



Department of
Environment and Conservation

Our environment, our future



Birds Australia
CONSERVATION THROUGH KNOWLEDGE

Carnaby's Cockatoo (*Calyptorhynchus latirostris*) identification of nocturnal roost sites and the 2010 Great Cocky Count.

Report prepared for the WA Department of
Environment and Conservation



Quinton Burnham¹, Geoff Barrett²,
Mark Blythman² and Raana Scott¹

¹*Birds Australia, Western Australia*

²*DEC, Western Australia*

August 2010

Carnaby's Cockatoo roost survey contact:

Dr Geoff Barrett
Regional Ecologist
Swan Region
Department of Environment and Conservation
7 Turner Avenue
Technology Park
Bentley WA 6102



Government of Western Australia
Department of Environment and Conservation

Email: Geoff.Barrett@dec.wa.gov.au

© Government of Western Australia 2010
July 2010

This work is copyright. You may download, display, print and reproduce this material in unaltered form only (retaining this notice) for your personal, non-commercial use or use within your organisation. Apart from any use as permitted under the *Copyright Act 1968*, all other rights are reserved. Requests and inquiries concerning reproduction and rights should be addressed to the Department of Conservation and Environment.

This document has been produced as part of the Carnaby's Cockatoo recovery program, under the *"High Priority recovery action for matters of national environmental significance in Western Australia"* project funded through the WA Natural Resource Management (NRM) Program.

Acknowledgements

The Department of Environment and Conservation would like to thank those who provided location data for existing roost sites, in particular, Tony Kirkby and Ron Johnstone from the WA Museum, Dr Hugh Finn from Murdoch University and Professor Will Stock (Edith Cowan University). We thank the Birds Australia (WA) Carnaby's Cockatoo Project Advisory Group for providing advice and guidance during the project. Without the 350 volunteers who enthusiastically and willingly gave up their time to count cockatoos, this project would not have been possible, a special thanks to them all. Judith O'Keeffe, John Hudson and Warwick Boardman helped with input of computer data. All photographs in this report are the property of Margaret Owen, who graciously allowed them to be used.

Summary

- This report presents the findings of the 2010 Carnaby's Cockatoo night roost survey, culminating in the Great Cocky Count (GCC) undertaken on 7 April 2010, which aimed to identify Carnaby's Cockatoo nocturnal roost sites in the DEC Swan Region.
- The survey investigated some 222 sites and following database searches, field visits and the 2010 GCC, the number of known Carnaby's Cockatoo roosts was increased from 70 to 129.
- The extensive search effort by DEC during this survey and prior to the GCC, gives us confidence that few large metropolitan roosts would have been overlooked.
- On the night of the GCC, approximately half of the roosts were unoccupied, supporting the view that many roost locations are only used at certain times.
- The number of birds per site and total number of birds counted were greater in the Gngalara area compared with the adjacent, extensively cleared and urbanized areas north of the Swan River.
- There was no statistically significant difference in the number Carnaby's Cockatoo at each roost location in 2006 compared with the 2010 GCC. However, the trend was towards there being fewer birds per roost in 2010. This was consistent with a decline in the total number of birds counted at these same locations.
- Decline in the number of birds at two roost locations since 2006 (R2 and DEC14) appears to be a direct result of pine removal.
- The GCC 2010 total count of 6,672 Carnaby's Cockatoos supports an estimated population of 8,000 to 10,000 birds for the Swan Coastal Plain and adjacent escarpment.
- A further three follow up Cocky Counts have been held, once a month, since the April 2010 GCC. The level of community support and the results to date, highlight the value of well structured community-based roost surveys for monitoring populations of Carnaby's Cockatoos.

Contents

Summary	2
Contents	3
Background	4
Aims	6
Methods	7
Locating roost sites	7
The roost count method	8
Count instructions:	9
Volunteer recruitment	10
Results	11
Location of roost sites	11
Carnaby's Cockatoo Roost surveys	15
Roost tree species	16
Estimated number of birds in northern Swan Coastal Plain and adjacent escarpment (within DEC Swan Region)	16
Distribution of birds across DEC Swan Region	17
Comparison with GCC 2006	20
Discussion	22
The Great Cocky Count	22
Regional and temporal variation	22
Comparison with the 2006 GCC	23
So how many Carnaby's Cockatoos visit the Swan Coastal Plain in DEC Swan Region?	24
Where to from here?	25
References	26
Table 1: Source of roost location data	13
Table 2: Search effort to locate new roost sites	13
Table 3: Carnaby's Cockatoo roost count summary	14
Table 4: Number of Carnaby's Cockatoos in different areas	19
Figure 1: Location of 222 potential and known roost sites in the DEC Swan Region	12
Figure 2: Five areas within the DEC Swan region	18
Figure 3: Comparison with the 16 roosts surveyed in 2006	21
Appendix 1: Great Cocky Count 2010 data sheet	28
Appendix 2: Media information	34
Appendix 3: Location details and counts	43
Appendix 4: Counts of Carnaby's Cockatoo at 10 roost locations	57

Background

The Carnaby's Cockatoo (*Calyptorhynchus latirostris*) is one of two species of white-tailed black cockatoo endemic to the south-west of Western Australia. Carnaby's Cockatoos were once numerous in Western Australia, however, since the late 1940s the species has suffered a predicted 30% contraction in range, a 50% decline in population and between 1968 and 1990 has disappeared from more than a third of its breeding range (Saunders 1990; Saunders and Ingram 1998). These declines have resulted in the Carnaby's Cockatoo being listed as '*rare or likely to become extinct*' under the Western Australian *Wildlife Conservation Act 1950* and it has been ranked as Endangered by the Western Australian Threatened Species Scientific Committee using IUCN (1994) Red List Categories and Criteria. The Carnaby's Cockatoo is also listed as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. In 2002 a recovery plan for the species was put in place by the Department of Conservation and Land Management (subsequently the Department of Environment and Conservation, DEC) (Cale 2003).

Carnaby's Cockatoos generally display a seasonal migratory pattern, whereby they are predominantly dispersed throughout the Avon Wheatbelt Bioregion during the breeding season (July to December, Saunders 1990) then shift to higher rainfall coastal areas where they form large flocks during the non-breeding season (December-July) (Saunders 1974, 1980, 1990; Berry 2008). More recently, breeding sites have been confirmed in coastal and near-coastal areas (DEC unpublished data) but it is unclear whether breeding on the coastal plain occurred historically or represents a shift in response to diminished habitat availability (as has been suggested by Shah, 2006).

The declining number of Carnaby's Cockatoos has been attributed primarily to the loss of habitat in the wheatbelt (Saunders 1980, 1990; Saunders and Ingram 1998). However, more recently the impact of increased clearing of the feeding areas on the Swan Coastal Plain has been recognized as being a significant factor (Finn *et al.* 2009; Berry and Owen 2010). The major food sources on the coastal plain are provided by coastal heath (particularly those with *Banksia sessilis*), *Banksia* woodland, eucalypt (Tuart and Marri) woodland and *Pinus pinaster* plantations (Saunders 1980).

It has been suggested that it is not only the food source on the Swan Coastal Plain that is of particular importance to Carnaby's Cockatoos but also their overnight roosting sites (Johnston *et al.* 2008). With the birds aggregated into large flocks during the non-breeding season they congregate in specific stands of trees to roost at night. Johnstone and Kirkby (2008) suggest that night roost sites for Carnaby's Cockatoos will be similar to those used by Baudin's black cockatoo (a close relative), and typically have tall, dense canopied trees, are close to water where the birds can drink and close to food trees such as banksias, bottlebrush and Marri (*Corymbia calophylla*). The roost trees are usually clumped and at larger roosts, cover an area of at least five hectares.

Despite the assumed decline in population numbers and the on-going threat posed by further clearing of remnant bushland for development and removal of large areas of pine plantation, little is known about the actual number and distribution of Carnaby's Cockatoos using the Swan Coastal Plain during the non-breeding season. Birds Australia organized a first Great Cockey Count in 2006, a community-based survey aimed at describing the pattern of Carnaby's Cockatoo abundance and providing a minimum population estimate of cockatoos on the Swan Coastal Plain (Shah 2006). An important insight from this 2006 survey was the value of counting birds at nocturnal roosts, as a means of monitoring population size.

The Carnaby's Cockatoo nocturnal roost project described in this report was designed as an extension to the baseline data provided by Shah (2006), with a view to comparing the two surveys. The full project involved a six-month review of roost locations in which existing knowledge of roost was gathered and new and potential roost sites were identified throughout the Greater Perth region, which corresponds to, and is hereafter referred to, as the DEC Swan Region (Figure 1).

On the night of the Great Cocky Count 2010 (GCC 2010), held on 7 April 2010, community volunteers were asked to count birds at as many roost sites as possible throughout the study area. A coordinated count at multiple nocturnal roost sites provides information on the numbers and distribution of Carnaby's Cockatoo that cannot be obtained by single roost counts at different nights.

Aims

Specifically, the aims of the Great Cocky Count 2010 survey were to:

- Locate roost sites being used by Carnaby's Cockatoos.
- Provide an estimate of the number of Carnaby's Cockatoos in the DEC Swan Region.
- Set up an on-going community based monitoring program to track changes in roost site utilization and Carnaby's Cockatoo population numbers.

Methods

Locating roost sites

In the six-months prior to the night of the GCC a significant effort was made to identify and confirm as many nocturnal roost sites as possible. This involved collecting existing knowledge of roost locations and new assessments by Birds Australia and DEC employees of potential roost areas suggested by land managers, members of the public and researchers. A project officer (Conservation Officer Mark Blythman) was employed by DEC and Birds Australia four days a week for four months prior to and two months after the GCC to undertake the project.

Searches for new roost sites by the GCC project officer prior to the GCC involved:

- Locating the birds in the late afternoon and following them to their roost site either by car or on foot (car is recommended). Once the birds appeared to have settled in their roost they were observed for at least 30 minutes after sunset as they will sometimes move to another roost after dark.
- Talking with local people was also helpful, particularly for finding out where the birds drink (e.g. horse stables) before they settled at a roost. Birds were then followed from the water point to their roost sites.
- Asking DEC field officers, Birds Australia members and scientists involved with birds for their observations of flocks of Carnaby's Cockatoo.

As suggested by Johnstone and Kirkby (2008), roost trees were often tall, thick canopied, exotic species located near a water source (including Blue Gum, Lemon Scented Gum or Pine), but also included tuart and marri. Observers were asked to record the tree type that the birds were roosting in, and given

the following choices; pine, eucalypt, marri, jarrah, tuart or other (Appendix 1).

The number of roost sites quoted in this report depends to some extent on the definition of a roost and it is possible that some of the larger roosts could in fact, be divided into smaller, distinct roost sites. An Edith Cowan University student, Megan Stalker is currently researching the question of what defines a Carnaby's Cockatoo roost on the Swan Coastal Plain.

The roost count method

Shah (2006) trialed three methods for calculating a population estimate for Carnaby's Cockatoos, they were area, nocturnal roost and transect surveys. Nocturnal roost surveys were considered most effective for monitoring population trends and estimating overall population size, as they minimize double counting and provide the added benefit of identifying highly significant habitat (Shah, 2006). The nocturnal roost survey method was also advocated by Johnstone and Kirby (2008) and is recognized internationally, as a method for monitoring population trends (Matuzak and Brightsmith 2007).

The roost count method used for the Great Cockey Count 2010 was adapted from the roost survey method originally developed by Johnstone and Kirkby (WA Museum, *pers. comm.*), and outlined in Shah (2006) and Berry (2008). As the Carnaby's Cockatoos fly into a night roost, they will often string across the sky, as pairs, triplets or single birds. The assumption in the Johnstone and Kirby method, is that a pair of birds represents an adult male and female, and a group of three birds (triplet) represents a male and female pair with a juvenile bird from the previous breeding season. As such, the proportion of triplets to pairs serves as an index of breeding success. While these proportions were recorded during the GCC 2010, their main value is for assessing trends from

year to year, so are beyond the scope of the current report and will be analysed at a later date. A copy of the data sheet is provided in Appendix 1.

Count instructions:

Volunteers were asked to:

- Visit the roost site before the night of the Great Cocky Count so as to familiarize themselves with its location, the layout of the roost, get an idea of how many birds to expect and the direction from which they are likely to arrive.
- Arrive on the night of the GCC at their allocated roost site at least half an hour before sunset so that the birds can be located (in case they have shifted to a nearby site).
- Count birds from half an hour before sunset until half an hour after sunset
- Preferably count flying birds as they approach the roost site (Counts of birds already in trees are generally unreliable).
- Where possible, use the technique of drawing an imaginary line across the sky and counting the number of birds as they cross the line.
- Where possible record the count of birds in each group, pairs and triplets as they cross the count line (for later analysis of population structure).
- For large flocks, consider estimating how big a group of 10 birds is and use this as a guide for estimating the size of the whole group (for example, if the group of 10 birds fits into the flock four times, there are 40 birds in the larger flock).
- Record the main roost tree type (pine, eucalypt, marri etc). This information was only included in the analysis if birds were actually seen in the recorded species/genera of roost trees.

Volunteer recruitment

In order to recruit enough volunteers to cover a large number of sites, significant publicity was required to engage volunteers and raise public awareness. This involved a media release being distributed to statewide and community newspapers, metropolitan radio and TV stations, as well as circulation of details through education and community groups (such as the various 'friends of' groups). The project was also advertised through the Birds Australia website:

(<http://www.birdsaustralia.com.au/homepage-news/taking-stock-of-the-cockies.html>). Birds Australia volunteers from the 2006 SCP survey were contacted personally, as well as other Perth based Birds Australia members. These activities generated at least ten local newspaper articles about the GCC, at least five radio interviews, a report on ABC News and the Channel Ten News (7th April). For details see Appendix 2.

The main process for recruiting and training volunteers was one-on-one phone conversations with people who expressed an interest in the project, describing the aims of the study and going through the survey procedure. The survey documentation was then sent to each participant as well as a map of the known roost locations in their area of interest. Using the map of roost locations as a guide, the volunteers were asked to 'adopt' a roost site, get to know it and carry out counts at this site.

Formal volunteer training sessions were held on three evenings prior to the GCC. To improve the quality of the count data, and for safety reasons, volunteers were encouraged to work with at least one other person. Also, there was usually more than one volunteer surveying a particular roost and they were encouraged to work together to make sure the roost site was properly covered.

The direction from where birds arrived or left the site was recorded. After the GCC, this information was used to identify situations where flocks may have

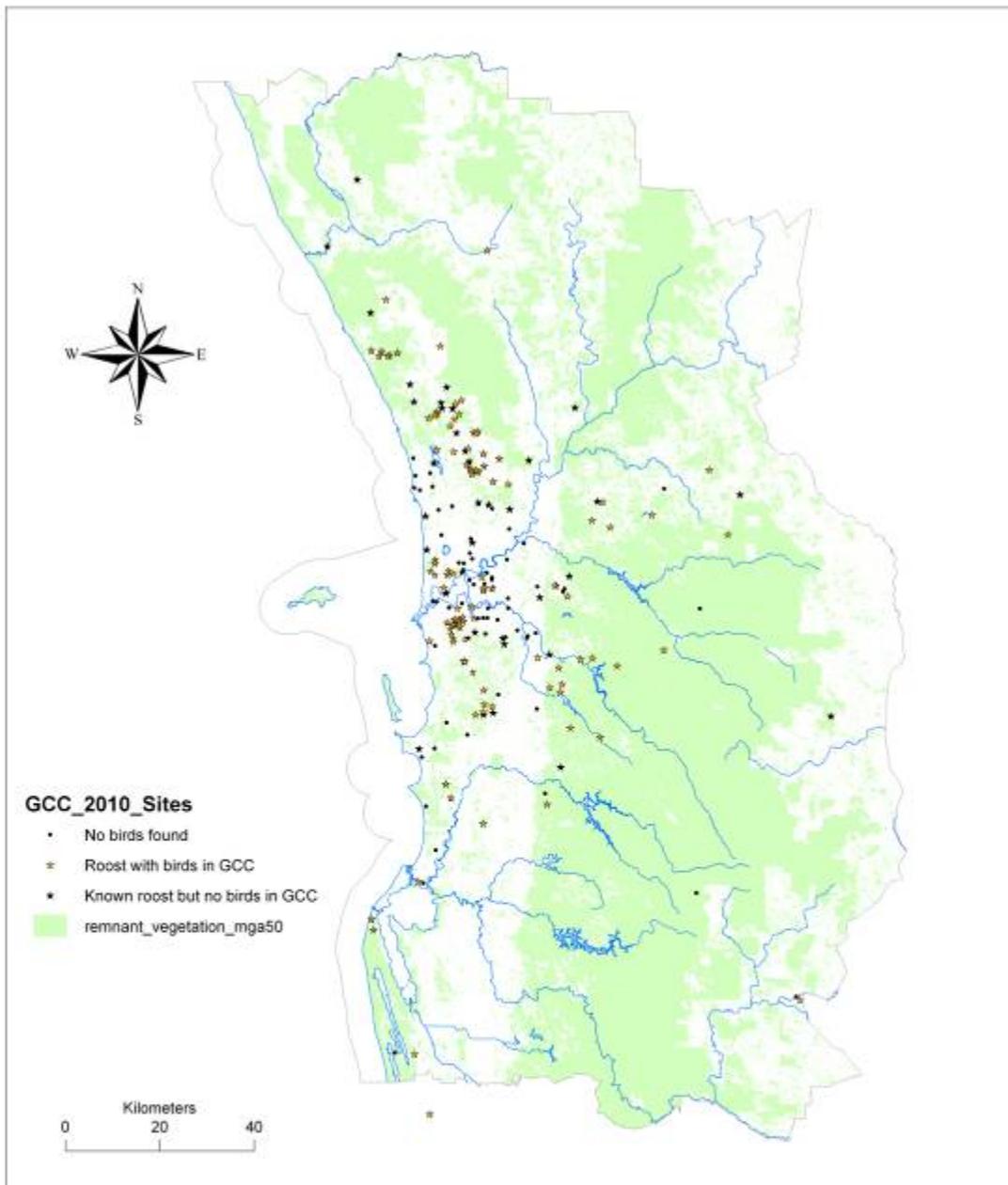
been double counted. An example was the Murdoch University roost, where at least five observers were present in a restricted location. While this was a well coordinated survey by experienced counters, a decision was made for the purposes of this report, to reduce the final Murdoch roost tally of 1,084 birds to 700.

Results

Location of roost sites

Six months prior to the 2010 GCC our knowledge of roost sites in Swan Region was based upon a variety of separate studies. Only 70 roost sites were identified through the collation of existing data sources (see Table 1).

Thanks to members of the public who suggested possible roost locations and subsequent field searches by Birds Australia and DEC employees, an additional 153 (potential) roosts were located in the lead up to the GCC. As an indication of the survey effort required to locate new roosts prior to the GCC, DEC Conservation Officer Mark Blythman spent 34 days searching for roosts, travelled 3,796km and located 20 new roosts (1 roost per 1.7 nights of searching). An average days search extended from afternoon into the night and covered approximately five hours, including two hrs driving to and from the search area (a summary of this search effort is provided in Table 2). Prior to the GCC, a total of 222 locations were identified as known roost or potential roost sites (Figure 1, Table 3 and Appendix 3). After the GCC, the number of known Carnaby's Cockatoo roosts in the DEC Swan Region had been increased from 70 to 129.



Contours shown at 10 metres intervals



Department of
Environment and Conservation
Our environment, our future



1388797

Projection: Universal Transverse Mercator
MGA Zone 50 Datum: GDA94



Produced under the Direction of
Kelian McNamara
Director General, Department of
Environment and Conservation

Produced at 10:47am, on February 18, 2010

The Dept. of Environment and Conservation does not guarantee that this map is without flaw of any kind and disclaims all liability for any errors, loss or other consequences which may arise from relying on any information depicted

Figure 1: Location of 222 potential and known roost sites in the DEC Swan Region. Circles identify sites that were surveyed but no birds were found, stars identify sites surveyed as part of the 2010 Great Cocky Count (yellow stars are site where birds were recorded and black stars are sites where no birds were recorded). For details of each site, see Appendix 3.

Table 1: Source of roost location data (includes potential roost sites)

Data source	Number of roosts confirmed	Source of roost location
Birds Australia Carnaby's Cockatoo Project database (literature, Shah 2006)	16	Literature and Existing database
WA Museum (Tony Kirkby and Ron Johnstone)	16	Existing database
Murdoch University (Dr Hugh Finn)	28	Existing database
Edith Cowan University (Professor Will Stock)	10	Existing database
New roosts identified during GCC	59	GCC 2010
Total number of confirmed roost sites	129	
Total number of confirmed and potential roost sites (not all surveyed as part of GCC)	222	

Table 2: Summary of DEC Officer, Mark Blythman's search effort to locate new roost sites prior to and during the GCC.

Area searched	Number of nights searched (average 3hrs per night)	Hours of search effort
South of Perth to Mandurah	13	39
South of Mandurah	6	18
East of Perth	5	15
North of Perth to Yanchep	3	9
North of Yanchep	7	21

Table 3: Carnaby's Cockatoo roost count summary for Great Cocky Count on 7th April 2010 (GCC).

	Number of sites
Total number of known or potential roost sites	222
Total number of known roosts in DEC Swan region at time of writing report	129
Number of sites surveyed during GCC	190
Number of known roosts surveyed during GCC	97
Number of known roosts with birds during GCC	50 (52% of 97 known roosts)
Average number of birds counted in known roost sites that had birds during GCC	165 ± 26 (± SE, n = 50 known roost sites with birds)
Total number of birds recorded across 97 known roosts during GCC	8,231
Number of birds recorded across 25 Perth Hills sites (assume 20%, 390 birds, were Carnaby's Cockatoo)	1,949
Estimated number of birds in DEC Swan region (8,231 – 1,949 + 390)	6,672

Carnaby's Cockatoo Roost surveys

Of the 222 known and potential roost locations, 190 were surveyed at the same time on the evening of 7th April 2010 for the Great Cocky Count, by an estimated 350 volunteers (Table 3 and Appendix 3). The remaining 32 sites were not visited due in part to their isolation and/or difficulty for access by volunteers. By including potential, speculative roost locations in the GCC, the chance of missing a roost site was reduced. For example, parts of the Perth metropolitan region with no previously recorded roosts were well surveyed during the GCC, giving strength to the conclusion that roosting Carnaby's Cockatoos were uncommon in these specific areas. As a consequence of having so many speculative sites, only 50 sites (26% of the 190 roosts surveyed) had birds present during the GCC, the rest of the sites had no birds recorded on the evening of April 7th. Many of these remain unconfirmed roosts or appear not to be Carnaby's Cockatoo roost sites.

Of the 97 sites that were known to be roost sites for Carnaby's Cockatoos prior to the GCC, only 52% had birds present on the night, suggesting that on any given evening, only half of all known roosts will be occupied. The average number of birds recorded during the GCC, in the known roosts that had birds (roosts with zero counts excluded) was 165 ± 26 . For a summary of the survey statistics, see Table 3 and for the actual site counts, see Appendix 3.

Roost tree species

The tree species that birds were seen roosting in on the evening of the GCC was recorded by observers at 29 sites. Of these 11 roosts were in pine trees (38%), 10 were in 'eucalypt roosts' (35%, this category would have included jarrah, marri and tuart), four were in jarrah roosts (14%), two were in marri roosts (7%), two were in tuart roosts (7%). A greater number of birds were recorded in pine roosts (see Appendix 3 for roost details). Note that the tree species of all roosts was not recorded. Future surveys and assessments can be made of roost sites to provide more information on the tree species used.

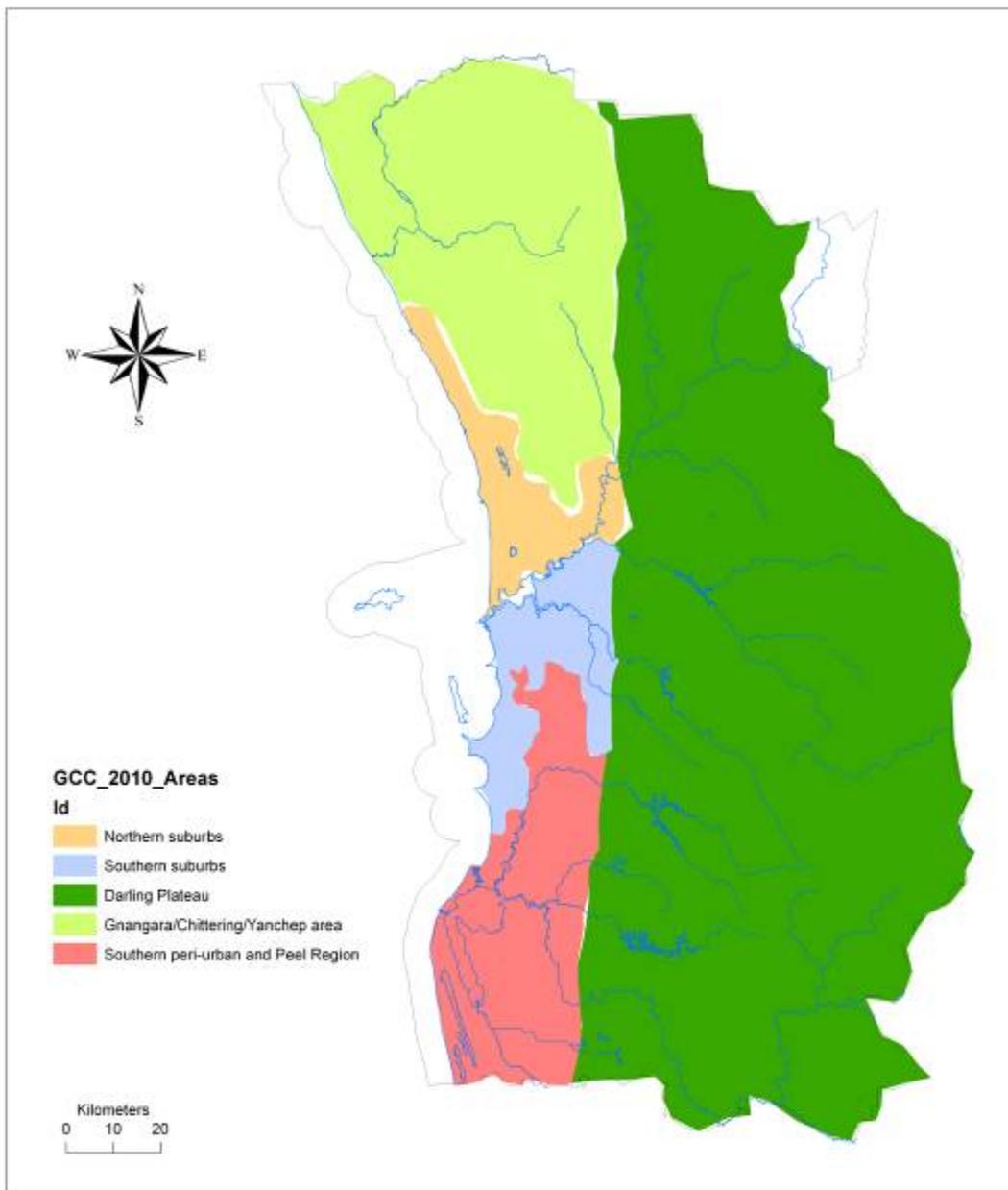
Estimated number of birds in northern Swan Coastal Plain and adjacent escarpment (within DEC Swan Region)

The total number of black-cockatoos counted on the evening of the GCC was 8,231 (Table 1 and Appendix 1). This number is not representative of the total number of Carnaby's Cockatoos within the DEC Swan Region because 1,949 of these birds were recorded from roost sites on the Darling Scarp and plateau (hereafter referred to as Darling plateau, Figure 2), which is a region known to contain mixed flocks of Carnaby's and Baudin's black-cockatoos. To account for the certain presence of mixed flocks, only 20% of the birds recorded from the 38 Darling plateau sites were assumed to be Carnaby's Cockatoos (see Appendix 1 for Darling plateau sites). The application of a 20% estimate of the proportion of Carnaby's Cockatoos within the scarp populations is based on previous surveys and expert advice from Tony Kirkby and Ron Johnston of the Western Australian Museum. Using this correction factor, the total number of black-cockatoos recorded on the Darling plateau (1,949 birds) represented 1,559 Baudin's black-cockatoos and 390 Carnaby's Cockatoos, thus reducing the total estimate of Carnaby's Cockatoos in the DEC Swan Region to 6,672 birds. Roost

locations for Red-tailed black cockatoo (*Calyptorhynchus banksii naso*) were also reported and while not analysed here, have been added to the DEC fauna database.

Distribution of birds across DEC Swan Region

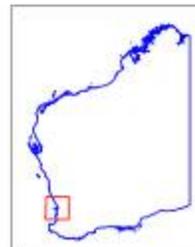
The DEC Swan Region was divided into two Bioregions with five sub-areas: The Jarra Forest bioregion (1. Darling Plateau), and the Swan Coastal bioregion with four sub areas; 2. Gnangara/Chittering/Yanchep area (northern SCP), 3. Northern suburbs, 3. Southern suburbs and 5. Southern peri-urban and Peel Region (Figure 2, see Appendix 3 for roosts in each region). The total number of birds tended to be lower in the northern urban areas, compared with the Gnangara/Chittering/Yanchep area to the northeast and the suburban areas south of the Swan River (Table 4). The average number of birds per site showed a similar trend, being lower in the extensively cleared and urbanized areas north and south of the Swan River (roosts with no birds excluded). Note, however, that large counts did occur in suburban locations both north and south of the river. Note also, that the figure for Darling plateau follows the 20% correction for the presence of Baudin's black-cockatoos.



© All rights reserved. All 10 years data information.



**Department of
Environment and Conservation**
Our environment, our future



Produced under the Direction of
Kerion McNamee
Director General, Department of
Environment and Conservation
Produced at 50/7am, on February 18, 2015

1388.516

Projection: Universal Transverse Mercator
MOA Zone 50 (Dubai, GDMS)

The Dept. of Environment and Conservation does not guarantee that this map is without error of any kind and disclaims liability for any error, loss or other consequence which may arise from relying on any information depicted.

Figure 2: Five areas within the DEC Swan region: 1. Darling Plateau, 2. Gngangara/Chittering/Yanchep area (northern SCP), 3. Northern suburbs, 4. Southern suburbs and 5. Southern peri-urban and Peel Region. For details of counts within each area, see Table 4.

Table 4: Number of Carnaby's Cockatoos in different areas within the DEC Swan region.

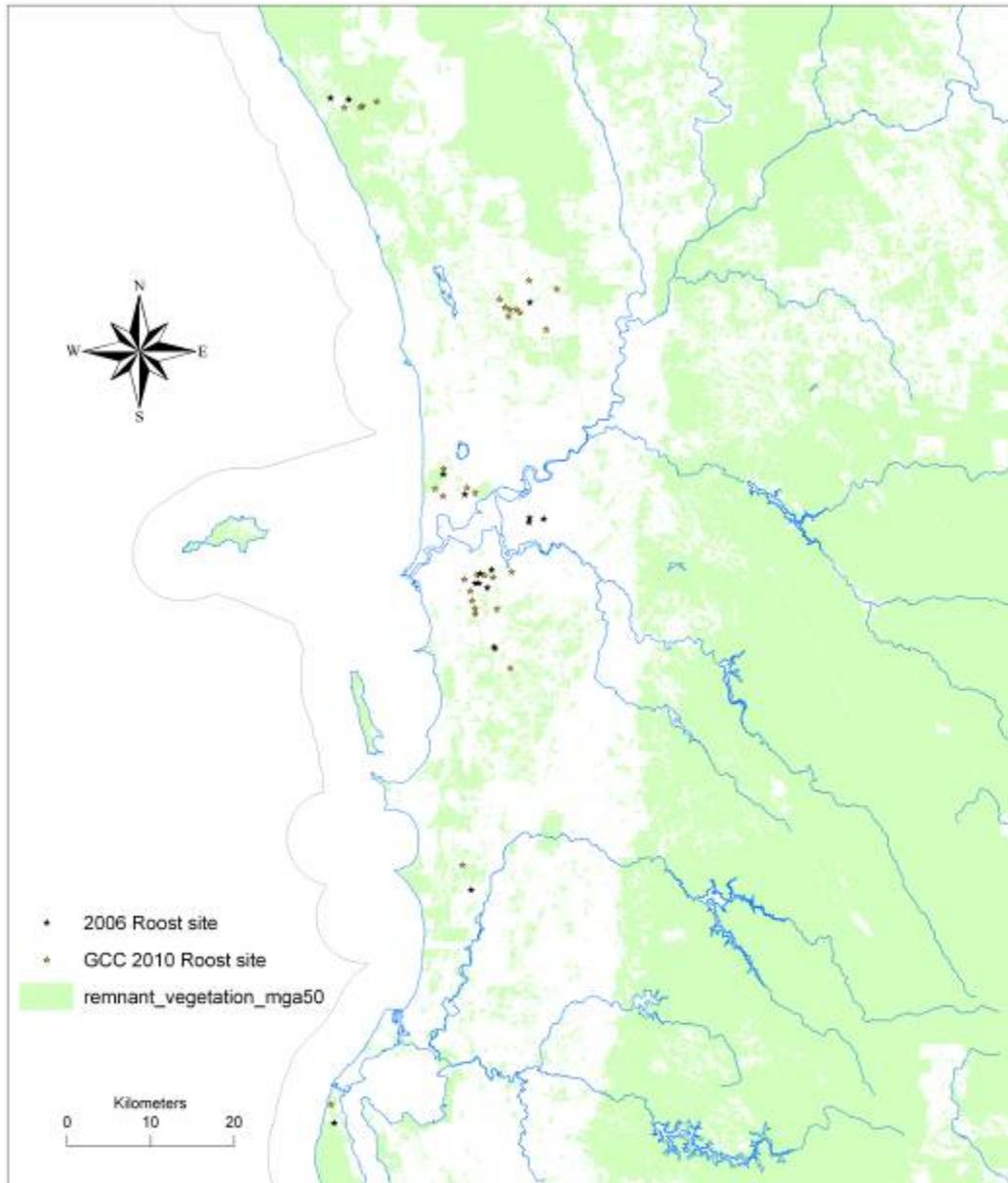
Area within DEC Swan Region	No Roosts	No roosts with birds (GCC)	No. Carnaby's Cockatoos counted	Carnaby's Cockatoos per site (\pm SE) Zero counts excluded	Highest count at a given site
Darling Plateau (estimated 20% are Carnaby's Cockatoos)	20	15	390 20% of 1,949)	26 (\pm 7)	89 (20% of 443)
Gnangara/Chittering/Yanchep (far north)	33	10	2,437	244 (\pm 61)	542
Northern suburbs	14	6	1,080	180 (\pm 89)	604
Southern suburbs	19	11	2,245	204 (\pm 70)	700
Southern peri-urban and Peel Region (far south)	11	8	520	65 (\pm 23)	167
Total	97	50	6,672	-	-

Comparison with GCC 2006

A comparison between the roost sites surveyed in both the 2006 and 2010 Great Cockey Counts provides an insight in to the possibility of using roost counts to monitor population trends over time (Appendix 4). It must be stated however, that this comparison is confounded by the slightly different survey methods used in 2006 (Shah 2006). The exact dimensions of a Carnaby's Cockatoo nocturnal roost site shifts over time, both within season and between seasons (Barrett, unpublished data) and so, for each of the 16 roost sites reported in Shah (2006), we have determined that counting occurred at what would be considered multiple roost sites in 2010.

The 16 roosts surveyed in 2006 were amalgamated into 10 roost locations and compared with 50 roost sites surveyed during the 2010 GCC. These 50 roosts all occurred within four km of the ten amalgamated roost locations (see Figure 3 and Appendix 4 for details of comparison). As a consequence, our analysis is deliberately conservative, reducing the possibility of finding a decline where no decline in numbers actually occurred. The total number of birds recorded across the 50 roost sites surveyed in 2010 was 3,184 (Appendix 4), which compared with 5,000 birds counted across the 16 roosts in 2006 (revised to 4,510 birds by Shah, 2006). Comparing these two figures (4,510 in 2006 and 3,184 in 2010), we have a 29% decline in overall population count for these 10 roost locations.

There was no statistically significant difference in the average number of Carnaby's Cockatoos across the 10 paired roost locations in 2006 compared with 2010 (Chi -Square = 0.006, $p=0.9$, d.f.=9). There was, however, a trend towards there being fewer birds per roost site in 2010 (318 ± 74 compared with 500 ± 226 in 2006), a 36% difference.



MapScale sheet A120: roosts & roosts



Department of
Environment and Conservation
Our environment, our future



1:219,436

Projection: Universal Transverse Mercator
MGA Zone 50, Datum: GDA94



Produced under the Direction of
Kenan Mohammadi
Director General, Department of
Environment and Conservation

Printed at 10:47am, on February 12, 2010

The Dept. of Environment and Conservation does not guarantee that this map is without error of any kind and disclaims all liability for any error, loss or other consequence which may arise from relying on any information depicted.

Figure 3: Location of the 10 sites used for comparison with the 16 roosts surveyed in 2006 (50 roosts surveyed as part of the GCC 2010, see Appendix 4 for details about which sites were combined for comparison).

Discussion

The Great Cocky Count

The nocturnal roost survey, including the Great Cocky Count 2010, carried out in partnership between DEC and Birds Australia has been a success, with 222 known and potential roost sites identified, 190 sites surveyed in a single night by 350 volunteers, and the number of known roosts in the DEC Swan Region increased from 70 to 129 (an 85% increase) due directly to this project. The extensive search effort by DEC prior to the GCC, with priority given to the areas south of the Swan River (Table 2), meant that potential roost sites could be identified and surveyed. As a consequence, we can be confident that most large metropolitan roosts were included. Unfortunately, we can not be so confident about having covered the extensively forested areas on the Darling escarpment and Jarrah Forest bioregion. Undetected roosts are likely to occur in the extensive pine plantations and banksia woodlands to the north (Gnangara) and south (e.g. Baldivis) of the Swan Coastal Plain bioregion, or parts of the northern SCP, particularly North and East of Yanchep.

Regional and temporal variation

The observation that approximately half of the previously confirmed roost sites were unoccupied on the night of the April 7th GCC (Table 3), supports the view that many roost locations are transitional in nature and the number of birds using them will vary from day to day (Berry 2008; Finn *et al.* 2009; Berry and Owen 2010). There was also geographical variation in the number of birds counted across the DEC Swan Region. The size of the roosting flocks as well as the total count of Carnaby's Cockatoos tended to be larger in the Gnangara/Chittering/Yanchep area compared with the adjacent northern suburbs (Table 4, Figure 2). This supports the view that habitat fragmentation

through urbanization is a significant barrier to Carnaby's Cockatoos (Shah, 2006; Finn, Stock and Valentine, 2009). Notwithstanding this, it should be noted that some large roosts (up to 700 birds) were recorded in suburban areas, both north and south of the Swan River (Table 4), these were associated with relatively large areas of pines retained after conversion of pine plantation to other land uses (for example at Murdoch and Kensington).

Comparison with the 2006 GCC

While there was no statistically significant difference in the average number of Carnaby's Cockatoos at each roost location in 2006 compared with the 2010, for the current analysis of ten amalgamated roost locations (Figure 3), the 2010 GCC average number of birds per roost site was 36% lower than in 2006. This trend may be an artifact of the difference in sampling methods and/or normal variation in day to day roost utilization by birds. The number of birds recorded at site R2 during the 2006 GCC was 2,489, compared with 527 birds counted across the 11 sites in the same area in 2010 (Appendix 4). If R2 is excluded from the comparison, the average number of Carnaby's Cockatoos per site is similar between 2006 and 2010. However, Shah (2006) also recorded the number of birds roosting at R2 across nine other evenings in late April/early May 2006 and recorded as many as 825 on a single day. Whether the count of 2,489 birds at R2 on the evening of the 29th April for the 2006 Great Cocky Count was an anomaly or not, it is clear that this particular site has in the past supported large numbers of birds.

When the 2010 count was conducted, no birds were recorded at the specific R2 location (Appendix 3). The extensive area of pine plantation at site R2 had been reduced to a small, isolated stand, which appears to no longer provide sufficient roosting habitat for Carnaby's Cockatoos. It is also worth noting that the count at Baldivis (DEC14) was reduced by over one-third (574 compared with 346 at the nearby R12, Appendix 4, site DEC 14). The Baldivis site is

similar to site R2 in that much of the pine plantation in the area had been cleared between 2006 and 2010. Less than a month after the 2010 GCC, many of the remaining pines were removed, with the count at the DEC14 roost falling to zero birds in July 2010 (DEC data).

So how many Carnaby's Cockatoos visit the Swan Coastal Plain in DEC Swan Region?

Assuming that we will have missed some roosting birds during the 2010 GCC, our count of 6,672 birds generally supports an estimated population of 8,000 to 10,000 birds for the Swan Coastal Plain and adjacent escarpment, in the DEC Swan Region (noting that our count has been reduced from 8,231 to account for probable mixed flocks of Carnaby's and Baudin's black-cockatoos in the Darling plateau). This is greater than the 4,510 birds estimated for the northern Swan Coastal Plain (SCP) by Shah (2006) and greater than the estimate of fewer than 10,000 birds on whole SCP (assuming about half of the birds would occur in the DEC Swan Region) by Mawson and Johnstone (1997). At the other end of the scale, twenty five years ago, Saunders *et al.* (1985) estimated a total population of 40,000 to 60,000 birds across the range of the species (it is reasonable to expect that at least 10,000 to 15,000 of these birds would visit the DEC Swan Region). Consistent with this upper estimate is the Birds Australia (Goldberg *et al.* 2010) estimate of 4,600 to 15,000 in the northern SCP Important Bird Area, and Johnstone *et al.* (2008) who estimate that between 10,000 to 15,000 birds occur on the SCP, with the majority from Perth to Lancelin. A recent estimate of around 7,000 birds for the DEC Swan Region is based on a count of 4,500 birds for the Gnangara area, combined with the observation that twice as many birds occur in the Gnangara area compared with the northern Perth metropolitan areas (Finn pers comm.). This observation is consistent with our 2010 GCC data, which found 2,437 birds in the Gnangara area, compared with a total of 1,080 birds in the Perth metro areas to the north the Swan River (Table 4).

Where to from here?

The comparison between the 2006 and 2010 Great Cockey Counts highlight the importance of long-term monitoring for tracking population changes over time and relating these changes to changes in habitat. Comparisons of single surveys as done here, are unlikely to be as useful as analysis of multiple surveys held within seasons and between years to provide an indication of variation and to better distinguish trends from sample variation.

The volunteers have shown an ongoing commitment to further counts, with a further three coordinated Cockey Counts undertaken since the April 2010 GCC (once a month from May to August 2010). These repeat surveys have occurred in around 40 sites, using the method of Berry (2008), allowing the proportion of single birds, pairs and triplets (two adult birds and their juvenile offspring) to be estimated as an index of reproductive success. The results of these surveys will be analysed and reported at a later date.

The positive volunteer response and the results from the GCC, highlight the value of well structured community-based surveys for assisting with the conservation of rare species.

References

- Berry, P.F. (2008). Counts of Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) and Records of Flock Composition at an Overnight Roosting Site in Metropolitan Perth. *Western Australian Naturalist* 26, 1-11.
- Berry, P.F. and Owen, M. (2010). Additional Counts and Records of Flock Composition of Carnaby's Cockatoo (*Calyptorhynchus latirostris*) at Two Overnight Roosting Sites in Metropolitan Perth. *Western Australian Naturalist* 27, 27-38.
- Cale, B., 2003. Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*) Recovery Plan (2002-2012). Report for the Carnaby's Black-Cockatoo Recovery Team, by the Department of Conservation and Land Management, Wanneroo, WA 6946.
- Finn, H., Stock, W. and Valentine, L. (2009). Pines and the Ecology of Carnaby's Black-Cockatoos (*Calyptorhynchus latirostris*) in the Gnangara Sustainability Strategy Study Area.
- Goldberg, J., Bleby, K., Mawson, P., 2010. Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*) Recovery Plan 2010 - 2019. WA Department of Environment and Conservation, Bentley, WA.
- Johnstone, R.E., Johnstone, C., Kirkby, T., 2008. Carnaby's Cockatoo (*Calyptorhynchus latirostris*) on the northern Swan Coastal Plain (Lancelin - Perth) CARNABY'S COCKATOO (*CALYPTORHYNCHUS LATIROSTRIS*) Western Australia. WA Museum.
- Johnstone, R.E., Kirkby, T., 2008. Distribution, status, social organisation, movements and conservation of Baudin's Cockatoo (*Calyptorhynchus baudinii*) in South-west Western Australia. *Records of the Western Australian Museum* 25, 107-118.
- Mawson, P. and Johnstone, R. (1997). Conservation status of parrots and cockatoos in Western Australia. *Eclectus*, 3: 21-23.
- Matuzak, G.D., Brightsmith, D.J., 2007. Roosting of Yellow-naped Parrots in Costa Rica: estimating the size and recruitment of threatened populations. *Journal of Field Ornithology* 78, 159-169.

- Saunders, D.A. (1974). Subspeciation in the White-tailed Black Cockatoo, *Calyptorhynchus baudinii*, in Western Australia. *Australian Wildlife Research*, 1, 55-69.
- Saunders, D.A. (1980). Food and Movements of the Short-billed Form of the White-tailed Black Cockatoo. *Wildlife Research* 7, 257-269.
- Saunders, D.A., Rowley, I., Smith, G.T., 1985. The effects of clearing for agriculture on the distribution of cockatoos in the southwest of Western Australia, In *Birds of eucalypt forests and woodlands: Ecology, Conservation, Management*. eds A. Keast, H.F. Recher, H. Ford, D. Saunders, pp. 309-321. Royal Australasian Ornithologists Union and Surrey Beatty: Sydney.
- Saunders, D.A. (1990). Problems of Survival in an Extensively Cultivated Landscape: the case of Carnaby's Cockatoo *Calyptorhynchus funereus latirostris*. *Biological Conservation* 54, 277-290.
- Saunders, D.A. and Ingram, J.A. (1998). Twenty-eight Years of Monitoring a Breeding Population of Carnaby's Cockatoo. *Pacific Conserv. Biol.* 4, 261-270.
- Shah, B. (2006). Conservation of Carnaby's Black-Cockatoo on the Swan Coastal Plain, Western Australia.

**Appendix 1: Great Cockey Count 2010 data sheet
and volunteer information**

The Great Cocky Count: Carnaby's Black-Cockatoo counts at overnight roosts

3 Steps to doing a roost count:

- 1) Arrive at your allocated roost site at least half an hour before sunset so that you can locate the birds.
- 2) Count birds until half an hour after sunset (around 6.40pm on the 7th April 2010)
 - Only count flying birds as they approach the roost site. (Counts of birds already in trees are generally unreliable)
 - A useful technique is to draw an imaginary line across the sky and count the number of birds as they cross the line.
 - For large groups, estimate how big a group of 10 birds is and then use this as a guide to estimating the size of the whole group. For example, if the group of 10 birds fits into the flock four times, there are 40 birds in the larger flock.
- 3) Please send completed forms to Geoff Barrett or Quinton Burnham (see details on back of sheet)

Equipment: survey sheet/s, something to sit on, a pen, TORCH, BINOCULARS, water, insect repellent, compass, watch, GPS (if you have one), map.

Name of observer(s):	Tel:	Email:
-----------------------------	-------------	---------------

Site name: _____

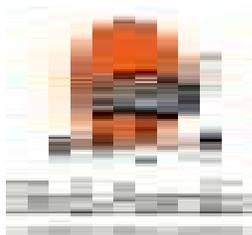
Address (describe location): _____

GPS location, either UTM (Universal Transverse Metric) or Latitude/ longitude:

UTM Easting (7 digits, e.g. 0384667)	UTM Northing (7 digits, e.g. 6409605)	Accuracy (m)	Latitude (e.g 32° 26' 52'')	Longitude (e.g. 115° 46' 10'')	Accuracy (m)
			Deg Min Sec	Deg Min Sec	

What is the main tree type that the birds are roosting in (tick box):

Pine Eucalypt Marri Jarrah Tuart Other _____



Department of
Environment and Conservation



--

The Great Cocky Count: Carnaby's Black-Cockatoo counts at overnight roosts

3 Steps to doing a roost count:

- 1) Arrive at your allocated roost site at least half an hour before sunset so that you can locate the birds (before 5.30pm on the 7th April 2010).
- 2) Count birds until half an hour after sunset (around 6.40pm on the 7th April 2010)
 - Only count flying birds as they approach the roost site. (Counts of birds already in trees are generally unreliable)
 - A useful technique is to draw an imaginary line across the sky and count the number of birds as they cross the line.
 - For large groups, estimate how big a group of 10 birds is and then use this as a guide to estimating the size of the whole group. For example, if the group of 10 birds fits into the flock four times, there are 40 birds in the larger flock.
- 3) Please send completed forms to Geoff Barrett or Quinton Burnham (see details on back of sheet)

Equipment: survey sheet/s, something to sit on, a pen, TORCH, BINOCULARS, water, insect repellent, compass, watch, GPS (if you have one), map.

Name of observer(s): <i>Geoff Barrett</i>	Tel: <i>9423 2907</i>	Email: <i>geoff.barrett@dec.wa.gov.au</i>
--	--------------------------	--

Site name: *Collier Golf Course* Address (describe location): *cnr Hayman Rd & Kent St Bentley*

GPS location, either UTM (Universal Transverse Metric) or Latitude/ longitude:

UTM Easting (7 digits, e.g. 0384667)	UTM Northing (7 digits, e.g. 6409605)	Accuracy (m)	Latitude (e.g. 32° 26' 52'')	Longitude (e.g. 115° 46' 10'')	Accuracy (m)
			Deg 31 Min 59 Sec 38	Deg 115 Min 53 Sec 86	5

What is the main tree type that the birds are roosting in (tick box):

Pine Eucalypt Marri Jarrah Tuart Other _____

(All tall pine trees)



Department of
Environment and Conservation



Date: <u>25/2/10</u> Time start: <u>18:35</u> Time finish: <u>19:30</u> Roost code (if known): <u>R4</u>	
You may wish to tally birds as they fly over imaginary line across the sky (for example 2,2,2,3,2,17,2,24, 2,3,3,1, ...)	Sub totals
50, 60, 70, 2, 3, 2, 15, 45, 50, 52,	
1, 2, 2, 3, 1, 40, 70	
<i>Example Data</i>	
Total number of birds at roost:	423

Direction from which birds arrived: <input type="checkbox"/> North <input type="checkbox"/> South <input type="checkbox"/> East <input type="checkbox"/> West Other (e.g. SW): <u>SW</u>
Comments: <u>most birds moved to north side of Hayman Rd</u> <u>after dark.</u>

Please send completed forms to:

Geoff Barrett, PO Box 116, Bentley Delivery Centre, Bentley WA 6983,
by email (geoff.barrett@dec.wa.gov.au), phone (9423 2907).

Alternatively, send forms to:
Quinton Burnham, by email (q.burnham@ecu.edu.au) phone (042 876 2292)

Please note our safety advice for volunteers taking part in the surveys:

- We wish to remind you that you are responsible for your own safety while taking part in the Cockatoo surveys.
- Always let someone know when you are going and when you expect to return.
- Wear sturdy, enclosed shoes or walking boots, protective clothing and be prepared for adverse conditions. Carry sufficient food and water.
- You must be fully capable of physical mobility and moderately physically fit to participate in these surveys.
- If children are present, they must be supervised by an adult.
- Avoid working under the tree canopy where you are at risk of falling branches and pine cones.
- Survey in groups of at least two people to maximize safety and improve the validity of the survey results.

The Great Cocky Count: Carnaby's Black-Cockatoo counts at overnight roosts

7th April 2010
(5.30pm to 6.30pm)

Dear Sir or Madam,

Thank you for helping us with our Carnaby's Cockatoo roost surveys. With a 50% decline in numbers and significant range contractions over the last 40 years, this fine bird is now recognised as threatened under both commonwealth and State legislation. Habitat clearing is the main concern but other factors such as competition with pest species and road-strike are also to blame. The last Birds Australia Great Cocky Count in 2006 suggested that over 4,500 birds visit the Perth region and more importantly, identified night roost sites as a key habitat resource.

During the summer and autumn months (January to July) when the birds are on the Swan Coastal Plain, they congregate each evening to drink, feed, have a good chat and spend the night. These night roosts tend to be in large trees, high in the landscape and close to water and a food source.

We would like you to get to know your Carnaby's Cockatoo roost, visit it for a couple of evenings before the Great Cocky Count on the 7th April and estimate the total number of birds flying into the site. Arrive at least half an hour before sunset. Work out where the birds usually come from, where they drink and feed, and the best point at which to estimate their numbers as they fly across the open sky.

Please find enclosed:

- 1) four blank data sheets (for recording the number of birds at the roost)
- 2) an example data sheet
- 3) a return address envelope for you to send your counts back to us.

If there are no birds at your roost we still want to know this, so please send in a zero count. If you see cockatoos fly past your roost (on their way to another roost site), record the direction of flight, the number of birds and note that the birds did not stay at your roost. If you want help with your roost count please get in touch, there are training sessions and we may even be able to visit your roost.

Yours sincerely

Dr Geoff Barrett
Regional Ecologist
DEC Swan Region

Email: geoff.barrett@dec.wa.gov.au
Ph 9423 2907



Department of
Environment and Conservation



Appendix 2: Media information and newsletter



THE CARNABY CALL

January 2010

Howdy All,

We are officially up and running with the 2010 Carnaby's Black-Cockatoo roost surveys! In January alone we managed to add eight potential new roosts and have had 15 new people indicate that they would like to have some involvement with the project - a fantastic result!

During January we had an afternoon tea at the BAWA office (Peregrine House) and the volunteers that attended received new Birds Australia volunteer polo shirts. Those volunteers who couldn't attend or have just come on board can collect one from the BAWA office, or if you let me know your size and colour preference, I will bring them to you.

Thank you to those people that have begun sending me their data sheets, to those of you that are just starting please email or post them to me at your earliest convenience so I can get them in to the database. Please don't forget that even if you do a survey but see no birds send me through that information, as it is important for us to know.

For those volunteers that are monitoring multiple roosts within an area I would be very interested to get your opinion on whether you think it is a single flock using different roosts or if you think it is different birds. Feel free to contact me with any comments/observations/questions that you have as they all contribute to our understanding and the future of these birds.

Quinton Burnham

(e) q.burnham@ecu.edu.au (m) 0428 762 292



Department of
Environment and Conservation



Media Statement

10 March 2010

Draft

Volunteers needed for 2010 Great Cocky Count

Volunteers are being called for to help count Carnaby's Black-cockatoos (*Calyptorhynchus latirostris*) in the Greater Perth region on Wednesday 7 April 2010.

The survey, organised by the Department of Environment and Conservation in conjunction with Birds Australia's Carnaby's Black-Cockatoo Recovery Project, aims to determine the population of this threatened species in the Greater Perth region from Moore River in the north, east to York and south to Yalgorup. The survey will help determine whether the population has declined or increased since the last survey in 2006.

DEC Swan Region Ecologist Geoff Barrett said that more than 1000 volunteers participated in Birds Australia's 2006 survey, which found that there were at least 4,500 birds of this species on the Swan Coastal Plain at that time.

"Subsequent estimates suggest as many as 10,000 birds may visit Perth after spending the winter and spring months in the Wheatbelt, where they breed," he said. "The 2006 survey also found that the best way to count Carnaby's Black-cockatoos was as they returned to their roost sites each evening."

Mr Barrett said the current project, funded by the WA State NRM aims to repeat the 2006 survey by counting birds at their night roost sites.

"Carnaby's Black-Cockatoo's are large black-cockatoos with white tails and their silhouettes can be seen spread across the sky as they return to their roosts just before sunset. This is the best time to count them and we would like to hear from people who may be able to help us with this exciting project."

"Roosts tend to be in tall trees, often pines, high in the landscape and close to food trees such as banksias and water where they can drink. Being social animals they call to each other as they arrive with their distinctive 'weeyou' call.

"A group of three birds is usually two adults with a single young bird from the most recent breeding season and by estimating the number of singles, pairs and triplets at a

roost, we can monitor breeding success. Surveys to date suggest that 30 to 40 per cent of roosting birds are family groups.”

Mr Barrett said the aim was to repeat the ‘Great Cocky Count’ of 2006 where as many people as possible count their cockatoos on the same evening, giving an estimate of the total number of birds in the Greater Perth Region.

“The 2010 ‘Great Cocky Count’ is scheduled for the evening of Wednesday 7 April, so mark this date in your diaries. It will involve getting to the roost half an hour before sunset, around 5.30pm, and counting the number of birds flying into the roost until about half an hour after sunset,” he said.

”While most breeding occurs in the Wheatbelt, low levels of breeding have been noted throughout the jarrah and marri forest along the Darling Range escarpment and some places on the Swan Coastal Plain.

Carnaby’s Black-Cockatoo recovery Project Manager, Raana Scott said “because the cockatoos congregate in large flocks, many falsely believe that the species are not under threat. “

Carnaby’s Black-cockatoos are endemic to southwestern Australia and it is estimated that only 40,000 currently exist with the population spread over only one third the range that existed 50 year ago.

“The cockatoos feed on road verges and road strike is an increasing problem, however the biggest threat to the species is loss of habitat across their range.” Ms Scott said.

As of 2007, an estimated 60 per cent of native vegetation had been cleared on the Swan Coastal Plain with nine per cent of this reserved in formal conservation estate. It has been estimated that 54 per cent of potential Carnaby’s Black-cockatoo habitat has been lost from the Swan Coastal Plain. If roost trees and feeding habitat continue to be lost, survival of these iconic birds into the future is uncertain.

If you can help us count birds at your local roost, or simply tell us where a Black cockatoo roost site is, please contact Geoff Barrett from the WA Department of Environment and Conservation (ph 9423 2907, geoff.barrett@dec.wa.gov.au) or Quinton Burnham from Birds Australia (ph 042 876 2292, q.burnham@ecu.edu.au)

Media contact: DEC Media 6467 5555

Date	Example Great Cocky Count media activities
18/03/2010	Great Cocky Count Media Statement sent to It was sent to The West Australian, Sunday Times, all community newspapers, metro radio and TV stations. Mitzi Vance from DEC media was the contact
18/03/2010	Radio interview with Barry Nichols from ABC Radio (Drive Time), spoke about Great Cocky Count, ABC Regional Radio
22/03/2010	Radio interview about Carnaby's Cockatoo Cockatoos, (pre-record) for airing on Wednesday 24 th March (92.1 fm, Understorey broadcast 11.30am on Wednesdays)
24/03/2010	Volunteer training session for Carnaby's roost counts at Bentley (5 people attended)
4/04/2010	At least 10 local newspaper articles about the GCC, at least 5 radio interviews, report on ABC News and Channel Ten News (April 7th)
6/04/2010	Organised and spoke at Great Cocky Count Launch at Black Cockatoo Rehabilitation Centre in Martin. Those present included City of Gosnells Mayor Mayor Olwen Searle, Birds Australia WA Group Chair Bruce Haynes, the Member for East Metropolitan Region, the Hon. Helen Morton, Glen Dewhurst from the rehabilitation centre, media representatives and volunteers (50 people all up)
7/04/2010	Discussed Carnaby's Roost surveys with at least 30 people via one-on-one phone calls
7/04/2010	Great Cocky Count Launch with the Honourable Donna Faragher, Minister for Environment; Youth Minister, at Kings Park
10/04/2010	GCC article in Post Newspaper - Margaret Owen
13/04/2010	Article in Stirling Times (13/4/10) about Carnaby's Roost surveys
20/04/2010	GCC Launch article in Environment and Conservation News Issue 8/10
28/04/2010	A brief article about the Great Cocky Count to publish in the Dec Science newsletter WHATSNU
21/05/2010	Provided Carnaby's count data from April 2010 Great Cocky Count to Emma O'Leary, DEC Media Relations
21/05/2010	Chanel 10 News interview about Carnaby's Cockatoo roost survey
21/05/2010	Media release of results from Great Cocky Count
27/05/2010	Interview about Great Cocky Count with ABC Journalist Sharon Hunt
1/06/2010	Article on Facebook about Carnaby's Cockatoo Great Cocky Count (http://www.thebirdsnest.net.au/)



Wildlife lover Margaret Owen brought a breath of the bush to the State Administrative Tribunal when she took bankxia and pictures to press the case for Carnaby's black cockatoo.

Carnaby's give counters the slip

By DAVID COHEN

People were out at dusk this week looking for cockatoos.

The searchers were counting Carnaby's black cockatoos in the first survey of its kind in four years. Claremont councillor Bruce Haynes was a spotter; he was at Claremont golf course, but had no luck.

"I had a pleasant walk and saw birds - not one was a Carnaby," he said.

The researchers were counting cockatoos, injured in last month's hailstorm, released back into the wild at King's Park. Mr Haynes hoped another spotter near Hollywood Private Hospital in Neelands had had more success than he did.

The survey was organised by Birds Australia's Carnaby's Black Cockatoo Recovery Project and the Department of Environment and Conservation (DEC).

It aimed to determine the population of the threatened species in the greater Perth re-

gion from Moore River in the north, east to York and south to Valgorup.

The survey will help determine whether the population has declined or increased since the last survey in 2000.

DEC Swan Region ecologist Geoff Barrett said that more than 1000 volunteers participated in Birds Australia's 2006 survey, which found that there were at least 4500 birds of this species on the Swan Coastal Plain at that time.

"Subsequent estimates suggest as many as 10,000 birds may visit Perth after spending the winter and spring months in the Wheatbelt, where they breed," he said.

The 2006 survey also found that the best way to count Carnaby's black cockatoos was as they returned to their roost sites each evening.

It has been estimated that more than 1000 Carnaby's black cockatoo habitat has been lost from the Swan Coastal Plain.

gets SAT run-around

Conservation campaigner Margaret Owen arrived with armfuls of bankxia flowers when she went to the State Administrative Tribunal (SAT) to plead against residential development on university-owned land at Floreat.

The veteran of the Friends of Underwood Bushland thought she had won the right to lodge her case with the SAT under a rarely used clause in the law.

But she thinks she was let down by SAT staff who failed to give her accurate information. And now she has complained to SAT president Justice John Chaney.

"I was told there was to be a directions hearing and I phoned several times and asked what the format would be and who would be there," she said.

"Each time I was told not to worry, to just turn up and that the tribunal member would guide me."

Mrs Owen said she prepared a submission based on how important the YWA bushland was as a feeding ground for the Carnaby's black cockatoo.

"I took along some bankxia prionites, one of the main food sources for the cockatoos," she said. "I guess it was a bit different from most people's submissions."

Mrs Owen said she had a chart showing roosting patterns for the birds and details of about 250 birds being killed in the recent hailstorm and previous extreme heat. "At the end I was told I had no standing before the tribunal," she said.

"I was very disappointed; if I had been told I had to argue for that, I would have approached the whole thing in a different way."



Subiaco Post
27-Mar-2010
Page: 44
General News
Region: Perth
Circulation: 51580
Type: Suburban
Size: 85.10 sq.cms
Frequency: ----F--

Join the great cocky count

Volunteers are needed to help count Carnaby's black cockatoos on Wednesday, April 7.

The survey, organised by Birds Australia with the Department of Environment and Conservation, aims to determine whether the Carnaby's population has declined or increased since the last survey in 2006.

Ecologist Geoff Barrett said sunset was the best time to count Carnaby's black cockatoos, as they returned to their roosts.

"Roosts tend to be in tall trees, often pines, high in the landscape and close to food trees such as banksias and water where they can drink," Dr Barrett said.

"Being social animals they

call to each other as they arrive with their distinctive 'weeyou' call."

Dr Barrett said the aim was have as many people as possible counting the cockatoos on the same evening.

"It will involve getting to the roost half an hour before sunset, before 5.30pm, and counting the number of birds flying into the roost until about half an hour after sunset," he said.

If you can help count birds at your local roost, or simply provide information on where a black cockatoo roost site is, call Dr Barrett on 9423 2907 or Quinton Burnham from Birds Australia on 0428 762 292.

Appendix 3: Location details and counts for 222 potential and known Carnaby's Cockatoo roost sites.

Roost Type = known roost (birds have been recorded roosting there, including pre and post GCC) or potential roost (as yet unconfirmed), Tree species = the dominant tree in which Carnaby's Cockatoos were recorded roosting (including pre and post GCC), and Carnaby's Cockatoo Count = number of birds recorded at that roost on April 7th 2010. For the details of the five DEC Swan Region Areas, see Figure 2. Sites that were not surveyed during the GCC are included.

Roost Type	Roost Code	Source	Tree species	Location	Location details	Area within DEC Swan Region	Lat deg	Lat min	Lat sec	Long Deg	Long min	Long sec	Carnaby's Cockatoo Count
roost	DEC1	New site	pine	Yanchep	Near Pinjara Power Station	Gnangara Chittering Yanchep (SCP)	31	31	50	115	47	52	61
roost	DEC10	New site		Jandakot	Between Jandakot Airport and Melville Glades Golf Course	Southern suburbs	32	4	37	115	52	6	0
roost	DEC11	New site	eucalypt	Wandi	Eastern end of Wandi Drv, tall trees around horse stables	Southern peri-urban Peel Region	32	11	16	115	53	13	63
roost	DEC12	New site		Oakford	Cumming Rd	Southern peri-urban Peel Region	32	14	2	115	53	9	0
roost	DEC13	New site		Wattle Grove	Crystal Brooke Wattle Grove and across the road on the corner of Emanuel Rd	Southern suburbs	32	0	42	116	0	52	not surveyed
roost	DEC14	New site	pine	Baldivis	Cnr Eighty Rd and Sixty Eight Rd in pine plantation	Southern suburbs	32	21	57	115	47	57	346
roost	DEC15	New site		Ardross	Wireless Hill, in from McCallum Crs	Southern suburbs	32	1	50	115	49	48	0
roost	DEC16	New site		Walliston	Pomeroy Rd, in the pines at the back of the industrial site	Darling Plateau (Jarrah Forest)	32	0	36	116	4	32	0
roost	DEC17	New site		Woodridge	Cnr King drv and Glenwood Pl, in tall introduced eucs	Northern suburbs	32	20	22	115	34	31	113
roost	DEC18	New site		Gidgegannup	Strawberry Hill Rd, in pines and introduced eucs	Darling Plateau (Jarrah Forest)	31	49	47	116	8	40	0
roost	DEC19	New site		Beermullah	Beermullah Rd	Gnangara Chittering Yanchep (SCP)	31	12	41	115	37	3	0
roost	DEC2	New site		Sth Fremantle	Manning Lake (Janson Rd, Hamilton Hill)	Southern suburbs	32	5	34	115	46	0	0
roost	DEC20	New site		Gingin	Granville Park, corner of Dewar Rd and Jones St	Gnangara Chittering Yanchep (SCP)	31	20	56	115	54	16	392
roost	DEC21	New site	pine	Preston Beach	In pine trees	Southern peri-urban Peel Region	32	52	48	115	43	19	1

Roost Type	Roost Code	Source	Tree species	Location	Location details	Area within DEC Swan Region	Lat deg	Lat min	Lat sec	Long Deg	Long min	Long sec	Carnaby's Cockatoo Count
roost	DEC22	New site		Guilderton	Along Moore River	Gnangara Chittering Yanchep (SCP)	31	20	17	115	32	57	not surveyed
roost	DEC23	New site		Winthrop	Hill Park	Southern suburbs	32	3	13	115	49	53	not surveyed
roost	DEC24	New site		Bakers Hill	Colgongine Rd between Hepburn and Inkpen Rd, in Wandoo.	Darling Plateau (Jarrah Forest)	31	49	6	116	27	48	0
roost	DEC25	New site		Keysbrook	South side of Elliot Rd near the corner of Yangedi Rd, introduced eucalypts	Southern peri-urban Peel Region	32	26	29	115	52	55	0
roost	DEC26	New site	pine	Success	Hammond Rd, in small pine plantation	Southern suburbs	32	8	0	115	50	38	252
roost	DEC27	New site	jarrah	Myalup	Cnr Riverdale Rd and Center Rd, in pines	Southern peri-urban Peel Region	32	59	41	115	45	17	52
roost	DEC28	New site		Oakford	King St, in pines at the back of the nursey	Southern peri-urban Peel Region	32	13	52	115	54	25	0
roost	DEC29	New site		Ballajura	Small Lake at the south end of Bramble Way	Northern suburbs	31	49	48	115	52	44	0
roost	DEC30	New site	eucalypt	Southern River	Corner of Ranford and Warton Rd	Southern suburbs	32	6	1	115	56	1	0
roost	DEC31	New site		Southern River	Corner of Campbell Rd and Chatsworth Rd. In golf course in the lemon scented gums	Southern suburbs	32	5	21	115	55	51	not surveyed
roost	DEC32	New site		Kalamunda	Corner of Alderside Rd and Hummerston Rd	Darling Plateau (Jarrah Forest)	31	58	19	116	4	51	not surveyed
roost	DEC33	New site		Dawesville	Corner of Donnybrook Turn and Laverton Rise	Southern peri-urban Peel Region	32	37	19	115	37	43	not surveyed
roost	DEC34	New site		Dale		Darling Plateau (Jarrah Forest)	32	14	30	116	39	55	not surveyed
roost	DEC35	New site		Bullsbrook		Darling Plateau (Jarrah Forest)	31	39	2	116	5	47	not surveyed
roost	DEC36	New site		Lesmurdie	Ronneby Rd Lesurdie	Darling Plateau (Jarrah Forest)	31	59	22	116	3	2	not surveyed

Roost Type	Roost Code	Source	Tree species	Location	Location details	Area within DEC Swan Region	Lat deg	Lat min	Lat sec	Long Deg	Long min	Long sec	Carnaby's Cockatoo Count
roost	DEC37	New site		Dalkeith	Sunset hospital. At the end of the Esplanade	Northern suburbs	32	0	7	115	48	13	not surveyed
roost	DEC38	New site		Jandabup		Gnangara Chittering Yanchep (SCP)	31	45	5	115	51	34	not surveyed
roost	DEC39	New site		Rockingham	Trees along Rae Rd	Southern suburbs	32	17	53	115	44	24	not surveyed
roost	DEC4	New site		City Beach/Wembley Golf Course	Between Tranmore Way and Bent St	Northern suburbs	31	55	7	115	45	46	0
roost	DEC5	New site		North Beach	Star Swamp, near Hope St	Northern suburbs	31	51	17	115	45	38	0
roost	DEC6	New site		Gnangara	Gironde Rd between Dollar and Silver Rd, Gnangara Pine Plantation	Gnangara Chittering Yanchep (SCP)	31	46	17	115	52	48	0
roost	DEC7	New site		Parkerville	Nth of Beacon Rd, Parkerville, near Clutterbuck Crk and Steiner School	Darling Plateau (Jarrah Forest)	31	51	57	116	7	56	243
roost	DEC8	New site		Boddington	1km west of Albany Hwy along Crossman Rd, roosting on Hotham River	Darling Plateau (Jarrah Forest)	32	46	35	116	35	3	not surveyed
roost	DEC9	New site		Yokine	Parkland Reserve between Virgil Ave, Shakespeare Ave and Dryden	Northern suburbs	31	54	22	115	51	52	not surveyed
roost	GCC01	New site		Joondalup	Corner Ashley Rd and Wanneroo Rd	Northern suburbs	31	43	41	115	47	16	0
roost	GCC101	New site	pine	Joondalup	Between Galah and Krake Rd east of Mulga	Gnangara Chittering Yanchep (SCP)	31	44	13	115	53	30	500
roost	GCC102	New site	eucalypt	Seville Grove	Cnr Kidbroke Pl and Third Ave	Southern suburbs	32	7	34	116	0	30	14
roost	GCC104	New site	eucalypt	Oakford	Cnr Orton Rd and Cumming Rd	Southern suburbs	32	13	45	115	53	7	167
roost	GCC116	New site		Dawesville	Timbers Edge Estate, Fernwood Rd	Southern suburbs							371
roost	GCC31	New site		Kardinya	Pine plantation between South St and Garling Ave	Darling Plateau (Jarrah Forest)	32	3	30	115	48	22	0

Roost Type	Roost Code	Source	Tree species	Location	Location details	Area within DEC Swan Region	Lat deg	Lat min	Lat sec	Long Deg	Long min	Long sec	Carnaby's Cockatoo Count
roost	GCC35	New site	marri	Helena Valley	Between Darlington and Glen Forrest (along old railway)	Northern suburbs							443
roost	GCC36	New site		Dalkeith	Adelma Rd	Southern peri-urban Peel Region	31	59	28	115	47	57	40
roost	GCC37	New site	eucalypt	Oakford	Tuart Rd	Southern peri-urban Peel Region	32	12	53	115	53	14	45
roost	GCC38	New site	eucalypt	Casuarina	Marri Park Golf Club, Surflin Ct	Darling Plateau (Jarrah Forest)	32	14	1	115	52	2	2
roost	GCC39	New site		Gwindinup	Hooker St	Darling Plateau (Jarrah Forest)	33	30	51	115	45	4	194
roost	GCC70	New site	eucalypt	Lesmurdie	Cnr Barbigal Place and Orange Valley Road	Darling Plateau (Jarrah Forest)	31	59	22	116	2	54	30
roost	GCC71	New site	jarrah	Dwellingup	Lewis Park, Erwin Rd Teesdale	Southern suburbs							64
roost	GCC72	New site		Mt Henry Peninsular		Gnangara Chittering Yanchep (SCP)	32	1	40	115	51	42	12
roost	GCC73	New site	pine	Marjilup		Darling Plateau (Jarrah Forest)	31	41	40	115	52	47	0
roost	GCC74	New site		Gidgegannup	Cnr Lakeview and Waterford Rd	Darling Plateau (Jarrah Forest)	31	49	53	116	9	22	101
roost	GCC75	New site		Chidlow	535 Lilydale Rd	Darling Plateau (Jarrah Forest)	31	51	23	116	16	0	16
roost	GCC77	New site	pine	Victoria Park	Raphael Park Cnr Washington St and Oswald St	Southern suburbs	31	58	20	115	53	9	2
roost	GCC78	New site		Murdoch	Corpus Christi College oval, Dean Rd, Parry Ave and Murdoch Drv	Southern suburbs	32	3	23	115	50	32	8
roost	GCC79	New site	eucalypt	Oakford	Corner of King and Thomas Rd	Southern peri-urban Peel Region	32	13	8	115	54	18	31
roost	GCC80	New site		Mundaring	Bugle Tree Gully area bounded by Gill, Stevens and Stoneville St	Darling Plateau (Jarrah Forest)							78
roost	GCC89	New site		Wundowie	Hyde Dr	Darling Plateau (Jarrah Forest)	31	46	15	116	23	42	125
roost	HF1	Murdoch		Gnangara	Gnangara Rd along Centre Rd (powerline corridor)	Gnangara Chittering Yanchep (SCP)	31	47	24	115	54	45	0

Roost Type	Roost Code	Source	Tree species	Location	Location details	Area within DEC Swan Region	Lat deg	Lat min	Lat sec	Long Deg	Long min	Long sec	Carnaby's Cockatoo Count
roost	HF10	Murdoch		Gnangara	Centre Way Cnr Blackboy Rd	Gnangara Chittering Yancheop (SCP)	31	44	47	115	54	95	0
roost	HF11	Murdoch	eucalypt	Gnangara	Ziatus-Chitty Road	Gnangara Chittering Yancheop (SCP)	31	40	13	115	49	39	64
roost	HF12	Murdoch		Gnangarra	Perry Road	Gnangara Chittering Yancheop (SCP)	31	39	38	115	50	16	not surveyed
roost	HF13	Murdoch		Gnangara	Regalia Road, Dasypogon Rd	Gnangara Chittering Yancheop (SCP)	31	38	4	115	50	36	275
roost	HF14	Murdoch	other	Gnangara	Waneroo Golf Course	Northern suburbs	31	41	0	115	49	6	13
roost	HF15	Murdoch		Gnangara	Perry Road	Gnangara Chittering Yancheop (SCP)	31	36	34	115	48	39	0
roost	HF16	Murdoch		Gnangarra	North of Wattle Avenue East	Gnangara Chittering Yancheop (SCP)	31	39	21	115	47	21	not surveyed
roost	HF17	Murdoch		Gnangarra	South of Wattle Avenue East	Northern suburbs	31	39	38	115	47	23	not surveyed
roost	HF18	Murdoch		Gnangara	West of Alf Barbagallo Raceway	Northern suburbs	31	39	44	115	47	2	604
roost	HF19	Murdoch		Gnangarra	Lot 21	Northern suburbs	31	40	3	115	46	13	not surveyed
roost	HF2	Murdoch	eucalypt	Gnangara	Stoney Rd	Gnangara Chittering Yancheop (SCP)	31	45	56	115	51	40	0
roost	HF21	Murdoch		Gnangarra	Gibbs Road North	Gnangara Chittering Yancheop (SCP)	31	38	59	115	49	26	not surveyed
roost	HF24	Murdoch		Gnangara	Anderson Rd	Gnangara Chittering Yancheop (SCP)	31	38	59	115	49	26	0
roost	HF25	Murdoch		Gnangara	Old Yancheop-Pinjar Road (South of Wescoe)	Gnangara Chittering Yancheop (SCP)	31	38	20	115	47	54	0
roost	HF26	Murdoch		Gnangara	SeaTrees Development	Gnangara Chittering Yancheop (SCP)	31	27	58	115	38	37	0
Roost	HF27	Murdoch		Gnangara	Carabooda Rd	Gnangara Chittering Yancheop (SCP)	31	36	11	115	43	45	0
roost	HF28	Murdoch	pine	Gnangara	Acacia Rd	Gnangara Chittering Yancheop (SCP)	31	26	28	115	40	40	49
roost	HF29	Murdoch		Gnangara	Whiteman Park	Gnangara Chittering Yancheop (SCP)	31	50	37	115	56	55	0
roost	HF3	Murdoch		Gnangara	Lakelands Leisure Centre, junction of Sydney Rd and Lakelands Drv	Gnangara Chittering Yancheop (SCP)	31	46	31	115	51	55	0
roost	HF30	Murdoch		Gnangara	Ballajura, Lakefarm Rd	Northern suburbs	31	50	2	115	54	7	0

Roost Type	Roost Code	Source	Tree species	Location	Location details	Area within DEC Swan Region	Lat deg	Lat min	Lat sec	Long Deg	Long min	Long sec	Carnaby's Cockatoo Count
roost	HF32	Murdoch		Gnangara	Yanchep National Park (east of Wanneroo Rd)	Gnangara Chittering Yanchep (SCP)	31	32	33	115	42	8	0
roost	HF4	Murdoch		Gnangara	Sydney Rd	Gnangara Chittering Yanchep (SCP)	31	46	6	115	52	2	27
roost	HF5	Murdoch		Gnangara	North of Stoney Rd	Gnangara Chittering Yanchep (SCP)	31	45	25	115	51	15	0
roost	HF6	Murdoch		Gnangarra	west of Boundary Rd	Gnangara Chittering Yanchep (SCP)	31	46	5	115	52	31	not surveyed
roost	HF7	Murdoch		Gnangara	Hawkins Road North	Gnangara Chittering Yanchep (SCP)	31	43	52	115	51	3	0
roost	HF8	Murdoch		Gnangara	Amarante Road (west of Quail Rd)	Gnangara Chittering Yanchep (SCP)	31	43	37	115	51	26	0
roost	HF9	Murdoch		Gnangara	Capron-Maringup-Garden Park Drv, Dundebur Rd, Franklin Rd	Gnangara Chittering Yanchep (SCP)	31	43	58	115	49	32	0
roost	R1	Birds Australia		Yanchep	Yanchep National Park	Northern suburbs	31	32	23	115	40	1	not surveyed
roost	R10	Birds Australia		Winthrop	Piney Lakes Reserve	Southern suburbs	32	2	53	115	50	26	0
roost	R11	Birds Australia		Kardinya	Morris Buzacott Reserve	Southern suburbs	32	3	44	115	49	27	0
roost	R12	Birds Australia		Baldivis	Karnup Pine Plantation	Southern suburbs	32	23	33	115	48	37	not surveyed
roost	R13	Birds Australia	tuart	Dawesville	West of Fernwood Rd	Southern peri-urban Peel Region	32	38	30	115	37	57	159
roost	R14	Birds Australia		Yanchep	Bush north and west of Moorpark Ave	Northern suburbs	31	32	17	115	38	39	not surveyed
roost	R15	Birds Australia		Floreat	Perry Lakes Reserve (cnr Underwood Ave and Brockway Rd)	Northern suburbs	31	56	40	115	46	50	237
roost	R16	Birds Australia		Jandakot	Jandakot Caravan Park, Hammond Rd	Southern suburbs	32	7	50	115	50	33	15
roost	R2	Birds Australia		Gnangara	Gnangara Pine Plantation	Gnangara Chittering Yanchep (SCP)	31	45	38	115	53	33	0
roost	R3	Birds Australia	other	Nedlands	Hollywood Hospital	Northern suburbs	31	58	0	115	48	28	73
roost	R4	Birds Australia	pine	Bentley	Collier Park Golf Course, Hayman Rd	Southern suburbs	31	59	50	115	53	18	408
roost	R5	Birds Australia		Bentley	Curtin University	Southern suburbs	31	59	50	115	53	18	not surveyed

Roost Type	Roost Code	Source	Tree species	Location	Location details	Area within DEC Swan Region	Lat deg	Lat min	Lat sec	Long Deg	Long min	Long sec	Carnaby's Cockatoo Count
roost	R6	Birds Australia	pine	Winthrop	Winthrop Park	Southern suburbs	32	3	8	115	49	33	117
roost	R7	Birds Australia		Kardinya	Laurie Withers Reserve	Southern suburbs	32	3	45	115	49	11	0
roost	R8	Birds Australia		Murdoch	Murdoch University	Southern suburbs	32	4	2	115	50	5	700
roost	R9	Birds Australia		Kensington	Technology Park	Southern suburbs	31	59	34	115	53	22	not surveyed
roost	TK1	WA Museum		Jarrahdale	Cnr Jarrahdale and Oak Way	Darling Plateau (Jarrah Forest)	32	20	7	116	3	27	0
roost	TK10	WA Museum		Lesley		Darling Plateau (Jarrah Forest)	32	8	36	116	11	11	not surveyed
roost	TK11	WA Museum		Mount	Dale	Darling Plateau (Jarrah Forest)	32	6	52	116	17	28	not surveyed
roost	TK12	WA Museum	jarrah	Scarp	Cnr Kingsbury and Scarp Rd	Darling Plateau (Jarrah Forest)	32	24	22	116	1	35	25
roost	TK13	WA Museum		Stoneville	Gilfellow Rd Mundaring	Darling Plateau (Jarrah Forest)	31	52	44	116	10	23	not surveyed
roost	TK14	WA Museum	marri	Wungong	Admiral Rd	Darling Plateau (Jarrah Forest)	32	11	33	116	3	31	385
roost	TK15	WA Museum		Wungong	Chandler Rd	Darling Plateau (Jarrah Forest)	32	16	45	116	8	48	not surveyed
roost	TK16	WA Museum		Wungong	Rosella Rd	Darling Plateau (Jarrah Forest)	32	15	39	116	4	49	not surveyed
roost	TK2	WA Museum		Araluen	McNess Rd near Watercorp sign	Darling Plateau (Jarrah Forest)	32	7	53	116	6	16	108
roost	TK3	WA Museum		Araluen		Darling Plateau (Jarrah Forest)	32	7	43	116	7	51	not surveyed
roost	TK4	WA Museum		Bedforddale	Camfield Place	Darling Plateau (Jarrah Forest)	32	8	46	116	3	19	57
roost	TK5	WA Museum	jarrah	Bedforddale	Cnr Albany Hwy and Narbethong	Darling Plateau (Jarrah Forest)	32	10	41	116	3	45	70
roost	TK6	WA Museum		Bungendore	Park	Darling Plateau (Jarrah Forest)	32	11	3	116	2	4	not surveyed
roost	TK7	WA Museum	eucalypt	Crossman	Cnr Crossman and Albany Hwy	Darling Plateau (Jarrah Forest)	32	46	58	116	35	38	10
roost	TK9	WA Museum		Kelmscott		Darling Plateau (Jarrah Forest)	32	7	14	116	2	4	0
roost	WS1	ECU	pine	Gnangara	Gnangara Rd	Gnangara Chittering Yanchepp (SCP)	31	47	43.58	115	56	47.2	185
roost	WS10	ECU	pine	Gnangara	Neaves Rd	Gnangara Chittering Yanchepp (SCP)	31	41	48.21	115	49	54.39	0
roost	WS11	ECU		Gnangara	Ellenbrook	Northern suburbs	31	45	1	115	59	34	0

Roost Type	Roost Code	Source	Tree species	Location	Location details	Area within DEC Swan Region	Lat deg	Lat min	Lat sec	Long Deg	Long min	Long sec	Carnaby's Cockatoo Count
roost	WS13	ECU		Gnangara	Neerabup	Gnangara Chittering Yancheop (SCP)	31	38	57	115	48	1	0
roost	WS2	ECU		Gnangara	Yancheop Golf Course	Northern suburbs	31	32	54.72	115	39	40.34	0
roost	WS3	ECU	tuart	Gnangara	Yancheop Park Volunteer Centre	Gnangara Chittering Yancheop (SCP)	31	32	54.7	115	40	53.76	342
roost	WS4	ECU		Gnangara	Gibb Rd North	Gnangara Chittering Yancheop (SCP)	31	38	10.74	115	44	15.7	0
roost	WS6	ECU		Gnangara	Edith Cowan University Lake	Northern suburbs	31	45	14	115	46	50	0
roost	WS7	ECU	pine	Gnangara	Conductor Rd	Gnangara Chittering Yancheop (SCP)	31	41	54.91	115	52	36.3	542
roost	WS9	ECU		Gnangara	Carabooda	Gnangara Chittering Yancheop (SCP)	31	35	52.8	115	43	28.05	0
potential roost	DEC3	New site		Dalkeith	Birdwood Parade, along river near Perth Flying Squadren	Northern suburbs	32	0	5	115	48	26	not surveyed
potential roost	GCC02	New site		Jandakot	Cnr Roe Rd and Hope Rd	Southern suburbs	32	5	18	115	51	13	0
potential roost	GCC03	New site		North Perth	Cnr Fitzgerald St and Farmer St		31	55	37	115	51	30	0
potential roost	GCC04	New site		Lathlain	Lathlain Football Oval Cnr Goddard St and Bishopsgate St	Southern suburbs	31	58	25	115	54	28	0
potential roost	GCC05	New site		South Perth	Perth Zoo Cnr Clarence Rd and Onslow Rd	Southern suburbs	31	58	40	115	51	24	0
potential roost	GCC06	New site		Byford	John Calvin School Cnr Soldiers St and Mead St	Southern suburbs	32	13	29	116	0	19	0
potential roost	GCC07	New site		Willeton	Brolga Park Cnr Brolga Prom and The Curlew	Southern suburbs	32	3	5	115	52	32	0
potential roost	GCC08	New site		Safety Bay	Sea Haven Park Cnr Charthouse Rd and Chalmers Ave	Southern suburbs	32	18	52	115	44	44	0
potential roost	GCC09	New site		Ocean Reef	Beaumaris Reserve Shenton Ave	Northern suburbs	31	44	40	115	44	5	0
potential roost	GCC10	New site		Forrestfield	Forrestfield Primary School Cnr Harewood St and Edinburgh St	Southern suburbs	31	59	30	116	0	32	0

Roost Type	Roost Code	Source	Tree species	Location	Location details	Area within DEC Swan Region	Lat deg	Lat min	Lat sec	Long Deg	Long min	Long sec	Carnaby's Cockatoo Count
potential roost	GCC100	New site		Mandurah	Merrit Rd Mandurah Parklands	Southern peri-urban Peel Region	32	29	31	115	46	29	0
potential roost	GCC103	New site		Midland	Midland Christian School nth of Great Northern Hwy and Middle Swan Rd	Northern suburbs							0
potential roost	GCC105	New site		Jandakot	Cnr Jackson Rd and Leeming Rd	Southern suburbs	32	4	51	115	53	31	0
potential roost	GCC106	New site		Joondalup	Pinnaroo Valley Memorial Park	Northern suburbs	31	47	56	115	46	37	0
potential roost	GCC107	New site		Ascot	Cnr Elmsfield St and Hardey Rd	South of Swan River							0
potential roost	GCC108	New site		Carine	Carine High School oval	Northern suburbs							0
potential roost	GCC109	New site		Port Kennedy	Endeavour School	South of Swan River							0
potential roost	GCC11	New site		Yokine	Yokine Reserve Cnr Chaucer Ave and Woodrow Ave	Southern suburbs	31	53	57	115	51	39	0
potential roost	GCC110	New site		Lockridge	Rosher Park Cnr Rosher Rd and Diana Crs		31	52	52	115	56	50	0
potential roost	GCC111	New site		Darlington	Maida Vale Rd	Northern suburbs							0
potential roost	GCC112	New site		Kewdale	Tomato Lake, Oats St and President St	South of Swan River							0
potential roost	GCC113	New site		Bayswater	Mills Avenue Park Cnr Mills Ave and Railway Pde	Northern suburbs							0
potential roost	GCC114	New site		Rockingham	Rockingham Golf Course	Southern suburbs	32	17	52	115	46	30	0
potential roost	GCC115	New site		Cannington	Hester Park Canoe club carpark	Southern suburbs	32	1	56	115	56	35	0
potential roost	GCC12	New site		Ardross	Shirley Strickland Oval, Cnr Coogee St and Mitchel St	Southern suburbs	32	1	21	115	50	23	0
potential roost	GCC13	New site		Jolimont	Jolimont lake, Mabel Talbot Park	Darling Plateau (Jarrah Forest)	31	94	40	115	80	99	0
potential roost	GCC14	New site		Padbury	Mawson Park Cnr Mawson Drv and Flinders Drv	Northern suburbs	31	48	20	115	44	55	0
potential roost	GCC15	New site		Craigie	Sandalford Park Cnr Ocean Reef and Craigie Drv	Northern suburbs	31	46	23	115	46	19	0

Roost Type	Roost Code	Source	Tree species	Location	Location details	Area within DEC Swan Region	Lat deg	Lat min	Lat sec	Long Deg	Long min	Long sec	Carnaby's Cockatoo Count
potential roost	GCC16	New site		Floreat	Birds Australia Carpark	Northern suburbs	31	56	18	115	46	53	0
potential roost	GCC17	New site		Riverton	Montes Park Cnr Montes Square and Jillian St	Southern suburbs	32	1	55	115	53	51	0
potential roost	GCC18	New site		Shenton Park	Lake at the Cnr Herbert Rd and Evans St	Northern suburbs	31	57	34	115	48	38	0
potential roost	GCC19	New site		Vic Park	Cnr Hillview Tce and Albany Hwy	Southern suburbs	31	59	33	115	54	32	0
potential roost	GCC20	New site		Kensington	Kent St High School oval cnr Kennard St and Rathay St	Southern suburbs	31	59	7	115	53	26	0
potential roost	GCC21	New site		Warwick	Warwick Open Space	Northern suburbs	31	50	13	115	49	12	0
potential roost	GCC22	New site		Kemerton	Silica mine site Cnr Treasury and Wellesley Rds	Northern suburbs		6	20	115	47	40	0
potential roost	GCC23	New site		Willeton	All Saints College Ewing Ave		32	3	3	115	51	57	0
potential roost	GCC24	New site		Redcliffe	Smythe Lake Reserve Cnr Lyle and Stanton St	Southern suburbs	31	56	22	115	56	29	0
potential roost	GCC25	New site		Willeton	End of Aderyn Place	Southern suburbs	32	3	1	115	53	12	0
potential roost	GCC26	New site	pine	Applecross	Thompkins Park off Canning Hwy near North Lake Rd	Darling Plateau (Jarrah Forest)	32	2	10	115	81	81	0
potential roost	GCC27	New site		Atwell	Harvest Lakes between Kinship Way and Euphony Way	Southern suburbs	32	9	15	115	51	46	0
potential roost	GCC28	New site		Bellevue	Elder Park Cnr Katherine Street	South of Swan River							0
potential roost	GCC29	New site		Vic Park	Cnr Miller Rd and Beatty Ave	Southern suburbs	31	58	39	115	54	25	0
potential roost	GCC30	New site			Graylands Reserve	Northern suburbs	31	58	5	115	46	48	0
potential roost	GCC32	New site		Ballajura	Enderby Park Cnr Bellefin Dve and Enderby Crt	Northern suburbs	31	50	32	115	54	35	0
potential roost	GCC33	New site		Canning Vale	Cnr Ladham and Welbeck Rd	Southern suburbs	32	5	16	115	56	11	0

Roost Type	Roost Code	Source	Tree species	Location	Location details	Area within DEC Swan Region	Lat deg	Lat min	Lat sec	Long Deg	Long min	Long sec	Carnaby's Cockatoo Count
potential roost	GCC34	New site		Attadale	Groves Park	Southern suburbs	32	1	49	115	48	39	0
potential roost	GCC41	New site		Camillo	Swingler Park Cnr Nullagine Way and Walker Place	Southern suburbs	32	5	8	115	59	10	0
potential roost	GCC42	New site		Hillarys	Cnr Broadbeach Blvd and Waterston Gardens	Northern suburbs	31	48	3	115	44	9	0
potential roost	GCC43	New site		Kings Park	East of Forrest Drive Carpark	Northern suburbs	31	57	49	115	50	23	0
potential roost	GCC44	New site		Subiaco	Meuller Park	Northern suburbs	31	56	42	115	50	1	0
potential roost	GCC45	New site		Secret Harbour	Tuart Park Cnr Anstey Rd and Bluestone Parkway	South of Swan River	32	24	29	115	46	7	0
potential roost	GCC46	New site		South Perth	Earnest Johnson Oval Cnr South Tce and Sandgate St	Southern suburbs	31	59	11	115	52	0	0
potential roost	GCC47	New site		Kings Park	Synergy Parkland May Rd near Zamia Café		31	57	54	115	49	15	0
potential roost	GCC48	New site		South Guilford	Rosehill Golf Course	Southern suburbs	31	54	32	115	58	45	0
potential roost	GCC49	New site		Dawesville	Hazlemere Drv Florida	South of Swan River							0
potential roost	GCC50	New site		Walliston	Bill Shaw Reserve Cnr Grove Rd and Canning Rd	Darling Plateau (Jarrah Forest)	32	0	5	116	3	59	0
potential roost	GCC51	New site		Kings Park	Pines along Fraser ave in Kings Park	Northern suburbs	31	57	29	115	50	36	0
potential roost	GCC52	New site		Parkwood	Whaleback Golf Course Roe Hwy	Southern suburbs	32	3	16	115	55	10	0
potential roost	GCC53	New site		Burswood	G.O.Edwards Park Cnr Great Eastern Hwy and Craig St	Southern suburbs	31	57	53	115	53	46	0
potential roost	GCC54	New site		Warwick	Juniper Reserve Cnr Sycamore Drv and Tristania Rise	Northern suburbs	31	50	37	115	47	22	0
potential roost	GCC55	New site		Mt Claremont	Cnr Fortview and McClemans	Northern suburbs	31	57	37	115	46	13	0
potential roost	GCC56	New site		Kardinya	Allen Edwards Park Cnr South St and North Lake Rd	Southern suburbs	32	4	15	115	48	48	0

Roost Type	Roost Code	Source	Tree species	Location	Location details	Area within DEC Swan Region	Lat deg	Lat min	Lat sec	Long Deg	Long min	Long sec	Carnaby's Cockatoo Count
potential roost	GCC57	New site		Kiara	Arbor Park Cnr Elletra Close and Cassia Way	Northern suburbs							0
potential roost	GCC58	New site		Ballajura	Ballajura Oval Cnr Parkwood Drv and Greenoaks Gardens	Northern suburbs	31	49	59	115	52	45	0
potential roost	GCC59	New site		North Perth	Hyde Park Cnr Vincent and Williams St		31	56	15	115	51	50	0
potential roost	GCC60	New site		Spearwood	Pearce Park Cnr Spearwood Ave and Adela Place	Southern suburbs	32	6	9	115	46	42	0
potential roost	GCC61	New site		Huntingdale	Armstrong Park Cnr Warton Rd and Huntingdale Rd	Southern suburbs	32	4	28	115	57	47	0
potential roost	GCC62	New site		North Perth	Woodville Reserve Cnr Fitzgerald and Farmer St	Northern suburbs							0
potential roost	GCC63	New site		Cannington	Seven Oaks Senior College, Seven Oaks St	Southern suburbs	32	0	49	115	56	34	0
potential roost	GCC64	New site		Wooroloo	Cnr Liberton Rd and Needham Rd	Darling Plateau (Jarrah Forest)	31	48	26	116	17	38	0
potential roost	GCC65	New site		Coodanup	Cnr Beachan and Wanjeep St	Southern peri-urban Peel Region	32	33	16	115	44	46	0
potential roost	GCC66	New site		Bicton	Point Walter Golf Course, Honour Avenue	Southern suburbs	32	1	7	115	47	0	0
potential roost	GCC67	New site		Bibra Lake	West of Bibra Lake between Progress Drv and North Lake Rd	Southern suburbs	32	5	24	115	49	9	0
potential roost	GCC68	New site		Willeton	Prendwick Reserve	Southern suburbs	32	3	2	115	53	46	0
potential roost	GCC69	New site		Secret Harbour	Secret Harbour Golf Links, Spyglass Hill	Southern suburbs	32	24	29	115	45	14	0
potential roost	GCC81	New site		Kardinya	Robert Smith Park	Southern suburbs	32	3	12	115	49	19	0
potential roost	GCC82	New site		Iluka	Cnr Moonlight and Ratang Rd	Northern suburbs							not surveyed
potential roost	GCC85	New site		Innaloo	Birrale Park Cnr Bates Rd and Beatrice St	Northern suburbs	31	53	30	115	47	44	0

Roost Type	Roost Code	Source	Tree species	Location	Location details	Area within DEC Swan Region	Lat deg	Lat min	Lat sec	Long Deg	Long min	Long sec	Carnaby's Cockatoo Count
potential roost	GCC86	New site		Regans Ford	Brand Hwy	Gnangara Chittering Yanchep (SCP)	30	58	31	115	42	50	0
potential roost	GCC87	New site		Wellard	Cnr St Albans Rd and Telephone Lane	Southern peri-urban Peel Region	32	16	22	115	50	55	0
potential roost	GCC88	New site		West Perth	Harold Boas Park Cnr Colin St and Wellington St	Northern suburbs	31	56	45	115	50	41	0
potential roost	GCC90	New site		Gosnells	Park at Cnr Sandford and Murchinson	Southern suburbs	32	5	21	115	59	3	0
potential roost	GCC91	New site		Bibra Lake	Adventure World, Progress Drive	Southern suburbs	32	5	43	115	49	10	0
potential roost	GCC92	New site		Coolbellup	Old North Lake Primary School Cnr Juliette and Montague Rds	Southern suburbs	32	4	52	115	48	55	0
potential roost	GCC93	New site		Walliston	Cnr Veticordia Rd and Grevillea Rd	Darling Plateau (Jarrah Forest)	31	59	47	116	4	9	0
potential roost	GCC94	New site		Bibra Lake	Ramsey Park (Aubin Park) Parwkay Rd Cnr Tetlow and Dowell Way		32	5	26	115	50	48	0
potential roost	GCC95	New site		Gosnells	Mary Carroll Lake, Eudoria St	Southern suburbs	32	4	50	116	0	15	0
potential roost	GCC96	New site		Kwinana	Kwinana Golf Course Cnr Westbrook and Wellard Rd	Southern suburbs	32	14	57	115	48	7	0
potential roost	GCC97	New site		Mosman Park	Childley Point Bush Sanctuary/Golf Course Cnr Wellington and Bateman St	Northern suburbs	32	1	2	115	46	28	0
potential roost	GCC98	New site		Serpentine	Firms Rd	Darling Plateau (Jarrah Forest)	32	23	10	116	1	18	0
potential roost	GCC99	New site		Oakford	Pony Place	Southern peri-urban Peel Region	32	11	48	115	55	9	0
potential roost	QB02	New roost		Mullaloo	Korella Park	Northern suburbs	31	46	40	115	44	21	0
potential roost	WS12	ECU		Gnangara	Yanchep DEC Office	Gnangara Chittering Yanchep (SCP)	31	32	49.07	115	41	3.03	not surveyed

Appendix 4: Counts of Carnaby's Cockatoo at 10 roost locations surveyed in 2006 and again during the 2010 GCC (see Figure 3 for map of roost locations).

Roost location	Locality	2006 Site	2006 Count	2010 Site	2010 Count
1	Yanchep	R1	300	R1	0
				WS2	0
				WS12	0
				WS3	342
				HF32	0
				Total	300
2	Gnangara	R2	2489	R2	0
				H5	0
				DEC 38	0
				GCC101	500
				HF2	0
				HF3	0
				HF4	27
				HF6	0
				DEC6	0
				HF10	0
				HF1	0
	Total	2489	527		
3	Nedlands	R3	205	R3	73
				GCC18	0
				GCC47	0
				Total	205
4	Bentley/ Kensington	R4	50	R4	408
		R5	70	GCC19	0
		R9	225	GCC20	0
				GCC46	0
			Total	345	408
5	Winthrop Park Kardinya/ Murdoch	R6	212	R6	117
		R7	92	R7	0
		R8	90	R8	700
		R10	84	R10	0
		R11	69	R11	0
				GCC31	0
				GCC56	0
				GCC92	0
				GCC78	8
				GCC23	0
				GCC81	0
				DEC23	0
				GCC67	0
				GCC91	0
		GCC94	0		
	Total	547	825		

Roost location	Locality	2006 Site	2006 Count	2010 Site	2010 Count
6	Baldivis	R12	574	R12	0
				DEC14	346
		Total	574		346
7	Dawesville	R13	50	R13	159
				DEC33	0
		Total	50		159
8	Yanchep	R14	50	R14	0
9	Floreat	R15	290	R15	237
				GCC16	0
				GCC55	0
				GCC30	0
		Total	290		237
10	Jandakot	R16	150	R16	15
				DEC26	252
				GCC27	0
		Total	150		267
Overall Totals			5000		3184