

SEASONAL VARIATION IN GLOSSY BLACK-COCKATOO *Calyptorhynchus lathami* SIGHTINGS ON THE GOLD COAST, QUEENSLAND

MICHELLE J. STOCK^{1,2} and CLYDE H. WILD¹

¹School of Environmental and Applied Sciences, Gold Coast Campus, Griffith University,
PMB 50 Gold Coast Mail Centre, Queensland 9726

²Corresponding author. E-mail: m.stock@griffith.edu.au

Received: 4 May 2005

INTRODUCTION

The Glossy Black-Cockatoo *Calyptorhynchus lathami* is a monophagous bird, only feeding on the seeds of *Allocasuarina* species. This bird is currently listed as vulnerable according to the Queensland *Nature Conservation Act 1992*. The *Assessment of Conservation Status* for the Queensland Department of Environment estimates the entire Queensland population of Glossy Black Cockatoos to be between 1 000 and 2 500 individuals, and declining. It is unknown how many Glossy Black-Cockatoos are on the Gold Coast and this is currently under investigation.

The Glossy Black-Cockatoo is an elusive bird. It is difficult to locate and census the population using typical methods of censusing common bird species, such as point counts along transects. They only flock to drink, and researchers have found this to be the optimal time to census the population on Kangaroo Island (South Australia) (Crowley *et al.* 1996). Two censuses were conducted in 2001 (March and April) at various sites on the Gold Coast, Queensland (known drinking sites, as well as potential sites within known Glossy Black-Cockatoo feeding habitat) (Anon. 2002). On each occasion, only 15 birds were counted. We presume that not all drinking sites are known, and the 15 birds are merely a subset of a larger population. Alternatively, bird numbers may have been low on the Gold Coast at those times, due to seasonal movements. A thorough investigation of all potential drinking sites on the Gold Coast is impractical, as there are a substantial number of water bodies and many of these are inaccessible. Further complications arise since Glossy Black-Cockatoos have been observed drinking from puddles during wet weather (Anon. 2002).

The Glossy Black-Cockatoo Branch of the Wildlife Preservation Society in Queensland, is a community group with members residing in various locations on the Gold Coast (Tallebudgera, Reedy Creek, Elanora, Bonogin, Mudgeeraba, Tallai, Worongary, Gilston, Nerang, Mt Tamborine, Springbrook, Pimpama and

Coomera). They have been collecting sightings information since 1990 and most intensively in 1996 and 1997. The information collected includes the date, time and activity of the birds when they were observed, as well as flight directions, number and sex of birds and duration of sightings. For various reasons, such as the brevity of observations, not all records of observations are complete. Furthermore, records were only made when the birds were seen and not when there were 'no birds' observed: so it is unknown whether the lack of a record is due to the absence of observers or Glossy Black-Cockatoos.

The aim of this study is to analyse the data collected by the Glossy Black-Cockatoo Branch to identify seasonal patterns in the sightings.

METHODS

Data from the Wildlife Preservation Society of Queensland Glossy Black-Cockatoo Branch, comprising 1 009 reported sightings in a period of 13 years (4 748 days), were analysed. Sightings were allocated to the month of the year in which the sighting was made, and the average daily number of sightings was calculated for each month. The daily average was multiplied by the average month length (30.436 days). The number of sightings was thus reported as 'the average number of sightings in the particular month, standardized to a common month length' (Table 1).

TABLE 1

Standardized monthly sightings for Glossy Black-Cockatoos on the Gold Coast, between 1990 and 2002.

Month	Standardized sightings per month
January	4.9
February	7.8
March	6
April	7.8
May	8.8
June	8.2
July	10.4
August	5.2
September	7.4
October	4.5
November	4.8
December	2

TABLE 2
Nonlinear Estimation Model for number of sightings of Glossy Black-Cockatoos over 12 months.

	Estimate	Standard error	t-value df = 9	p-level	Lower 95% confidence limit	Upper 95% confidence limit
<i>m</i>	6.48	0.45	14.6	1.4×10^{-7}	5.48	7.49
<i>a</i>	2.52	0.63	4	0.0031	1.09	3.94
<i>p</i>	5.63	0.48	11.8	8.9×10^{-7}	4.54	6.71

A sinusoid with a cycle length of 12 months was fitted to these data by the Nonlinear Estimation routine of Statistica 6, fitting a function of the form:

$$\# \text{ sightings} = m + a * \cos((\text{month} - p) * \pi/6)$$

This function fits a sinusoid with a wavelength of 12 months. The parameters have the following meaning:

- m* — the mean level of sightings over the average year;
- a* — the amplitude of the sinusoid, i.e. the difference between peak (or minimum) sightings and the mean, *m*;
- p* — the phase shift of the peak of the sinusoid from month number 0 into the year.

RESULTS

Table 2 shows the values estimated for *m* through *p*, which were all highly significantly non-zero ($p < 0$). The graph shows the fitted function (Fig. 1; $R^2 = 0.639$). This result indicates that the number of sightings is very highly significantly greater than zero (mean per month 6.48, 95% confidence intervals 5.48 to 7.49) and this number varies highly significantly through the year ($t_9 = 4.0$, $p = 0.0031$), with an estimated peak of 2.52 (1.09 to 3.94) sightings per month above the mean (and a minimum six months later equidistant below the mean). The peak observation time is very highly significantly shifted after the start of the year,

and is 5.62 months (4.54 to 6.71) into the year. In summary, the birds' peak in early winter at about 9 reports per month, and are lowest in early summer at about 4 reports per month.

DISCUSSION

The fitted sinusoidal curve clearly showed a highly significant increase in the number of sightings of Glossy Black-Cockatoos during winter, relative to summer. Our data do not distinguish between an increase in bird numbers and observers in winter. Since our data do not contain records of negative observations, we cannot distinguish between increased winter observer numbers (i.e. effort) or increased winter bird numbers. We have no reason to believe that observers are more interested in observing birds any particular time of the year, and although we cannot rule out this explanation, we feel that it is quite unlikely. Indeed, Clout (1989) and Pepper (1996) both reported that Glossy Black-Cockatoos in Eden (New South Wales) and Kangaroo Island (South Australia), respectively, were more frequently seen in July and August, which coincided with the annual peak cone abundance.

A significant difference in the number of birds and not the number of observers throughout the year would indicate that Glossy Black-Cockatoos are relatively nomadic: leaving the coast to find either breeding, nesting or feed sites elsewhere. The alternative is that the birds are sedentary and these requirements are locally available.

Research on Kangaroo Island (South Australia) has shown that breeding Glossy Black-Cockatoos require an adequate quantity and quality food supply (in excess of ~1 hectare of *Allocasuarina*), nest sites (large hollow in *Eucalyptus* sp.), and a suitable drinking source: all within 12 kilometres, due to a tight energy budget (Crowley *et al.* 1996; Garnett *et al.* 1999). There seems to be sufficient food available and some past breeding sites are known on the Gold Coast, but the rate and success of these is unknown (Anon. 2002). The availability of drinking sites is highly variable throughout the year and between years. It seems likely that the birds are concentrating on the Gold Coast after the wet season (i.e. creeks have been replenished by the summer rains) and when suitable cones are abundant (conelets from the previous flowering season have developed), then dispersing to other areas during the summer wet season and profiting from additional feeding and drinking opportunities distant from the coast, which are normally too dry.

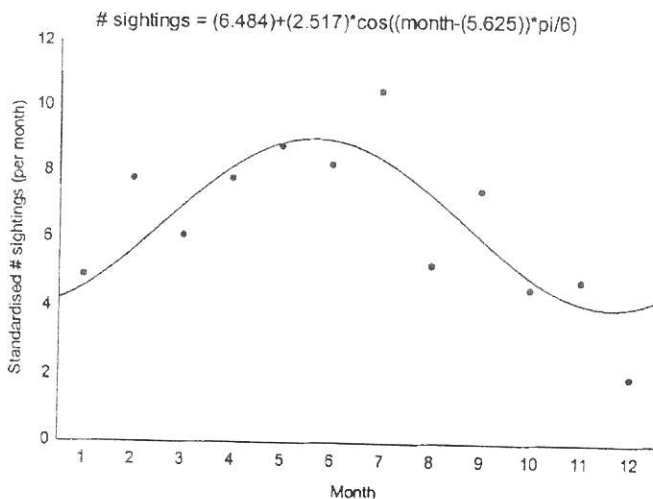


Figure 1. Fitted sinusoid function of the annual cycle of Glossy Black-Cockatoo sighting.

A detailed study involving radio-tracking and using the quantity of Glossy Black-Cockatoo feeding residue (chewings) to gain a greater understanding of their abundance and distribution on the Gold Coast is currently underway.

REFERENCES

- Anonymous (2002). 'Sightings and Records'. (Unpublished report of the Wildlife Preservation Society of Queensland, Glossy Black Cockatoo Branch Inc.: Gold Coast.)
- Clout, M. (1989). Foraging behaviour of Glossy Black Cockatoos. *Aust. Wildl. Res.* **16**: 467-473.
- Crowley, G., Garnett, S. and Pedler, L. (1996). 'Assessment of the role of captive breeding and translocation in the recovery of the South Australian subspecies of the Glossy Black Cockatoo *Calyptorhynchus lathami halmaturinus*.' (Report prepared for the South Australian Glossy Black Cockatoo Recovery Team, Kangaroo Island, South Australia.)
- Garnett, S. T., Pedler, L. P. and Crowley, G. M. (1999). The breeding biology of the Glossy Black-Cockatoo *Calyptorhynchus lathami* on Kangaroo Island, South Australia. *Emu* **99**: 262-279.
- Pepper, J. W. (1996). 'The behavioural ecology of the Glossy Black-Cockatoo *Calyptorhynchus lathami halmaturinus*'. PhD thesis. University of Michigan. Michigan. (unpubl.)
- Wild, C. H., Stock, M. and Thomas, E. (2002). 'Factors influencing choice of feed trees by the Glossy Black Cockatoo in south-east Queensland'. Unpublished report. (Griffith University, Gold Coast City Council and WPQS Glossy Black Cockatoo Branch.)