

Numbers of breeding Little Eagles *Hieraaetus morphnoides* in the Australian Capital Territory in relation to atlas counts

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The Little Eagle *Hieraaetus morphnoides* is undergoing a severe decline in parts of south-eastern Australia, including the Australian Capital Territory, even though atlas reporting rates may suggest that Little Eagle numbers are stable or declining only moderately. We compared trends in atlas reporting rates of the Little Eagle, and the number of occupied Little Eagle breeding territories (active nests), in the ACT during 1988–2011. We found that, although the number of occupied territories or breeding pairs declined from 13 to one (i.e. >90% decline), the number of reported Eagle sightings fluctuated about a rather constant level. Because atlas surveys may not accurately reflect declines, or the severity of declines, in some raptors, we suggest that atlas data are combined with surveys of nesting raptors to assess trends in raptor numbers.

INTRODUCTION

The Little Eagle *Hieraaetus morphnoides* is declining in parts of south-eastern Australia, and is now classified as *vulnerable* in the Australian Capital Territory (ACT) and New South Wales (Olsen and Fuentes 2005; Olsen *et al.* 2008, 2009; Debus 2011). Olsen *et al.* (2008, 2009) showed a decline in active Little Eagle nests from 11 to one in Canberra nature parks and reserves between 1992 and 2007, from a total ACT population of 13 occupied territories at the time (Taylor and COG 1992). In contrast, Barrett *et al.* (2007) reported a 39 percent decrease in the reporting rate for Little Eagles in New South Wales, based on data from the first Atlas of Australian Birds (conducted between 1977 and 1981: Blakers *et al.* 1984) and the New Atlas of Australian Birds (conducted between 1998 and 2001: Barrett *et al.* 2003). Sergio *et al.* (2008) argued that changes in atlas counts of raptors in Europe were not representative of changes in the number of breeding pairs of raptors, because such atlas counts can either over- or underestimate true raptor numbers. However, they presented no data to support this claim.

Owing to this lack of published data on breeding raptors and atlas counts, we sought to compare the number of active Little Eagle nests in the ACT over the period 1988–2010 against trends in reporting rates for the Little Eagle in the Canberra Ornithologists Group (COG) sightings database, to determine whether database sightings for Little Eagles were correlated with the number of active nests.

STUDY AREA AND METHODS

Study area

The study area was the Australian Capital Territory. Field methods and Little Eagle habitats were as previously described for studies on the comparative ecology of raptors

around Canberra in the ACT (Fuentes *et al.* 2007; Olsen *et al.* 2006, 2010a). These papers are available from the Institute for Applied Ecology website (www.canberra.edu.au/centres/iae) and the Global Raptor Information Network (www.globalraptors.org).

Counts of Little Eagle nests

The number of resident pairs of Little Eagles and their active nests (i.e. eggs or nestlings) in the ACT 1988–1992 were taken from broad surveys of raptors in the ACT (Olsen 1992; Taylor and COG 1992). When a decline of Little Eagles was first noted (Olsen and Fuentes 2005), a team co-ordinated by JO and colleagues (e.g., see Olsen and Osgood 2006; Olsen *et al.* 2008, 2012) attempted to find all active Little Eagle nests and occupied breeding territories in the ACT. It was readily apparent when a known pair moved its nest location from year to year (see Olsen *et al.* 2009, 2010b, 2012); that is, if a known site was found to be disused then alternative nests were identified before concluding that a territory was defunct.

Sightings of Little Eagles

Data on the reporting rate for Little Eagles in the ACT during 1988–2011 were obtained from the annual bird reports of the Canberra Ornithologists Group, published annually in *Canberra Bird Notes*, from sightings mainly by amateurs in the ACT. The atlas statistic used (COG's F-value) is a measure of the number of sightings as a proportion of observer effort: the number of sites at which the species was recorded, as a percentage of the total number of atlas surveys sites throughout the ACT (e.g. COG 2012). In the ACT, Little Eagles occur in the wooded and open areas around Canberra, including woodland between suburbs, but not in the rugged, forested south (Namadgi National Park) (e.g. Olsen 1992; Taylor and COG 1992; Olsen and Fuentes 2005).

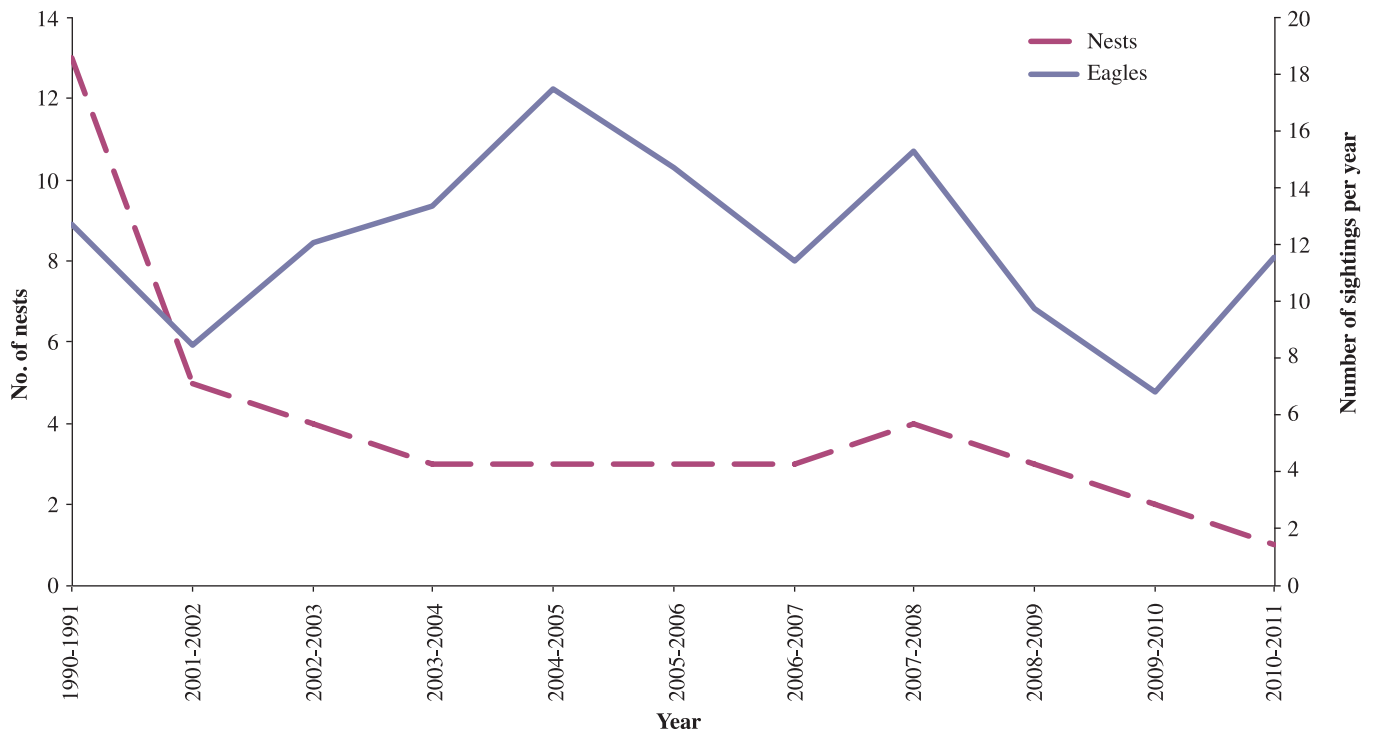


Figure 1. Relationship between number of active nests (from annual surveys of breeding pairs, = Nests) and atlas reporting rate (from annual COG surveys, = Eagles) for Little Eagles in the ACT, 1990–2010. Right vertical axis scale gives annual atlas reporting rate for Eagle sightings; left vertical axis scale gives number of Eagle nests (regression: $F = 0.06$; $P = 0.81$; not significant).

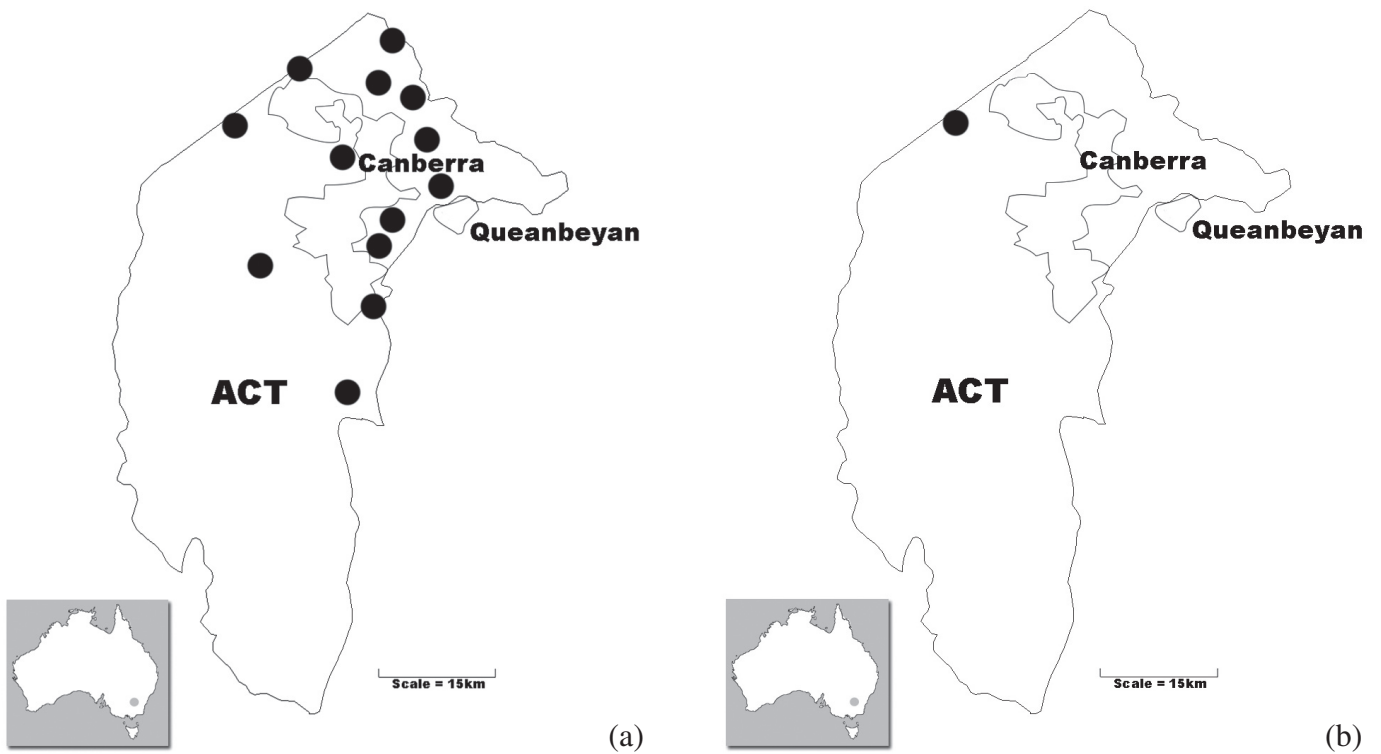


Figure 2. Breeding Little Eagles found in the Australian Capital Territory: (a) 1992, (b) 2011. Each black dot represents a cluster of up to six alternative nests inside a Little Eagle territory.

RESULTS AND DISCUSSION

There was no significant relationship between the number of active Little Eagle nests in the ACT and the COG atlas reporting rate for Little Eagles (Figure 1; regression analysis: $F = 0.06$, $P = 0.81$). That is, the number of sightings, although variable, has remained high until recently, but the number of pairs with active nests has declined by at least 90 percent over the same period (Figure 2). The lack of a correlation between sighting rates and active nests may relate to ongoing immigration of Little Eagles from adjoining New South Wales.

Admittedly, there has been variation in the incentive to report Little Eagle sightings, e.g. the national bird atlas in 1998–2001 and encouragement of COG members to report eagle sightings after their decline was first signalled in 2005. Nevertheless, it appears that the ACT has become a population sink for Little Eagles. Furthermore, the number of COG sightings may be inflated by false positives, as there have been several confirmed cases of other raptor species misidentified by COG observers as Little Eagles, including Brown Falcons *Falco berigora*, Whistling Kites *Haliastur sphenurus*, Black Kites *Milvus migrans*, and others. The converse also occurs, e.g. a dead Little Eagle (examined in the hand) misreported as a Powerful Owl *Ninox strenua* (Olsen *et al.* 2012). Recently, several photographs were submitted to JO for identification: (a) a Little Eagle and a Whistling Kite in the same frame, initially suspected as a pair of Little Eagles at Jerrabomberra, and (b) a dark-morph Little Eagle over Canberra, initially suspected as a Whistling Kite or a female Swamp Harrier *Circus approximans*. This case illustrates (a) the high potential among amateurs for confusing raptor species, and (b) the commendable practice of verifying records before submitting them to the COG database, which contrasts with the frequent ‘I know what I saw’ syndrome that has resulted in erroneous records.

Data in this study, and in Olsen *et al.* (2009), may be the only data comparing sighting records with nest surveys for an Australian raptor, and validate a similar conclusion by Olsen *et al.* (2009) on a smaller dataset. Sighting records may mask the true situation with respect to an eagle’s breeding population (e.g. Sergio *et al.* 2008). Surveys of active nests and breeding productivity provide a more reliable yardstick for assessing trends in raptor numbers than do bird atlas reporting rates, hence the need for long-term monitoring of these aspects in sample areas (e.g. Olsen *et al.* 2009), though combining atlas data with nest surveys could provide a better measure of raptor numbers than either method used on its own. The causes of territory desertions and unexpected eagle deaths also require investigation (e.g. Olsen *et al.* 2010b; Debus 2011). Further comparisons of nest surveys with atlas reporting rates, in Australia and elsewhere, are needed to replicate and confirm the findings of this study.

In 2011 we made recommendations to the ACT Government for a Little Eagle Action Plan. These include: retain woodland, begin radio-tracking studies of Little Eagles to determine home-range size and habitat use, and investigate the effects on raptors of the chemicals Pindone (2-pivalyl, 3-indandione) and 1080 (sodium fluoroacetate) used to poison rabbits in the ACT. However, only one breeding pair of Little Eagles was found in the ACT in 2011. Furthermore, we recommend that records of rare, uncommon or threatened raptors in the ACT be verified by photographs referred to experts, before acceptance into the COG database.

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