Collision mortality in an endangered parrot *Lathamus discolor*

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Introduction

Bird mortality due to collisions with artificial structures, such as windows, fences, motor vehicles and powerlines, has become increasingly recognised (Dunn 1993; Bevanger 1994; Osburn et al. 2000). A study of bird caused by window strikes in the USA estimated that there are 1-10 birds killed annually for every building in North America (Dunn 1993).

The population of the endangered swift parrot, *Lathamus discolor*, suffers an annual mortality from collisions with windows, fences and motor vehicles (Brown 1989; Brereton 1996). The peak of this mortality occurs during the breeding season (September to January) in the suburbs of Hobart. The first study of this mortality reports that between 1981 and 1986, 37 birds were reported as casualties to the National Parks and Wildlife Service in Hobart, mostly due to window collisions (Brown 1989). In the 1987/88 season, 17 birds were reported to the National Parks and Wildlife Service in Hobart as being involved with collisions with windows, fences and motor vehicles, 10 of which died (Brown 1989). Brereton (1996) estimates that 20 swift parrots are submitted to the National Parks and Wildlife Service in Hobart each year from window collisions but no makes further reference to mortality.

This study aims to examine the causes of the mortality of swift parrots during the breeding season in the Hobart region, to characterise the injuries sustained, and to assess the potential impact of these deaths on the swift parrot population.

Materials and Methods

Twelve carcases of wild *L. discolor* that were submitted to National Parks and Wildlife Service prior to June 1998 had been stored frozen, with details of date of death and location recorded. From June 1998 until January 2001, all birds that were found and submitted to the National Parks and Wildlife Service were forwarded to the School of Zoology as soon as possible. If such transfer could be done within three days of the date of death then the birds were refrigerated at 4ºC until the post mortem examination could be performed. Where immediate transfer was not possible, birds were frozen. To increase the number of carcases retrieved, a request for assistance was mailed to all veterinary surgeons in Tasmania. Thirty eight carcases were collected in this period. The gonads and gastro-intestinal tract from two additional specimens that were killed by fence strike were obtained from Toowoomba in Queensland during the winter of 1998. Fifty-two wild birds were obtained overall.

Results

The most common cause of death in wild living swift parrots was trauma from collisions with artificial objects (71.1 %; n = 37/52 cases). Predator attacks and infectious agents each accounted for 7.7 % of the deaths (n = 4/52 for each category). A cause of death could not be identified in 13.5 % (n = 7/52).

Three distinct traumatic causes of death were differentiated in this study, predominantly by the case history and post mortem findings. These were classified as window strike (n = 26), fence strike (n = 5) or motor vehicle impact (n = 6). The gross post mortem changes that occurred in window and fence strikes were similar with the most common injuries corresponding to impact occurring on the sternum or to the head. Such injuries included: pectoral muscle bruising (n = 6); pulmonary congestion and haemorrhage (n = 13); cardiac haemorrhage and/or rupture (n = 4); fracture of the thoracic girdle (clavicle, coracoid and/or keel) (n = 5); rupture of oesophagus and/or jugular vein (n = 7); wing fractures (n = 4); liver and kidney haemorrhage (n = 4); head trauma (n = 10) and spinal injuries (n = 2). Some birds survived the initial impact only to die in captivity several days later as a result of secondary bacterial and fungal infections (n = 4). Motor vehicle impacts tended to result in more severe crushing injuries and included: crushed skull (n = 2); organ rupture (n = 4); cardiac haemorrhage and/or rupture (n = 2); pulmonary haemorrhage (n = 3); keel fracture (n = 3); leg amputation (n = 1); and spinal fracture (n = 1).

Discussion

Collision mortality was the predominant cause of swift parrot mortality during the breeding season in Hobart. From the number of birds that were affected in this study, it can be concluded that mortality due to traumatic collisions is removing a significant proportion of the healthy adult breeding population annually. If we take the highly conservative assumption that the number of birds submitted approached the actual population mortality due to collisions, then approximately 1% of the estimated total population (~1800 birds) is affected annually. If this sample represents 10% of the actual population mortality due to collisions then the rate increases to 10% annual mortality due to collisions of the estimated total population. The true figure probably lies somewhere between these extremes.

Significant variation in the numbers of swift parrots killed by collisions occurs between years. This may be due to the different foraging distributions that occur between years. In years of poor flowering of *Eucalyptus globulus* the birds tend to congregate in urban areas where alternative food sources occur and little breeding occurs (Brown 1989; Brereton 1996). It is likely that this results in an increased risk of urban mortality to the adults. In years where there is good flowering of *E. globulus*, the birds tend to move to more rural areas and the risk of collisions is subsequently reduced. More information from good breeding years is needed to verify these hypotheses.

This investigation into mortality is heavily biased in favour of collisions. This bias inevitably results from an unavoidable reliance on the public submission of dead birds. This means that a specimen was more likely to be submitted if it was in an urban area and was found intact. Therefore, deaths that occurred in rural or bush settings were relatively unlikely to be noticed. Consequently, deaths from predation are most likely highly underestimated in this study. This study can give no insight into causes of death during the migratory periods or the winter.

The nature of the injuries in the birds killed by impacts with windows and fences reveals that not all birds are colliding headfirst with these objects. The high frequency of sternal fractures, combined with pulmonary and cardiac haemorrhages indicates that many of these birds are striking the objects with their sternum. This suggests that the birds are seeing the objects and attempting to pull up prior to the strike. Hence, increasing the visibility of these objects should help to reduce the mortality.

The only proven method of reducing window strikes is the screening of windows (Dunn 1993). Chain mesh fences are commonly involved in mortality in Hobart. A local hot spot for collisions, the Mount Nelson Primary School, have put considerable work into reducing this problem. Their early solution was to use shade-cloth on the fences, which increased visibility but quickly deteriorated due to exposure to wind and rain. They are currently testing strips of reflective material fastened to the fence, which has resulted in a drop in mortality in its first two years of use.

In summary, this study has determined that the majority of the mortality that occurs during the breeding season in swift parrots is due to traumatic collisions. The window and fence collisions produce injuries consistent with either head trauma or sternal impact, while motor vehicle injuries tend to produce crushing injuries. This level of annual mortality is likely to be having a significant effect on the swift parrot population.

References

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