Warren, K., Le Souëf, A., Holyoake, C., Yeap, L., Calver, M., Finn, H., Cooey, C., Johnstone, R., Saunders, D., Dawson, R., Mawson, P., Vitali, S. and Klandorf, H. (2013) First insights into the age and sex structure demographics of two wild populations of Carnaby's cockatoo.
In: Wildlife Disease Association – Australasian Section Conference, 29 September - 4 October, Grampians National Park, Vic, Australia

First insights into the age and sex structure demographics of two wild populations of Carnaby's cockatoo

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Carnaby's cockatoo (*Calyptorhynchus latirostris*) is classified as Endangered. Threatening factors for this species include habitat loss, climate change, competition with other species for nest hollows, vehicle strike, poaching and illegal shooting. Several potentially pathogenic diseases (beak and feather disease, avian polyomavirus infection and *Chlamydia psittaci*) have been detected in wild nestlings. An additional concern has been the idea that post-fledging recruitment may be limited, resulting in an increasing average age of wild flocks comprising many senescent birds that are past breeding age, and that there may be a severe population crash when these older birds die.

An understanding of age and sex structure demographics is essential for conservation management of endangered avian species, providing critical information relating to reproductive success, epidemiology of diseases of concern and survival rates. Until recently, it has not been possible to accurately age birds after they reached sexual maturity. The development of a genus-specific age curve for *Calyptorhynchus* spp. using pentosidine analysis provided an age estimation tool which could be applied to determine the age of wild black cockatoos. This tool was used to retrospectively age 96 wild Carnaby's cockatoos using museum specimens originating from two flocks in the Hopetoun-Munglinup region, in the south-west of Western Australia. The birds had died from heat stress associated with an extreme heat event in January 2010 and their carcasses had been lodged at the Western Australian Museum.

The sex of immature birds and adult birds for 69 birds was determined by DNA analysis of feathers; the remaining 26 birds were adult birds which had their sex recorded based on morphology and gonad examination. The study showed that the male to female sex ratio was 1:1.07. The birds were aged using pentosidine analysis with 95% confidence intervals that ranged between +/- 1.2 months – 3 years of the estimated age for birds up to 28 years. The data indicated that 27% of the study birds were immature (< 4 years of age) and 73% were mature (> 4 years of age). The age demographics from these two flocks provides evidence of recruitment with 45% of birds being under eight years of age, however 82% of birds were less than 20 years of age and the declining numbers of older birds may be indicative of high levels of both juvenile and adult mortality. The aging tool is currently being used to age all injured Carnaby's cockatoos presenting to Perth Zoo Veterinary Department for treatment and any dead individuals that are collected by the Department of Environment and Conservation and the Western Australian Museum.

This initial insight into the age structure of two flocks of wild Carnaby's cockatoos will assist in the interpretation of current disease epidemiology and reproductive biology research on Carnaby's cockatoos, highlight areas for further research and inform conservation management of this endangered species.