

## 8.1 Methodology

The habitat assessment for black cockatoos was carried out in accordance with the EPBC Act referral guidelines for the three threatened black cockatoo species (SEWPaC 2012). An experienced ecologist carried out a systematic and thorough search of the site on the 3rd July 2015.

The assessment of foraging habitat was based on the EBPC Act Environmental Offset Policy 2012, which incorporates a general guide to offset assessment including broad criteria for determining habitat quality, based on the broad site characteristics, site condition and site context. A set of specific criteria relevant to Black Cockatoo foraging habitat quality were compiled for the field assessment and used as a basis for mapping habitat quality. The habitat quality was assessed for each habitat type within the project area. Appendix 3 shows the criteria and scoring method used. Habitat quality was assessed, based on the combined score of all the criteria total scores (where: 0-5 = low, 6-10 = moderate, 11 - 15 = good, 16 - 21 = excellent).

All Jarrah (*Eucalyptus Marginata*) and Marri (*Corymbia calophylla*) trees with diameter at breast height of greater than 50 cm were recorded as waypoint locations (i.e. by use of GPS) along with other relevant tree data such as presence of potential hollows (Appendix 5). Evidence of cockatoo foraging activity, or individuals observed, was also recorded across the site. Other potential habitat trees found in the area were also assessed, including *Eucalyptus tottiana* (Prickly bark) and *Eucalyptus gomphocephala* (Tuart)

## 8.2 Results

### 8.2.1 Black Cockatoo Habitat Assessment

The majority of the site was uncleared, and the large trees and shrubs that were present were native (Appendix 3). The majority of the trees present were Banksias, mainly, *Banksia menziesii*, *Banksia attenuata* and *Banksia illicifolia*. There were also some large *Eucalyptus marginata*, *Corymbia calophylla* and *Eucalyptus gomphocephala*. One area described as a CCW Dampland had large *Melaleuca preissiana* present, but were in poor condition. There was a great deal of seedling recruitment on the property, mainly banksias but also some of the eucalypts and to a very minor extent the melaleucas.

### 8.2.2 Black Cockatoo Foraging Habitat Assessment

Although no Black cockatoos were present during the most recent site visit, their calls were noted during the transect. The majority of the site contains species of plant

a daily basis, until the supply of fruit was exhausted (Johnstone & Kirkby 1999). The production of Marri fruit takes about 17 months from bud initiation (Mawson 1995). In most years, only about 20-50% of Marri trees produce a large crop of fruits and a small proportion of the trees produce only male flowers, which fail to fruit (Mawson 1995). The slow and patchy flowering and seeding of Marri trees, highlights the need for foraging habitat to consist of a mosaic of tree species and age classes.

Both Baudin's and Forest Red-tailed Black Cockatoos are frequently found feeding in the Marri / Jarrah forests of the nearby darling Scarp.

Carnaby's cockatoo feed on a wider variety of foods, including a number of banksia species, Dryandra, Hakea, Grevillea, a large variety of Gums including Marri and Jarrah. They also feed on a number of introduced species such as the Pine and Jacaranda trees (Johnstone & Kirkby 1999),

Although no foraging was observed on site on the day of the survey, evidence of foraging was detected; chewed nuts from Marri trees were collected, which were identified as having been chewed by Carnaby's Cockatoo.

### 3.4. Conclusions

#### 3.4.1. Black Cockatoos Foraging Habitat

The survey methodology is based on the information currently available on black cockatoos and the EPBC Act referral guidelines (SEWPaC 2012). These guidelines state that there is a high risk of significant impact if a proposal involves 'the clearing of more than 1 hectare of quality foraging habitat' (Appendix 4). The total area of the development is approximately 45 Ha. The entire property can be described as quality foraging habitat for the Black Cockatoos, (with the possible exception of Forrest Red tailed Black Cockatoos).

#### 3.4.2. Black Cockatoos Breeding Habitat

The site contains species of trees (Marri, Jarrah and Tuart) listed, within the guidelines, as known to support breeding cockatoos, with diameter at breast height of greater than 50cms (Appendix 5 & Figure 6). Therefore, by definition it is deemed as potential breeding habitat. It is uncertain whether changes in breeding range of all species of Black Cockatoos will extend their breeding range to within the site. However, SEWPaC maps indicate that both the Carnaby's and Forrest Red Tailed Black Cockatoos are found in the area and that it is definitely in the breeding area of Carnaby's Cockatoos. Too little is known about the breeding habitats of the Red Tailed Black Cockatoos to be certain.



Breeding occurs mainly from early July to mid-December in the semiarid and sub humid interior. There has been an apparent shift in its breeding range further west and south since the middle of last century with a more rapid increase in the past 10–30 years into the Jarrah-Marri forests of the Darling Scarp and the Tuart forests of the Swan Coastal Plain. There are now numerous breeding records for the northern Darling Scarp. Including: near Canning Dam, near Wungong Dam, Serpentine and near Collie, and on the Swan Coastal near Mandurah, Lake Clifton and near Bunbury (Storr-Johnstone Bird Data Bank).

There is also an indication that this species is expanding its breeding range in the far south-east i.e. Lake Cronin, Lake King and Ravensthorpe region.

There is very little breeding information and the breeding biology of this species is poorly known. Recorded breeding in deep south-west, north to the Whicher Range and Lowden and also records at Wungong Catchment, Serpentine (hills area) and east to Kojonup and near Albany. They nest in large, mostly vertical, hollows of Karri (*Eucalyptus diversicolor*), Marri (*Corymbia calophylla*), Wandoo (*Eucalyptus wandoo*) and Bullich (*Eucalyptus megacarpa*). Baudin's Cockatoos display strong pair bonds are monogamous, and probably mate for life and the pair remain together all year round. Pairs have also been recorded prospecting for hollows in most months and also outside the breeding range. Egg laying is recorded in August, September, October, November and December.

Following breeding, the birds leave the nesting areas and family groups then amalgamate to form larger foraging flocks. The flocks begin to arrive at non-breeding traditional roosts in the central and northern parts of the Darling Scarp. The largest groups (600+) being recorded between April and September with some foraging out onto the southern Swan Coastal Plain to areas such as Kelmscott, Mundijong, Serpentine, Pinjarra, Harvey, Myalup, Bunbury, Capel, Tutunup, Busselton, Dunsborough and Meelup. Judging from recent surveys (Johnstone. and Kirkby 2008a) for the groups of birds that have spent the non-breeding season in the Perth hills districts, there appears to be a definite shift westward onto the southern Swan Coastal Plain, just prior to the flocks moving south to breed.

Breeding has been recorded from February to December (with a peak between October and December, also a peak in some years in April–May). The Forest Red-tailed Black Cockatoo nests in large hollows of Marri (*Corymbia calophylla*), Jarrah

(*Eucalyptus marginata*), Wandoo (*Eucalyptus wandoo*), Bullich (*Eucalyptus megacarpa*), Tuart (*Eucalyptus gomphocephala*) and Karri (*Eucalyptus diversicolor*).

On the Swan Coastal Plain breeding has been recorded in November–December. Birds begin to breed at 4+ years of age. This species favours large top entry hollows with entrances ranging from 12–14 cm in diameter and hollow depth 1–5 metres.

## 9. Conclusions and Recommendations

### 9.1 Vegetation

The site contains vegetation in very good to excellent condition and although no DRF or priority species were identified, their presence cannot be completely dismissed. If the development was to go ahead it would be advisable to carry out a level 1 survey in the affected areas.

### 9.2 Black Cockatoos

If the proposed development involves the clearing of potential breeding trees (breeding habitat), then there is a high risk of significant impact and the project should be referred for Federal approval.

As the development is likely to require clearing of an area greater than 1Ha there is also a high risk of significant impact upon the foraging habitat of the Black Cockatoos and there is a requirement to refer the proposal for Federal approval.

The two criteria: breeding and foraging habitat are considered separately under the Federal referral guidelines, and there is a requirement to refer based on impact on breeding habitat and Foraging habitat. Once the area of trees that will be impacted is known, then it would be advisable to liaise with SEWPaC about federal referral.



## 10. References

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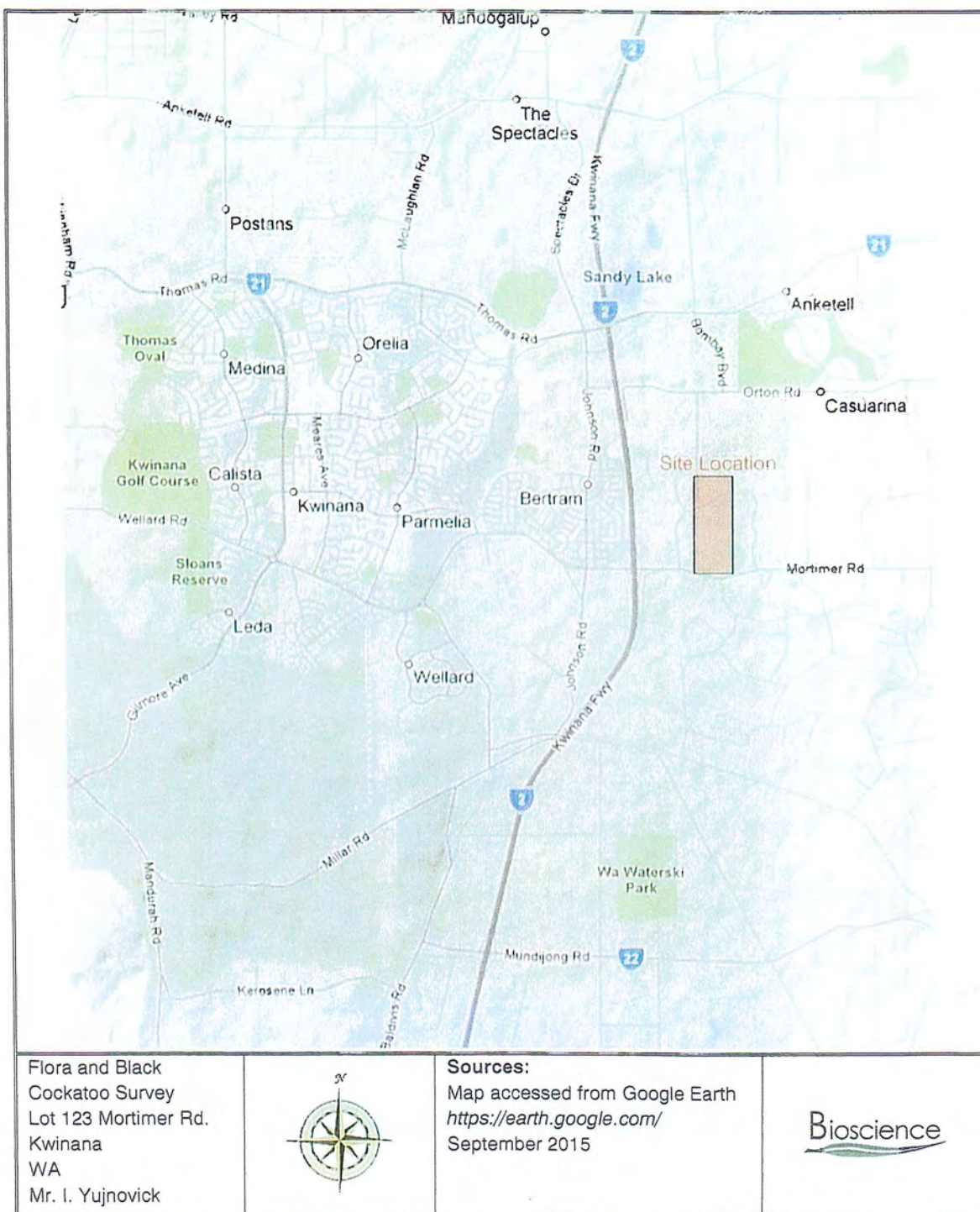
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## Figures







Flora and Black  
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Mr. I. Yujnovick



**Sources:**  
Map accessed from Nearmap  
[maps.au.nearmap.com](http://maps.au.nearmap.com)  
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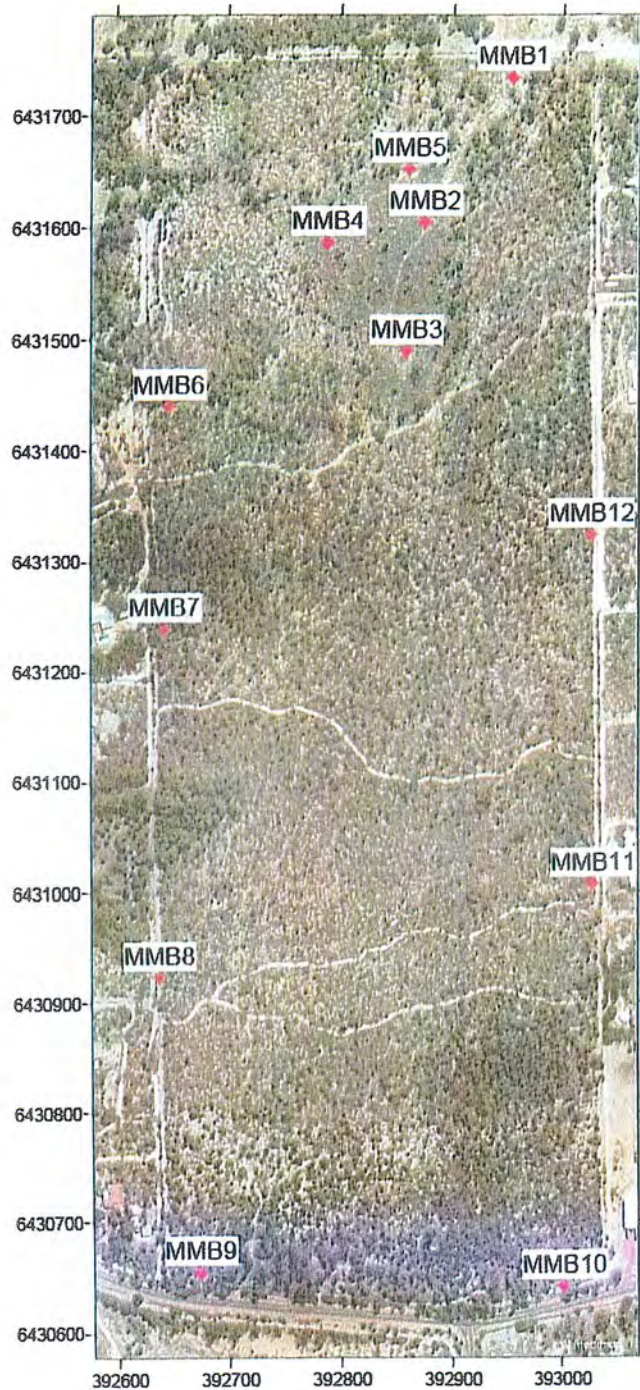


**Sources:**

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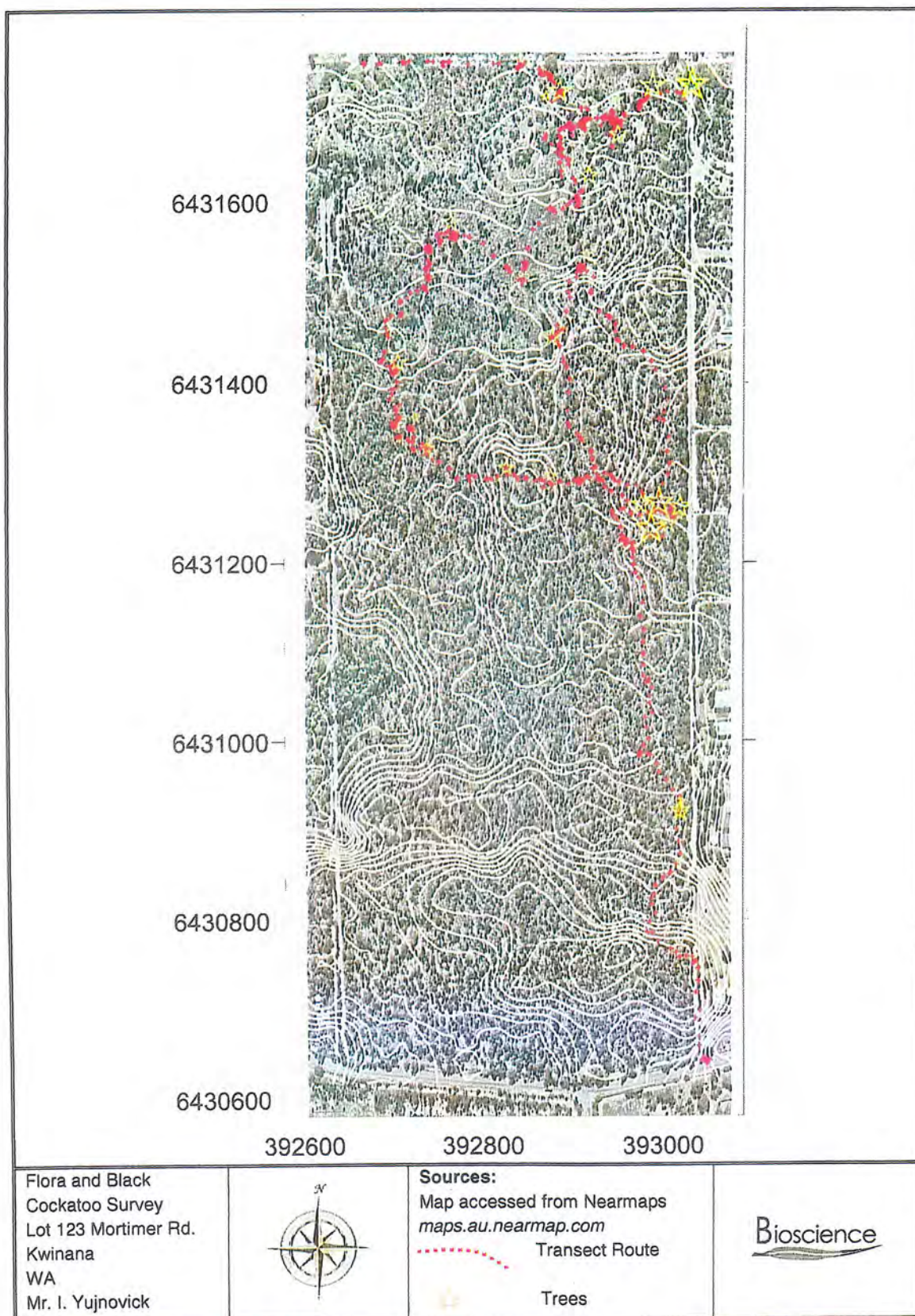


**Sources:**

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Quadrats: MR01-MR06  
Transect: MRT01

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**Map 1: Modelled distribution of Baudin's black cockatoo (*Calyptorhynchus baudinii*)**



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**Legend**

- Known Breeding Areas
- Predicted Breeding Range
- Known Foraging Areas
- Main Wintering Area
- Species Likely to Occur
- Cities & Towns
- Roads
- Major Rivers
- Lakes

**Please Note:** Known breeding areas represent locations known to be used by birds for breeding as at December 2009. As habitat has been lost in traditional breeding areas, birds have begun breeding at new locations. Distribution tracked and verified using point locations in SPRAT database (DSEWPac, 2011) and from expert feedback (R. Johnstone, 2011).

CAVEAT: The information presented in this map has been prepared for general guidance only. It is not intended to be used as a basis for legal decisions. The map is not a guarantee of accuracy and is not intended to be used as a basis for legal decisions. The map is not a guarantee of accuracy and is not intended to be used as a basis for legal decisions. The map is not a guarantee of accuracy and is not intended to be used as a basis for legal decisions.

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**Sources:**  
 Map extracted from: DSEWPac  
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**Map 2: Modelled distribution of Carnaby's black cockatoo**  
*(Calyptorhynchus latirostris)*



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**Legend**  
 Breeding Range  
 Non-breeding Range  
 Chas & Towns  
 Roads  
 Major Rivers  
 Lakes

**Please Note:** The breeding range represents the areas known to be used by birds for breeding as at December 2009. As habitat has been lost in traditional breeding areas, birds have begun breeding at new locations. Distribution created and verified using point locations in SPRAT database (DSEWPaC 2011) and from expert feedback (R. Johnstone, 2011).

**CAVEAT:** This information is not intended to be used as a basis for legal decisions. It is a modelled distribution and should not be used to make decisions about the status of any individual bird or population. It is a modelled distribution and should not be used to make decisions about the status of any individual bird or population. It is a modelled distribution and should not be used to make decisions about the status of any individual bird or population.

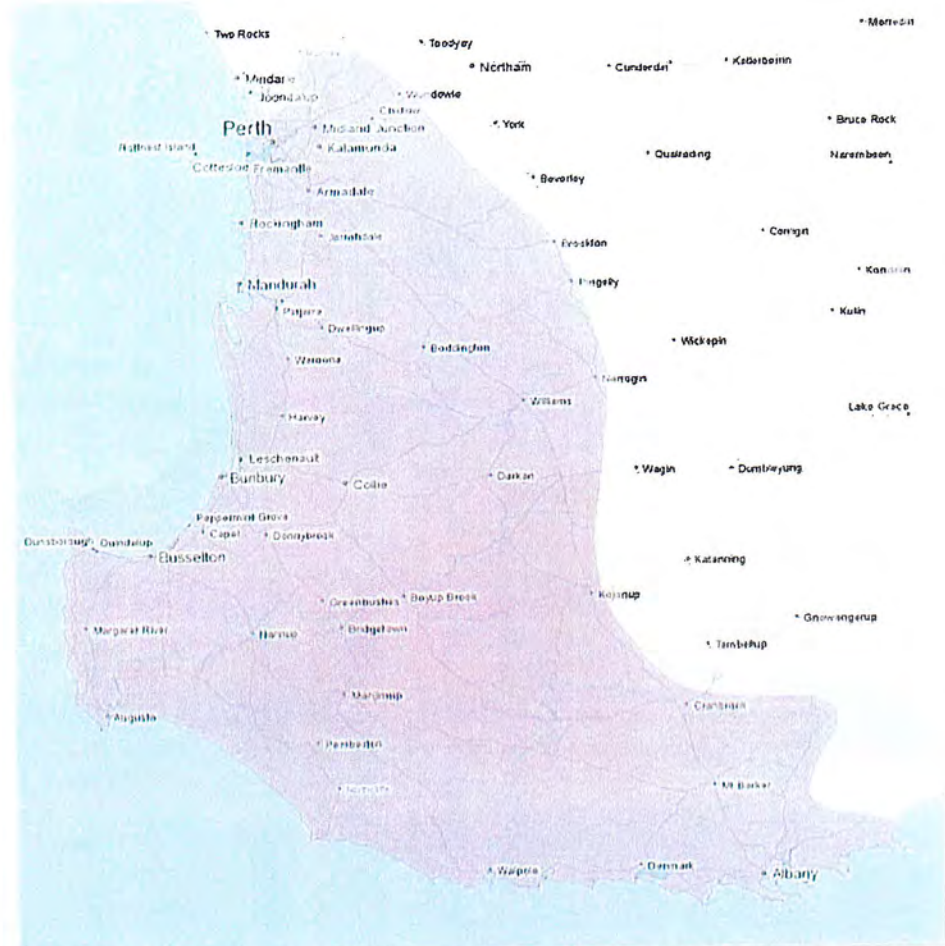
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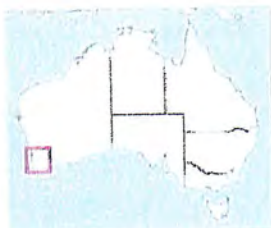
**Sources:**  
 Map extracted from:  
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Map 3: Modelled distribution of forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*)



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- Legend**
- Species May Occur
  - Cities & Towns
  - Roads
  - Major Rivers
  - Lakes

Please Note: Distribution created and verified using point locations in SPRAT database (DSEWPaC, 2011) and from expert feedback (R. Jordon, 2011).

CAVEAT: This map is a general indication of the distribution of the forest red-tailed black cockatoo. It is not a definitive map and should not be used for legal purposes. The map is based on the best available information and is subject to change. The map is not a guarantee of the accuracy of the information. The map is not a guarantee of the accuracy of the information. The map is not a guarantee of the accuracy of the information.

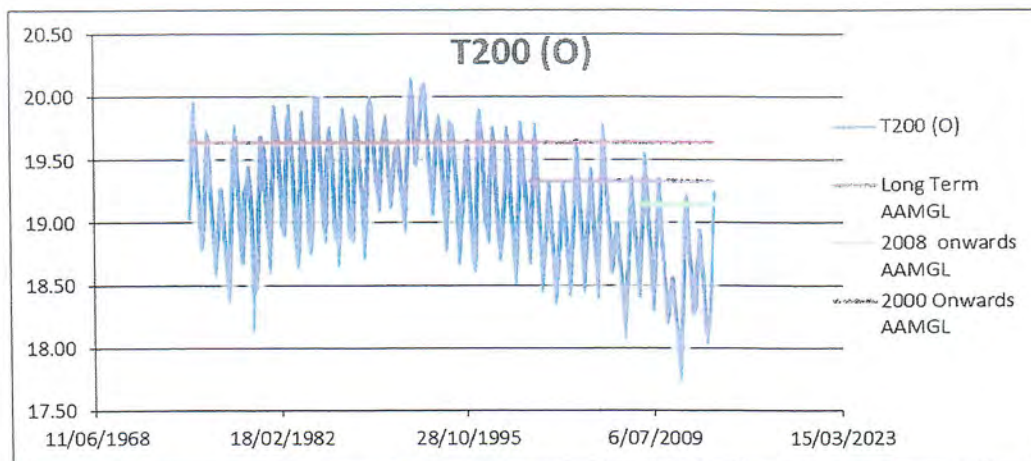
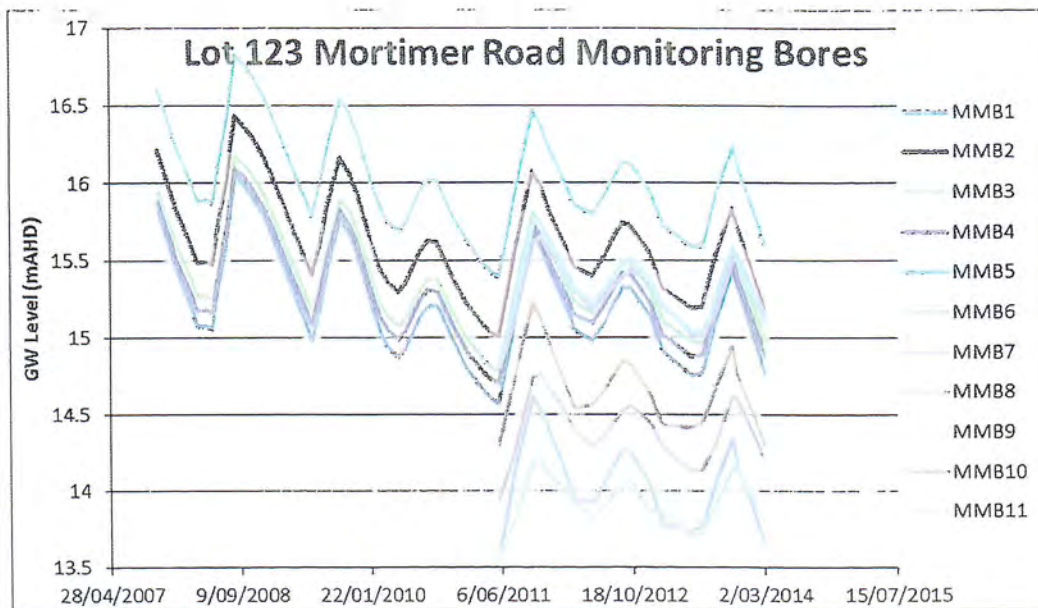
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Sources:  
Map extracted from:  
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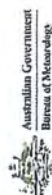
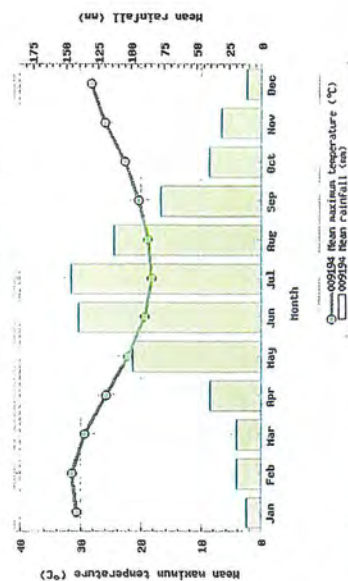
Sources:  
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Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean maximum temperature (°C)	30.7	31.5	29.3	25.7	22.1	19.4	18.3	18.9	20.3	22.7	26	28.2	24.4
Highest temperature (°C)	44.9	45.8	43.3	38.1	32.9	26.5	25.8	28	34	37.8	41.4	45	45.8
Mean minimum temperature (°C)	17.1	17.6	16	13.4	10.5	9	8.2	8.2	9.2	10.4	13.4	15.1	12.3
Lowest temperature (°C)	4.8	6.4	4.5	2.4	2	-2	-1	-0.8	0.4	0.7	3.1	4.4	-2
Mean rainfall (mm)	11.5	18.8	19.3	39.4	98.5	140.8	145.9	113	77.2	40.1	31.4	11.4	754.8
Highest rainfall (mm)	86.2	246.5	67.4	114	226.9	250.8	248.9	170.7	145.2	108	93.2	59	1022.2
Lowest rainfall (mm)	0	0	0	2.7	34.7	28.4	39.4	42.8	33.6	7.9	5	0	487.1

Location: 009194 MEDINA RESEARCH CENTRE



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Sources: Bureau of Meteorology  
<http://www.bom.gov.au/>  
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