

Keeping tabby off the rails

It is a well-established and sad statistic that among birds, island-dwelling and flightless species are at greatest risk of extinction. Of the 138 bird extinctions that have occurred since 1600, 124 were on islands. Some of these were extremely rapid. The Stephen Island Wren *Xenicus lyalli*, a bird with a world range of less than three square kilometres, was 'discovered' by Tibbles, the lighthouse keeper's cat, in 1894. By the end of the same year, Tibbles had hunted the wren to extinction.

In terms of post-1600 extinctions, the hardest-hit family has been the Rallidae – the rails and crakes. At least 11 species are extinct – all of these lived on islands and all were either flightless or near-flightless. Of the extant Rallidae, 33 species are globally threatened. Of these, 22 are confined to islands and of these insular forms, fewer than 50 per cent can fly.

Only one flightless bird survives in the vast expanse and numerous islands of the tropical Indian Ocean – the Aldabra Rail *Dryolimnas [cuvieri] aldabranus*. Once widespread throughout the Aldabras, by 1977 its range had shrunk to three islets within Aldabra Atoll. Feral cats had driven it to extinction on surrounding islands and on two of the Atoll islands, including the largest, Grande Terre. In 1999, a FitzPatrick expedition successfully re-introduced 18 birds from Malabar Island (by far the largest population, about 6 300 birds and representing approximately 90 per cent of the species' global numbers) to the now cat-free island of Picard (where rails had been extirpated pre-1900). Within months these birds were breeding successfully and the population has grown exponentially ever since.

Despite this success, the fact remains that the world population is confined to four adjacent islets within a single



Flightless survivor – but it would take a founder population of only one pair of cats to reduce the world population of Aldabra Rail by more than 90 per cent in less than a decade.

atoll – there are no *ex situ* populations. This is a scenario consistent with a high risk of stochastic extinction through, for example, disease. It also places the population at risk through predator introductions – there are still cats on Grande Terre, adjacent to the surviving populations of rails.

The rails are highly territorial, and not only has the Malabar breeding population remained unchanged for at least the past 20 years, but the island is saturated with territories. A consequence of this is that there are more birds on the island than there are breeding opportunities, resulting in a population of non-breeding 'floaters', which wait to appropriate a breeding vacancy. At the time of this study, there were about 1 700 floaters – the size of this sector of the population had never previously been estimated. Having studied some of the important breeding parameters of the species, Ross Wanless and Phil Hockey set out to model the likely impact of the introduction of cats to Malabar Island. They first modelled the population's

response to different climate scenarios, ranging from very wet (good) to very dry (poor) conditions. Even in a succession of dry years, with chick production decreasing and adult mortality increasing, the floater population was a sufficient 'buffer' for the breeding population to remain saturated, even though at times the floater population was very small. Based on these results, they predicted that the floaters might also provide a buffer against cat predation.

And they did, but nowhere near as effective a buffer as floaters offer against climate variation. If one pair of cats arrived on Malabar, and females produced (a very conservative number of) four kit-

tens per year, and if each cat ate only one rail per week, rails would be extinct within approximately seven years. This model had everything stacked in the rails' favour – even cat density was not allowed to exceed one animal per hectare. But once the floater pool has gone and predation encroaches on the 'capital' of the breeding population, the writing is on the wall.

In conclusion, territorial behaviour and the existence of the resultant floater population provides a very short-term buffer against predators – perhaps just long enough to eradicate them if they are detected in time...

On a positive note, the study provided one piece of good news for the rails. Although predation by cats would signal their demise, the Malabar population, by virtue of its floaters, is resilient to the removal of at least 100 breeding pairs per year (into perpetuity and even during a succession of dry years) for introduction programmes elsewhere. The challenge is to render other potential sites of re-introduction predator-free. □

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