habitat within the proposed clearing area itself given it is mainly comprised of scattered, individual trees.

5.2.3 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 shows one documented roost site just east of the survey area (DoP 2011), though as with breeding habitat the lack of records could simply be a consequence of a lack of survey work or a lack of publicly available data. Given the relatively large extent of remnant vegetation still present with 10km of the survey area (~15,100 ha) there is likely to be numerous roosting opportunities present in the general vicinity.

6. CONCLUSION & RECOMMENDATIONS

The assessment reported on here was primarily undertaken to identify trees with a diameter at breast height of greater than 50cm and trees that may contain suitable nesting hollows for black cockatoos within the survey area, as requested by DPaW.

The assessment identified 156 trees within the survey area with a DBH of ≥50cm (Figure 3). Most (147 – ~94%) of these trees did not appear to contain hollows of any size or contained apparent hollows that appeared unlikely to be suitable for black cockatoos to use for nesting.

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The following recommendations are provided for consideration during ongoing planning. This listing is not exhaustive and management actions should be finalised after liaison with relevant regulatory authorities.

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- Once all facets of the proposal to clear vegetation from the site are finalised and agreeable to the DER, consideration should also be given to referring the proposal to the DotEE to ensure compliance with the *EPBC Act*.

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.

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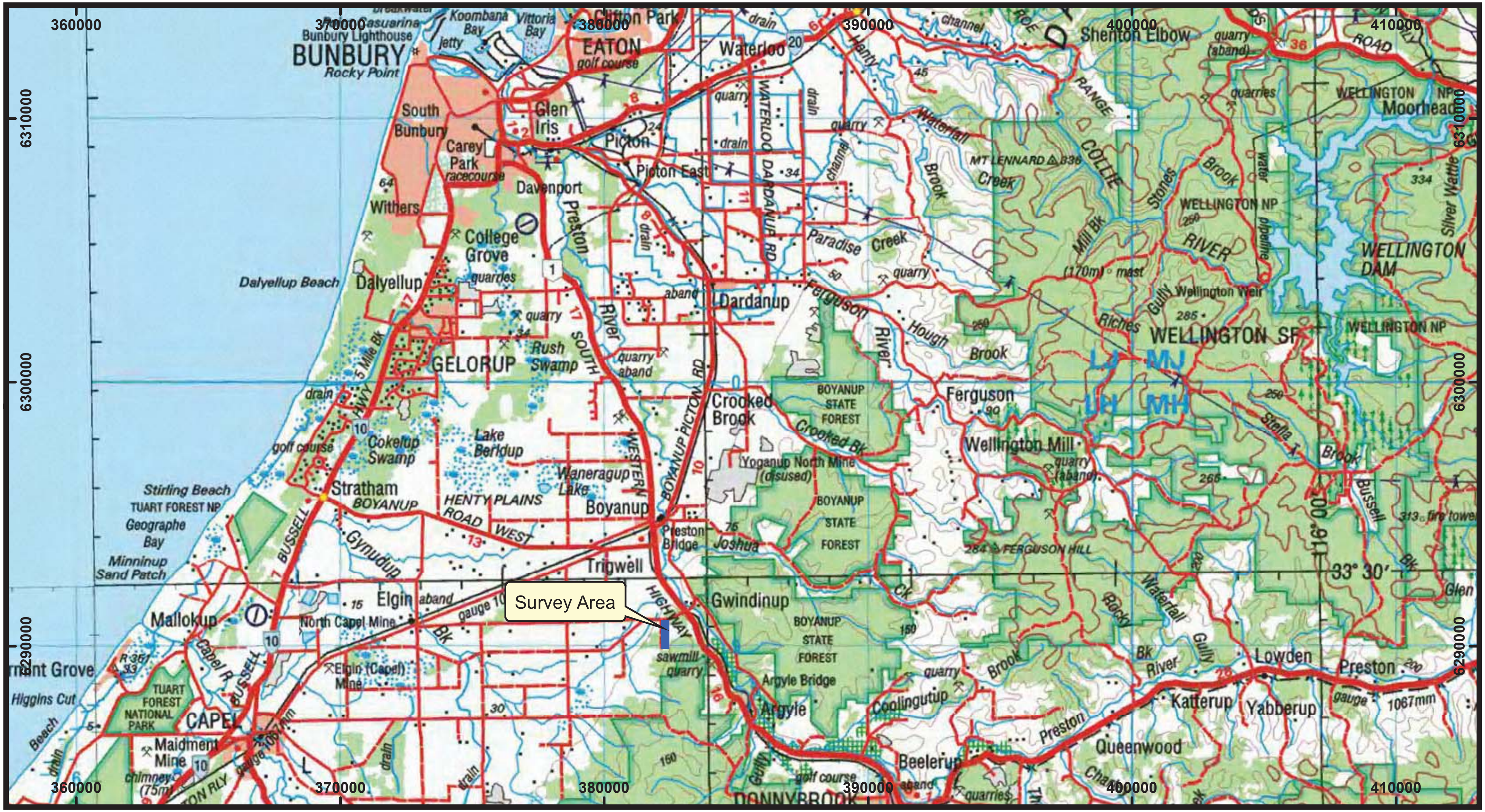
Johnstone, R. E. & Kirkby, T. (2011). Carnaby's Cockatoo (*Calyptorhynchus latirostris*), Baudin's Cockatoo (*Calyptorhynchus baudinii*) and the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) on the Swan Coastal Plain (Lancelin–Dunsborough), Western Australia. Studies on distribution, 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.

FIGURES



Legend

Survey Area

0 5 10 15 20

Kilometres

Fauna Assessment

Drawn: G. Harewood

Date: Dec 2016

Scale: 1:200,000

Projection/Coordinate System: UTM/MGA Zone 50

Lot 393 Gwindinup (CPS 7171/1)

Survey Area & Surrounds

Figure: 1

Legend

Lot 393 Boundary

CPS 717/1 Clearing Area

N

0 50 100 150 200

Metres

Cockatoo Assessment

Lot 393 Gwindinup (CPS 7171/1)

Air Photo

Drawn: G. Harewood

Date: Dec 2016

Scale: 1:5,000

Projection/Coordinate System: UTM/MGA Zone 50

Figure: 2

Legend

- Lot 393 Boundary
- CPS 717/1 Clearing Area
- 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

Cockatoo Assessment

Lot 393 Gwindinup (CPS 7171/1)

Habitat Trees (DBH ≥50cm)

Drawn: G. Harewood	
Date: Dec 2016	
Scale: 1:5,000	
Projection/Coordinate System: UTM/MGA Zone 50	Figure: 3

APPENDIX A

HABITAT TREE DETAILS

Habitat Trees (DBH ≥50cm)
Datum - GDA94

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimated Hollow Entrance Size Range (cm)	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt001	50H	382212	6290526	Jarrah	>50	20+	2+	Small-Large (cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt002	50H	382289	6290520	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Fissure between two trunks
wpt003	50H	382324	6290481	Dead Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt004	50H	382323	6290462	Jarrah	>50	15-20	2+	Small	No Signs	No Signs	No	Large low shallow spout
wpt005	50H	382334	6290462	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt006	50H	382316	6290438	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt007	50H	382312	6290439	Dead Jarrah	>50	15-20	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt008	50H	382323	6290432	Dead Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt009	50H	382316	6290423	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt010	50H	382345	6290427	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt011	50H	382342	6290434	Dead Unknown	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Large low shallow spout
wpt012	50H	382363	6290488	Dead Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt013	50H	382417	6290488	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt014	50H	382435	6290486	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt015	50H	382438	6290496	Dead Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt016	50H	382461	6290492	Dead Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt017	50H	382465	6290512	Dead Unknown	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt018	50H	382403	6290508	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt019	50H	382400	6290503	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt020	50H	382401	6290516	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt021	50H	382391	6290537	Jarrah	>50	15-20	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt022	50H	382392	6290550	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt023	50H	382416	6290551	Jarrah	>50	20+	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt024	50H	382424	6290553	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt025	50H	382410	6290696	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt026	50H	382456	6290711	Jarrah	>50	15-20	2+	Small-Large	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt027	50H	382458	6290749	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt028	50H	382443	6290765	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt029	50H	382424	6290759	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt030	50H	382424	6290768	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt031	50H	382438	6290802	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt032	50H	382456	6290811	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt033	50H	382456	6290830	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt034	50H	382452	6290844	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt035	50H	382439	6290845	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt036	50H	382458	6290863	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt037	50H	382435	6290897	Jarrah	>50	15-20	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt038	50H	382451	6290893	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt039	50H	382426	6290908	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt040	50H	382418	6290927	Jarrah	>50	10-15	0		No Signs	No Signs	No	
wpt041	50H	382440	6290935	Jarrah	>50	15-20	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt042	50H	382442	6290936	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt043	50H	382363	6290967	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt044	50H	382358	6290959	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt045	50H	382352	6290955	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt046	50H	382344	6290958	Jarrah	>50	10-15	0		No Signs	No Signs	No	
wpt047	50H	382345	6290967	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt048	50H	382340	6290969	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt049	50H	382350	6290967	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt050	50H	382345	6290737	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt051	50H	382315	6290642	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt052	50H	382316	6290642	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt053	50H	382311	6290643	Jarrah	>50	20+	1	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt054	50H	382310	6290644	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt055	50H	382309	6290652	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt056	50H	382310	6290646	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt057	50H	382316	6290570	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt058	50H	382269	6290624	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt059	50H	382236	6290630	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt060	50H	382231	6290630	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt061	50H	382205	6290705	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt062	50H	382204	6290573	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt063	50H	382199	6290574	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt064	50H	382188	6290578	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt065	50H	382204	6290338	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt066	50H	382183	6290237	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt067	50H	382212	6290199	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt068	50H	382222	6290179	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt069	50H	382226	6290177	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt070	50H	382226	6290183	Dead Unknown	>50	15-20	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt071	50H	382174	6290122	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt072	50H	382172	6290110	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt073	50H	382211	6290094	Jarrah	>50	20+	1	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt074	50H	382161	6290029	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt075	50H	382158	6290027	Marri	>50	20+	0		No Signs	No Signs	No	
wpt076	50H	382172	6290016	Marri	>50	15-20	1	Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt077	50H	382169	6290021	Marri	>50	15-20	0		No Signs	No Signs	No	
wpt078	50H	382173	6289989	Marri	>50	15-20	0		No Signs	No Signs	No	
wpt079	50H	382165	6289990	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt080	50H	382176	6289984	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt081	50H	382175	6289972	Dead Unknown	>50	15-20	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt082	50H	382167	6289968	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt083	50H	382160	6289932	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt084	50H	382207	6289970	Marri	>50	15-20	1	Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt085	50H	382265	6289969	Dead Unknown	>50	15-20	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimated Hollow Entrance Size Range (cm)	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt086	50H	382272	6289899	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt087	50H	382313	6289918	Jarrah	>50	15-20	2+	Small-Large (cockatoo)	No Signs	No Signs	Yes	Possibly too low/shallow
wpt088	50H	382328	6289955	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt089	50H	382334	6289947	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt090	50H	382338	6289952	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt091	50H	382414	6289946	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt092	50H	382440	6289935	Jarrah	>50	20+	2+	Small-Large (cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt093	50H	382446	6289920	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt094	50H	382441	6289909	Marri	>50	20+	0		No Signs	No Signs	No	
wpt095	50H	382432	6289909	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt096	50H	382458	6289901	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt097	50H	382457	6289917	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt098	50H	382459	6289946	Jarrah	>50	20+	1	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt099	50H	382466	6289948	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt100	50H	382456	6289957	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt101	50H	382460	6289970	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt102	50H	382469	6289985	Jarrah	>50	20+	2+	Small-Large	No Signs	No Signs	No	Too low/shallow
wpt103	50H	382454	6289984	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt104	50H	382442	6289989	Marri	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt105	50H	382425	6289987	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt106	50H	382443	6290049	Jarrah	>50	20+	2+	Small-Large (cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt107	50H	382470	6290065	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt108	50H	382418	6290116	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt109	50H	382426	6290144	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt110	50H	382414	6290151	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt111	50H	382391	6290170	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt112	50H	382394	6290174	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt113	50H	382407	6290179	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt114	50H	382394	6290205	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt115	50H	382404	6290231	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt116	50H	382433	6290232	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt117	50H	382461	6290225	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt118	50H	382466	6290236	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt119	50H	382464	6290302	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt120	50H	382400	6290273	Jarrah	>50	15-20	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt121	50H	382396	6290288	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt122	50H	382378	6290258	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt123	50H	382371	6290257	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt124	50H	382365	6290264	Jarrah	>50	20+	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt125	50H	382353	6290240	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt126	50H	382344	6290254	Jarrah	>50	15-20	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt127	50H	382319	6290296	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt128	50H	382304	6290288	Jarrah	>50	20+	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt129	50H	382303	6290354	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt130	50H	382239	6290406	Jarrah	>50	20+	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt131	50H	382237	6290423	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt132	50H	382225	6290435	Dead Unknown	>50	15-20	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt133	50H	382324	6290224	Jarrah	>50	15-20	1	Small	Bees	No Signs	No	Internal dimensions of hollows unknown
wpt134	50H	382335	6290201	Jarrah	>50	20+	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt135	50H	382330	6290127	Jarrah	>50	20+	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt136	50H	382306	6290119	Marri	>50	20+	0		No Signs	No Signs	No	
wpt137	50H	382298	6290109	Jarrah	>50	20+	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt138	50H	382291	6290097	Jarrah	>50	15-20	2+	Small-Large (cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt139	50H	382259	6290121	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt140	50H	382251	6290135	Jarrah	>50	15-20	2+	Small-Large (cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt141	50H	382259	6290104	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt142	50H	382264	6290095	Jarrah	>50	20+	2+	Small-Large (cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt143	50H	382242	6290088	Jarrah	>50	15-20	1	Small	Bees	No Signs	No	Internal dimensions of hollows unknown
wpt144	50H	382227	6290075	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt145	50H	382202	6290043	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt146	50H	382228	6290022	Marri	>50	20+	2+	Small-Large (cockatoo)	No Signs	Cockatoos	Yes	Rub marks - "drink" tree?
wpt147	50H	382293	6290051	Jarrah	>50	15-20	1	Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt148	50H	382351	6290013	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt149	50H	382381	6290029	Marri	>50	20+	0		No Signs	No Signs	No	
wpt150	50H	382398	6290024	Jarrah	>50	20+	2+	Small-Large (cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt151	50H	382407	6290075	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt152	50H	382349	6290108	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt153	50H	382359	6290205	Jarrah	>50	20+	0		No Signs	No Signs	No	
wpt154	50H	382368	6290203	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt155	50H	382361	6290207	Jarrah	>50	15-20	0		No Signs	No Signs	No	
wpt156	50H	382361	6290216	Jarrah	>50	20+	0		No Signs	No Signs	No	

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