4

Daily life and adaptations

Tawny frogmouth behaviour still poses many questions. This and the following chapters are by no means exhaustive but they provide a window into the night and day life of tawny frogmouths. Much is intriguing and unusual about tawny frogmouths.

Lifespan and interventions

It is not known how long tawny frogmouths actually live in the wild. Banding records of a small sample of 107 recovered birds showed that the oldest was 165 months or 13.75 years of age.[1] Some zoo records might have information on lifespan in captivity but this raises further questions. Captivity can have seriously detrimental effects on lifespan (shortening it) or, at times, may prolong life well beyond normal life expectancy in the wild, making the two sets of data not easily comparable. The data on captive tawny frogmouths, as sparse as they are, certainly suggest a potential for a very long lifespan, if one thinks of the recent report from London Zoo of having to euthanase a tawny frogmouth at the age of 32 years. And then there is the individual adult male rescued in 1994 in New South Wales that is still alive in 2017 at the time of writing the revised copy of this book.

Getting accurate records of optimal lifespan in the wild is not easy for any species. Many birds die well before they reach reproductive age and even those who survive on their own into adulthood can meet with misadventure, especially in modern society with its many civilisation risks. Tawny frogmouths feeding on

roads at night regularly get hit by cars. There are many factors that can foreshorten the life of a bird. However, it is worth noting that Australian birds in general tend to have far longer lifespans than birds in the Northern Hemisphere. For instance, magpies may live for 25–30 years, and many other large Australian birds have been known to live to phenomenal ages of 80 years or more (galah) and even to 100 years of age (sulphur-crested cockatoo), at least in captivity or as pets. Bearing this in mind it is conceivable that the tawny frogmouth's actual optimal lifespan may be much longer than current records suggest.

In the records of tawny frogmouths, there appear to be some contradictions based on scant reports. Records apparently show that, at most, 30 per cent of tawny frogmouth offspring make it to adulthood and survive the first year.[1] More on this later. Suffice it to say at this point, that the overall figure of 70 per cent perishing, often before fledging, would seem remarkably high, although not entirely uncommon among avian species. It was established some decades ago[2] that only 14 per cent of magpies make it to breeding successfully, a sign that even for the best equipped native birds with abundant and amazing physical adaptations and resourcefulness, those that manage to raise offspring successfully are in a minority.

Predation and survival

There are many serious obstacles to overcome in order to survive. First, there are many other birds (among them ravens, butcherbirds and currawongs) that will attempt to steal eggs or kill young birds, mostly to feed their own young, which have a high need for protein during the nestling stage. Currawongs switch largely to fruit as adults and ravens are omnivorous, but for the intense growing bouts of nestlings, high protein food is the preferred food that parents will provide. Birds of prey, such as goshawks, hobbies and falcons, also take eggs and nestlings. Owls are as much a risk to adult tawny frogmouths as to nestlings, even though the boobook owl is slightly smaller than the tawny frogmouth. Rodents, particularly bush rats, collect eggs and regularly cause major damage to clutches of small and large birds alike.

Further, tree-climbing snakes can take eggs and nestlings. Carpet snakes (pythons) in particular can find and take even adult tawny frogmouths during the day.[3] On the coast, where some observations were made in areas with a good population of lace monitors (Fig. 4.1), it is rare for even larger birds to raise any of their clutches in any given year. In the hinterland of Woolgoolga in patches of remaining rainforest, I collected data on the reproductive success of kookaburras, currawongs, magpies and tawny frogmouths for more than 10 years. In the period of observation, the magpie pair managed to raise three offspring (one in 2001 and another two in 2013) and the kookaburras two offspring (2005). The currawong pair has never yet raised a single chick of its own species, although the pair once raised a chick that turned out to be a channel-billed cuckoo, able to vocalise in

ways very similar to begging calls of currawong nestlings. A single tawny frogmouth appears to live a solitary life there and has never even been seen with a partner. Pied butcherbirds were more successful, raising one offspring successfully about every two years. Magpies and currawongs, in particular, get heavily parasitised by channel-billed cuckoos and the common koel. Moreover, the clutch is often taken at egg stage and nestlings are also not safe from lace monitors. Lace monitors are superb tree climbers and very swift in capturing prey (Figs 4.1 and 4.2). Sometimes tawny frogmouths, and other bird species in more subtropical

Fig. 4.1. The lace monitor is an extremely alert and capable hunter and a superb climber of the tallest trees. It can even jump short distances from one tree trunk to another and therefore has no difficulties at all in reaching any nest site close to the stem. This includes those of nest hole dwellers such as kookaburras, rosellas and other parrots and cockatoos (and also arboreal marsupials such as gliders) and tree stem nesters such as the tawny frogmouth.

Fig. 4.2. A lace monitor devouring a magpie juvenile from the feet up. Tawny frogmouths are also a prey item for lace monitors, not only at egg stage or early nestling age but even almost to adult age. Lace monitors also feed on the nests of possums and gliders.

areas where food is plentiful any time of year, may start brooding early in winter in order to miss the re-awakening of lace monitors hungry after bouts of hibernation. This is only a factor in southern latitudes and not in the northern tropical regions where lace monitors remain active for most of the year.

Lace monitors will feed on invertebrates and any of the smaller range of vertebrates (up to the size of ring-tailed possums), dead or alive. Nestlings are particularly easy targets. I have seen a juvenile tawny frogmouth being eaten and have also seen a juvenile magpie being devoured by a lace monitor but here I was far too late on the scene. Half the body was already ingested while the terrified magpie cried like a baby, a sound that is difficult to forget (Fig. 4.2). By contrast, the juvenile tawny frogmouth was silent while its wing was being eaten and only the half-open beak, the wide-open eyes and the raised feathers on the head indicated that the bird was very much alive. As will be discussed in the last chapter, tawny frogmouths have, in fact, very loud distress, fear and warning screams but, surprisingly, in this instance, the bird made no sound whatsoever.

Apart from natural predators and poor weather conditions, the most serious problems for tawny frogmouths arise as a result of contact with human society and

its pets. Cats are the chief villains, according to some reports, but dogs and foxes also occasionally kill tawny frogmouths.[4] Many tawny frogmouths are killed on rural roads,[5] and an unknown number are poisoned by ingesting pesticides.[6] Sometimes this is indirect and death is substantially delayed because some toxins (administered to cockroaches or rodents) are absorbed into fatty tissue and the birds survive without any overt signs of ill health. Then, as the lean winter months wear on and as the birds start drawing on their fat deposits and lose weight, the poison that was previously dormant enters the bloodstream and the birds suddenly die. Winter months can be carnage, with spates of dead adult tawny frogmouths being found as a result of toxins ingested earlier in the year in a warmer season. In other words, life is made rather difficult by the addition of countless hazards and dangers in addition to natural predators, diseases and poisons contained in the environment (see Chapter 5). However, in some pockets, there seem to be particularly favourable conditions in which food availability and nesting opportunities are good and survival to fledging state has been shown to be high.[7]

Roosting and camouflage

Roosting during the day and camouflage go together in tawny frogmouths. However, arguing, as Fleay did,[8] that they never seek shelter and, more often than not, roost on bare branches, is a claim not confirmed by my observations and by other studies.[9] Indeed, it was not uncommon for tawny frogmouths to change day roosts when the sun became too hot or a sheltered area too cold. Boobook owls always seek shelter under well-leafed trees to avoid being seen and mobbed by diurnal passerines. Tawny frogmouths appear similar in size and head shape to boobook owls and can therefore also expect to be mobbed unless they adopt a camouflage posture (explained below). Butcherbirds and noisy miners seem to have a particular dislike of tawny frogmouths, especially juveniles, and will mob them with great regularity.

Here it is necessary to distinguish the behaviour of tawny frogmouths on day and night roosts. Day roosts, of whatever kind, are associated with camouflage posture, whereas night roosts are usually not. I have never once seen tawny frogmouths in camouflage posture at night, and that is over a 20-year period. Hence, it is relatively safe to deduce that camouflage postures are designed to protect tawny frogmouths during the day.

Many writers have commented on how well the markings and colouration of tawny frogmouths work to conceal them (Fig. 4.3). Their facial strobes around the eye further make the bird look more like a branch than a bird.[3] In order to work as camouflage, however, the bird needs to enlist the help of its environment. It needs to have in its immediate vicinity trees that best match its colouration and markings and roost on a branch of such a tree or near a trunk, otherwise the concealment will not be effective (Fig. 4.4). A systematic study[9] confirms this, showing that

Fig. 4.3. Nestlings in their protective camouflage plumage.

tawny frogmouths exhibit a significant roosting preference for the coarse and dark-barked stringy-bark trees but will also frequent smooth-barked, light-coloured gums. If the birds choose the latter, they will then preferentially sit on dead branches usually having a coarser structure and, generally, darker colour than living branches (Fig. 4.5).

Adopting a camouflage posture consists of several movements. It involves stretching the entire body and the head upwards (the beak facing upwards giving the appearance of a branch that is petering out), sleeking down all feathers on the head and body, and closing the eyes to a small, inconspicuous slit (see Fig. 4.7). Once that is achieved, the next phase of the camouflage posture is to stay absolutely still and remain so until the perceived danger is over. There is one added requirement. In many cases, the camouflage posture also has to be angled in the way the tree branches are growing and here the function of having a semi-zygodactyl second toe (as described in Chapter 2) becomes abundantly clear. In order to achieve maximum benefit from the cryptic colouration of its plumage, the bird has to align itself in the direction of the branch, not at a right angle to it (as normal perching would be) and for this it is important to have mobile digits that can fit around the branch lengthwise. If a pair of tawny frogmouths roost together, they do not align themselves in the same direction but will branch out in opposite

Fig. 4.4. The familiar and often described 'stick' or camouflage posture of the tawny frogmouth. The angle of stretching can vary from almost vertically upwards to an angle of nearly 45°. This angle appears to be dependent on the direction of tree branches of the roost.

directions as a mirror image of each other. The effect is that the two birds together now look like the fork of a tree with two branches going in opposite directions but at about the same angle.

The clear preference for day roosts that provide a colouration and patterning similar to their own suggests that the theory of roosting as 'camouflage' is correct. Moreover, the actual physical change to a camouflage posture seems to be genetically embedded and a reflex response. If an unknown stimulus is presented, even two-week old nestlings will engage in the camouflage posture; not very successfully at first, however, because their extensive feathers on the head do not permit the same sleek look as is typical in adults (Fig. 4.6). Choosing the right tree for roosting, by contrast, might well be a learned behaviour because fledglings tend to choose entirely inappropriate roosting spots, at least for the first four weeks post-fledging, and will land and stay on surfaces that expose rather than hide them.

Fig. 4.5. A beautiful demonstration of choice of substrate for a day roost and the protection that the tree affords. The bird is stretching slightly in a camouflage posture and the feet are angled up the trunk.

But is it correct to say that the camouflage posture helps to avoid detection by predators? The camouflage posture is triggered only when a tawny frogmouth becomes aware of an approaching or moving object. That may be a human or a bird of prey. When the tawny frogmouth begins to change its posture, it may well be too late to avoid detection, particularly since changing from a relaxed sitting and sleeping position to a camouflage position involves movement – something predators are very quick to detect. It seems, therefore, rather more likely that the roosting position itself (blending in with the environment) is more important than camouflage posture changes in avoiding detection by an aerial predator. This is possibly different for ground predators where camouflage posture changes might assist tawny frogmouths in avoiding detection. The camouflage does not work at all in the case of reptilian predators because they rely first and foremost on smell. Avoidance of reptilian predators is easy, however, and such predators only constitute a risk to a seriously injured adult frogmouth. Indeed, tawny frogmouths, like kookaburras, can actually kill snakes but, unlike kookaburras, will generally not eat them, unless they are very small.

Tawny frogmouths change day-roost positions surprisingly frequently. Although they will usually remain on the branch of the tree that they occupy at daybreak, they

Fig. 4.6. A nestling will already adopt the camouflage posture when approached. This one, pictured in front of its parent, had its eye nearly shut.

change day-roosting positions from one day to the next. It is relatively rare to see them roost in the same place for more than three days running.[9]

Day roosts and thermoregulation

During day roosting, harm may come to individuals in two ways: from predators and thermoregulatory cost. Sitting all day out in the open, particularly when sitting on bare branches, raises the question of protection from high temperatures in summer months and from cold temperatures in winter months. It would, therefore, make sense for tawny frogmouths to choose positions that do not have all-day exposure to the sun when the sunrays are at maximum strength and supplement warmth by more exposure to the sun when it is cold. Although tawny frogmouths do not always follow this rule, research results have found a significant difference between northerly orientation in winter (more exposure to sun) and protected areas from the sun in summer months.[9]

During daylight hours, tawny frogmouths can sometimes be seen on the ground and passers-by make the mistake of thinking that the bird is injured because it is splayed out, motionless, with wings wide open, beak wide open and eyes shut. But this is not so. Tawny frogmouths go to the ground, even when not feeding, in order to take a sunbath. The warmth of the sun has a strangely paralysing or mesmerising effect on birds (and not just on tawny frogmouths but

magpies, currawongs, indeed many avian species). The bird also moves the head to the side so that the sunrays can penetrate beneath the thick layer of feathers, and may remain motionless for up to five minutes at a time.

This sunbathing behaviour may play a role in thermoregulation, but it may also be related to two other possible benefits. One is the direct administration to the skin of sunrays that will then allow the body to synthesise vitamin D. Another possible benefit is parasite control, either by exposing larvae to more sun than they can sustain or by inviting pests to leave the body. Parasite control is thought to be achieved by dust bathing but, to my knowledge, tawny frogmouths do not use dust bathing.

When there is no sunshine, the reason for coming to the ground during the day[10] is difficult to determine. Why they would do so at times when not feeding is not clear. On those occasions, they often have their wings outstretched as if to support their bodyweight but their eyes are open. I have observed this behaviour on several occasions. Eventually, they will fly up to another roost. It is possible that tawny frogmouths once regularly roosted on the ground, just as their cousins the owlet-nightjars and the nightjars sometimes still do, and were forced back into the trees for roosting because of the multitude of introduced mammalian predators (cats, dogs and foxes). The Eastwood State Forest, in which University of New England researchers conducted their study, is infested with all three ground predators and neither researcher had ever seen a tawny frogmouth roost on the ground.[9]

Sleeping

How is a nocturnal bird able to sleep and rest during the day without getting killed? Actually, having observed them for long periods of time during the day it seems that tawny frogmouths, and other nocturnal birds, rarely ever completely sleep. In fact, all animals, particularly prey animals, suffer all their lives from a fundamental conflict between sleep and wakefulness because sleeping is a dangerous activity. It appears from recent literature that only birds (and possibly some reptiles) have solved this conflict by engaging in unihemispheric sleep. This is a unique state in which one brain hemisphere sleeps while the other remains awake. Rattenborg and colleagues[11] have investigated behavioural, neurophysiological and evolutionary aspects of unihemispheric sleep in birds and have shown that unihemispheric sleep may be chiefly concerned with predator detection. They observed mallards (ducks) sitting in a row and found that any duck in the more vulnerable position at the end of the row (not protected from conspecifics at least on one side) showed an increase of 150 per cent in unihemispheric slow-wave sleep and responded rapidly to visual stimuli presented to the open eye.[12]