

Growth of a nestling Little Eagle *Hieraaetus morphnoides*, with comments on rescue of pre-fledglings

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Abstract. A nestling Little Eagle *Hieraaetus morphnoides* was photographed and videoed from age 3 weeks until prematurely fledged at 8 weeks near Emmaville, New South Wales, during November–December 2023. This visual record, with notes, of physical and behavioural development supplements descriptions and the few earlier photographs of age-related growth stages of nestlings of this species. The adult Eagles tolerated observation on the ground from ~70 m away, without adverse effects on the breeding event. Brief descriptions of parental behaviour at these weekly stages, and at the incubation and hatching stages, are included. A predator killed the pre-fledged but feathered eaglet after an overnight storm blew the eaglet to the ground before it could fly. Rescue of such grounded fledglings is discussed.

Introduction

Age-related growth stages and plumage development in nestlings of the Little Eagle *Hieraaetus morphnoides* have been summarised (Debus 2017, 2022), on the basis of detailed descriptions and several photographs of chicks of known age (Debus *et al.* 2007; Debus & Ley 2009; Debus 2011). One of these chicks, apparently a female on body mass (700 g) at 5 weeks old, was photographed at 1, 3, 3.5 and 5 weeks old while in captive care (Debus *et al.* 2007), but its history and subsequent death at 6 weeks suggest that its growth might have been slightly retarded. Cupper & Cupper (1981) provided photographs of two siblings at 1 week old (the older chick), and again at 52–56 days old when prematurely fledged (accidentally flushed by human inspection of the nest) and then returned to the nest by the observer. Otherwise, there are few time-series of photographs of the same eaglet(s) at regular intervals through the nestling period, showing age-specific growth stages. Rae (2023) provided brief descriptions and distant photographs of an eaglet in the nest at just over 1 week old (fully white and downy, with a dark ring around each eye); 3 weeks (downy with flight feathers emerging); 4 weeks (dorsal feathers emerged); 6 weeks (essentially feathered, with down visible around the face); and at fledging at 8 weeks (feathered but with short wings and tail).

Physical growth curves (measurements), and equations for estimating from wing-length the age in days, of nestling and fledgling Little Eagles have been provided (Marchant & Higgins 1993; Olsen 1995). Being able to correlate these with visual age characters may be of assistance to those handling or observing/studying Little Eagle chicks. Visual age markers may have greater field application than measurements of wing-length (which require capture and handling of birds), and would thus minimise researcher impact and the ethical implications for study projects. Given the Little Eagle's continent-wide distribution and regional variation in its breeding season (Marchant & Higgins 1993; Debus 2017), visual age markers of nestlings may help to define region-specific breeding seasons.

Here we provide photographs of a Little Eagle chick at intervals through the nestling period until its premature fledging at 8 weeks, when a storm blew it from the nest to the ground before it could fly well. A predator killed the grounded eaglet before it could be rescued, thus curtailing the project.

Study area, subjects and methods

The Little Eagles' nest was located on the privately owned Koompartoo Conservation Reserve ~19 km north-north-west of Emmaville, New South Wales (29°27'S, 151°36'E). The nest was in a small (~2 ha) clearing embedded within extensive (200 km²) granitic rugged, forested country, though with 'islands' of open land of ~25–200 ha within 1–2 km either side of the nest site, and extensive open country 5 km away. The stick nest was ~15 m above ground in a sloping fork below the upper canopy of a mature, living Fuzzy Box *Eucalyptus conica* ~20 m tall (Figure 1), beside a track ~20 m from a shed complex and ~200 m from a rural house. Early in the Eagles' breeding cycle, a bushfire burned for 1 week to within 2 km of the nest, but the nesting event proceeded to the fledging stage.

The adult Eagles, both dark morph (a rare combination in the region), were confiding and appeared comfortable with observation of the nest, without flushing, 'protesting' vocally or showing outward signs of distress at human presence, as they were habituated to routine landowner activity on the property. Their calm temperament and acceptance of observation continued from the 2021 and 2022 seasons (when nestling plumages were not recorded). Lack of adverse observer effects was indicated by successful fledging in the first 2 years and near-fledging in 2023, curtailed by misadventure. The male and female were separable by the male's smaller size and crisper pattern on his head and face. The eaglet, when fully feathered, was also a dark morph, plumage differences from light-morph juveniles being most evident near or after fledging (i.e. deeper and more extensive tawny underparts, dark underwing pattern: Marchant & Higgins 1993).



Figure 1. Nest-tree of Little Eagles, Emmaville, NSW, 2023. Nest is near top of tree, left of centre. Photo: G.N. Wilkins

In 2023, the nest site was occupied by the pair on 1 September. On 16 September, incubation was in progress, as revealed by the sitting or returning female visibly rearranging the egg(s) beneath her, and an incubation change-over with the male. On 4 October, the female was sitting on the nest (G. & L. Foster pers. comm.). On 21 October, a chick had just hatched, as indicated by parental behaviour (brooding female restless, changing position and checking beneath her; male brought food to the nest; female initially fed herself but did not feed the chick until the male's second prey delivery 3 h later that day; chick vocalisations then heard). The interval 16 September to 21 October (35 days) closely agrees with the known incubation period (~38 days), with laying probably by 13 September, in agreement with regional peak laying dates in the second week of September (Marchant & Higgins 1993; Debus 2017).

In addition to these observation dates, digital photographs were taken by GNW from a position partly concealed by a tree and shrub, on the ground ~70 m from the nest-tree at regular (weekly) intervals throughout the nestling period on 11 November (chick 3 weeks old), 18 November (4 weeks), 25 November (5 weeks), 2 December (6 weeks) and 9 December (7 weeks). The camera's video and audio function was also deployed by GNW in some of the nestling weeks (at hatching, and at 3, 4 and 6 weeks). The camera was a Nikon D7200 with a Tamron 150–600-mm zoom lens (SP 150–600 mm F/5.6–6.3 Di VC USD G2), mostly tripod-mounted and kept focused on the nest, and activated by a JJC WT-868 wireless and cabled remote control from a position ~2 m from the camera. The zoom was generally set at maximum (600 mm, effective focal

length 900 mm with Nikon's inbuilt crop factor of 1.5×), except when an occasional wider view took in a nearby adult, and photographs were digitally adjusted for clarity and variably cropped. Hence, the sequential photographs are not strictly to scale, showing degree of feathering rather than relative size with time. The conservative observation distance was determined by the adults' acceptance of observers and camera.

The photographs (selection herein), video footage and GNW's field notes were reviewed by SJSD for information supplementing the visual record of the eaglet's growth. The video footage of the eaglet and adults, with audio, has been uploaded to the Macaulay Library of Cornell University (<https://macaulaylibrary.org/asset/ML618747524>) for inclusion in an update of Debus (2022). Vocalisations and their contexts described below follow the descriptions of Debus (1983) and Marchant & Higgins (1993), and are captured in the upload to the Macaulay Library.

On 16 December, the fledgling (8 weeks old) was on the ground, unable to fly, after an overnight storm with very strong wind gusts. On approach, it ran into some scrub but returned to the base of the nest-tree after a few minutes; photographs and video of it were obtained. In the ensuing 90 minutes of observer absence while trying to acquire phone signal and organise for landowner assistance to catch and contain the fledgling, a predator killed the fledgling, and its mangled remains were found only after a 45-minute search by four people.

Results

Eaglet growth stages

At 3 weeks old, when first fully visible, the chick was downy white with dark eye 'mask' persisting (Figure 2) and alert, mobile and actively moving around the nest. At 4 weeks, the pin-feathers of its remiges and rectrices had emerged through the down, those of the primaries having just burst from their sheaths; remiges developed more quickly than rectrices (Figure 3). The chick defaecated over the nest rim, and stood and flapped its wings. At 5 weeks, dorsal pin-feathers had burst, with dark feathers on the scapulars, wings and tail (Figure 4). At 6 weeks, the chick was increasingly feathered dorsally, with feathers emerging on



Figure 2. Little Eagle chick at 3 weeks old, Emmaville, NSW, 11 November 2023. Photo: G.N. Wilkins



Figure 3. Little Eagle chick at 4 weeks, 18 November 2023: (a) underwing showing emerging remiges, and (b) rear view showing emerging rectrix pins. Photo (a) and still from video (b): G.N. Wilkins



Figure 4. Little Eagle nestling at 5 weeks, 25 November 2023: (a) showing downy head and foreparts, and (b) feathering dorsally (chick is leaning down into nest, head at left, right wing partly open). Photos: G.N. Wilkins

the crown and ventrally (Figure 5); it fed itself on prey in the nest. At 7 weeks, the eaglet was essentially feathered, with down on the underwings, sides of the neck and about the face (Figure 6). It stood on the side of the nest then sought a shady part of the nest. At 8 weeks, the eaglet was prematurely fledged, on the ground at the base of the nest-tree and not yet able to fly from there to a safe perch (Figure 7), while the female perched in the nest-tree above, watching. Down still showed on the fledgling's forehead and throat, its primary tips extended little beyond the tertials and secondaries on the folded wings, and its tail was half-length. Its wings showed no sign of injury, but it might have been wet overnight, exhausted and disoriented by its fall.

From 3 weeks old, when first visible, the chick's cere and gape were yellow. At 7 weeks, when they became visible from the observation point, its toes were also yellow. At 8 weeks, the cere and toes had faded to pale grey, and the gape to cream.

Parental behaviour and prey

The female brooded the day-old hatchling, and sheltered the nestling at 5 weeks old for several hours during rain. Otherwise, she did not brood the nestling in fine weather through the middle of the day at age 3 and 4 weeks,



Figure 5. Little Eagle nestling at 6 weeks, 2 December 2023. Photo: G.N. Wilkins

although one of the adults sometimes perched on the nest rim or beside it, or was close by, at 4 and 5 weeks. At 3 weeks, fresh green foliage was visible on the nest.



Figure 6. Little Eagle nestling at 7 weeks, 9 December 2023: (a) feathered dorsally (leaning down into nest, head at left), and (b) downy underwings with short, ensheathed remiges. Photos: G.N. Wilkins

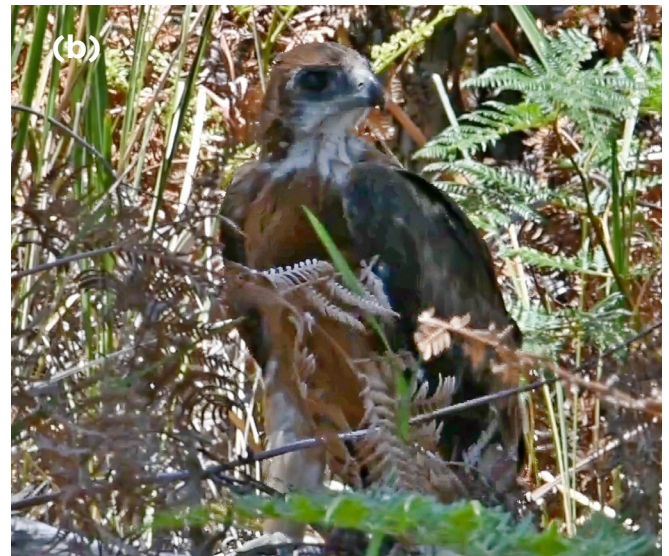


Figure 7. Little Eagle grounded pre-fledgling at 8 weeks, 16 December 2023: (a) dorsal view, and (b) ventral view. Photo (a) and still from video (b): G.N. Wilkins

The female perched in a tree ~150 m from the nest when not attending the 6-week-old nestling. She preened the nestling at 4 and 5 weeks old. Up to age 6 weeks, one of the adults sometimes briefly inspected the nestling on non-feeding visits, and late in Week 7 both soared over the area, but at 7 weeks both adults were absent through a fine afternoon, although one (apparently the female) was at the nest 2 days later (photo: L. Foster). The female fed the nestling bill to bill to at least 5 weeks, and at 4 weeks the male fed the nestling bill to bill twice, on stored food in the nest, through his 4-hour continuous nest attendance. On that occasion, both adults seemed concerned about a pair of Torresian Crows *Corvus orru* (i.e. nest predators) and their fledgling that were within 100 m of the Eagles' nest all day. Every time the fledgling or adult Crows called, the Eagles reacted, and throughout that day did not leave their nestling unattended.

A further concern, during the adult Eagles' absence at 7 weeks, was the activity of shooters late in Week 7 two properties away, which area formed part of the Eagles'

hunting range. However, an adult Eagle was back at the nest early in Week 8 (photo: L. Foster). One and two days after the fledgling was killed, the adult female was seen and photographed near the nest (G. & L. Foster pers. comm.). Both adults were sighted on the property during the week ending 20 January 2024, i.e. a month after the fledgling was killed.

Prey items recognised were a Common Bluetongue *Tiliqua scincoides* apparently caught by the female while the male incubated; another Bluetongue delivered to the nest by the male and fed by the female to the hatchling; and a small agamid (probably a Tree Dragon *Amphibolurus muricatus*) delivered to the nest by the male and consumed by the 6-week-old nestling, including the lizard's long thin tail swallowed. At 7 weeks, the female arrived in the nest-tree with an enormous full crop indicating large prey, which was not delivered to the nest. She had previously (at 5 weeks) fed the nestling on light-red flesh suggesting European Rabbit *Oryctolagus cuniculus*.

At the hatching stage, the female gave begging (piping) calls before and after the male delivered prey, and he gave several soft three-note calls as he departed. At chick age 4 weeks, with another Little Eagle high overhead, the nest-attending female bobbed and peered up, while giving repeated three-note calls occasionally interspersed with 'bubbly' (rapid, ascending) piping calls, then left the nest, followed by distant two- and three-note calls. The male adult then arrived to stand on the nest with the chick. This event is interpreted as the female defending the territory against an intruding Little Eagle while the male guarded the chick.

Discussion

Breeding biology

The subject eaglet's physical and behavioural developmental stages closely match previous verbal descriptions and the few time-series photographs (Marchant & Higgins 1993; Debus 2017, 2022; Rae 2023), here supplemented with visual reference at age-specific intervals. The adult Little Eagles' parental behaviour also closely agrees with previous accounts of single or few other nests (Marchant & Higgins 1993; Debus 2017, 2022). The characteristics of the Eagles' nest-site fall within known parameters for the region (see Larkin *et al.* 2020), and add a nest-tree species. Given premature fledging at 8 weeks (56 days) old, it is likely that the subject eaglet was female, as male Little Eagle nestlings tend to develop slightly more rapidly than females and can fledge at 54 days, versus 58+ days for a female (Olsen 1995; Debus & Ley 2009; Debus 2011).

Potential disturbance to the breeding event

There was no indication that shooters on a nearby property, nor the proximity of a bushfire, adversely affected the Eagles or their breeding attempt at Koompatoo. However, we note the reduction in flight time, and therefore probably foraging time by breeding Little Eagles, associated with intense bushfire smoke during the megafires of summer 2019–2020 (Rae *et al.* 2023).

Comments on the eaglet's fate

The grounded fledgling's death by predation reinforces the urgency of prompt rescue, to prevent loss of an individual of this species, listed as Vulnerable in NSW. It could have been reunited with the adults after a week in care, just sufficient for it to reach flying age. Although such grounded fledglings can run, they can be readily caught and, if suitable means of containment (e.g. a box) are not available, if sufficiently calm (e.g. in a breathable cloth bag or covered with a light cloth) they can be placed temporarily in the foot-well of a vacant passenger seat in a vehicle en route to care. Successful local rescues include another Little Eagle at the same age, caught by a landowner and successfully rehabilitated, and a Square-tailed Kite *Lophoictinia isura* fledgling (also listed as Vulnerable in NSW) taken into care (Debus in prep.). Valuable advice

on capture, restraining, containment or housing (NOT behind wire mesh) and treatment of raptor rescue cases is provided by, for example, Naisbitt & Holz (2004) and Olsen (2011, 2014).

Pre-fledged raptors can be readily recognised by their short wings and tail and any traces of down remaining. Grounded fledglings are at high risk of predation by Red Foxes *Vulpes vulpes*, dogs *Canis familiaris*, cats *Felis catus*, larger raptors, goannas (monitor lizards, *Varanus* spp.) and, depending on location, possibly Spotted-tailed Quolls *Dasyurus maculatus*, as suspected in the present case. They may also be subject to harassment and injury, by e.g. corvids and similar birds. Published examples of such grounded fledglings, observed by birdwatchers or photographers but apparently not rescued or placed on a safe perch, and therefore probably perished, include the 'immature' (really pre-fledged) Little Eagle featured in Olsen *et al.* (1993, photograph p. 76) and the pre-fledged Square-tailed Kite featured by Debus (1996, photograph p. 262).

Concluding remarks

Because of the height of the nest and often obscure views of the eaglet (e.g. by foliage, or the eaglet's position in the nest), the present photographic series was incomplete and could be improved upon by, for example, full-body photographs of eaglets on the hatching day and at weekly or more frequent intervals thereafter until fledging. This process could involve a hide or other observation point above nest height, a nest camera, or officially approved handling of nestlings for research purposes, while avoiding adverse impacts on the nesting event by 'reading' the adults' behaviour and responding accordingly. There is much individual variation in nesting adult Little Eagles' response to observation at various distances (Debus 1983; Debus *et al.* 2007; Debus & Ley 2009), which needs to be taken into account.

We note the risk of nest failure or adult and nestling distress by intrusive photography at raptor nests (e.g. Falkenberg 2023), following repeated flushing or keeping the adults off, and the consequent risk of nest predation, or chick starvation or exposure (to heat and cold). Ethical guidelines for bird photography are provided at <https://birdlife.org.au/how-to/ethical-birdwatching-guidelines/>. We also note that nest photography is discouraged, other than for *bona fide* research with ethical approval. Deliberate or accidental intrusion and disturbance by drones also requires consideration, as they may elicit alarm or attack by raptors.

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