

LEARNING FROM LOSS

Ecologists **John Woinarski, Stephen Garnett, David Lindenmayer** and **Sarah Legge** conduct an unofficial inquest into three recent extinctions.

A speeding train leaves its rails and crashes into a car park, with many casualties. Five recent cases of an obscure cancer are clustered around a chemical factory. While waiting for medical attention a child dies in the emergency ward of a hospital. A wildfire ignited by a fallen powerline kills two people. Governments respond to such tragedies – and the community expects them to respond – with a formal public inquiry, typically by a coroner, to identify the causes and contributing factors, and the regulatory or policy shortcomings that allowed them to occur. These inquiries are not only for establishing culpability but, more importantly, for recommending reforms that make it less likely they will recur. They also provide a forum for affected parties with differing views to debate and conciliate.

We think there should be similar public inquiries whenever a species goes extinct – to identify what went wrong, and how laws, policies and practices can be improved to reduce the likelihood of future extinctions.

Australia has an appalling record of extinctions, losing more plants and mammals over the past 200 years than any other country. Extinction trends suggest that we have learnt little from these losses, for they are occurring still. Just in the past decade two more mammals and a reptile have gone: the Christmas Island pipistrelle (on 26 August 2009), the Bramble Cay melomys (between 2009 and 2014), and the Christmas Island forest skink (on 31 May 2014).

Currently, governments are mute in response to extinctions. There is no obligation for review or to apportion culpability. In such absence, we conducted an unofficial inquiry into the three recent extinctions, with our review published in the journal *Conservation Biology*. We followed the steps typical of coronial inquiries – detailing the circumstances of the ‘deceased’ and their ‘deaths’, identifying causal or contributory factors, and recommending reforms. Most conservation biologists who examine extinctions focus on ecological causes, such as habitat destruction or introduced predators. We took a broader perspective, by considering also the legal, policy and management failings.

The deceased

All three species were endemic to islands, two to Christmas Island and one to Bramble Cay. This is no aberration. Islands (those smaller than Tasmania) comprise less than 0.5% of Australia’s land area, but island species have accounted for at least 24% of Australia’s extinctions. It is a world-wide characteristic: islands are a crucible for radiation of species, but also such risky places that they readily become biodiversity graveyards. With small populations and low genetic variability, island species may have little resistance to new diseases, the plants may have few defences against introduced herbivores and the animals may be naive to new predators.

The Christmas Island pipistrelle was a tiny bat common in its small range until about the 1980s, after which it declined at a more or less constant rate, as was well documented by monitoring. The main extinction driver was likely to be an introduced predator (the giant centipede or wolf snake), but this is conjectural. Although there was a recovery plan, which was partly implemented, the plan did not have trigger points for an emergency response (such as captive breeding) or specify what the response should be. Without a predefined process, governments dithered in response to the predicted extinction.

The fate of the Christmas Island forest skink was similar, although there was little monitoring and its imperilled status was not officially recognised until far too late. It was listed as threatened (critically endangered) only four months before its extinction, about 15 years after a substantial decline was first recorded. The ecological causes of its demise are unknown, but probably involved one or more introduced predators.

The Bramble Cay melomys was a small rodent known only from a 5 hectare low-lying island in Torres Strait. Like the pipistrelle, its recovery plan lacked consideration of an emergency response. Almost certainly what delivered its extinction were one or more periods of inundation of the island due to storms and a gradual rise in sea level, probably resulting from global climate change.

Christmas Island forest skink (*Emoia nativitatis*). Photo: Hal Cogger

EXTINCT
31 MAY
2014



Bramble Cay melomys (*Melomys rubicola*). Photo: Ian Bell



Christmas Island pipistrelle (*Pipistrellus murrayi*). Photo: Lindy Lumsden

Legal and policy shortcomings

We found several legal shortcomings, particularly of Australia's main environmental legislation, the *Environment Protection and Biodiversity Conservation Act 1999*, that contributed to the extinctions.

First, it is not an offence under that act to cause, contribute to, or fail to take reasonable actions to prevent an extinction. We found some evidence that actions or lack of actions by agencies or individuals contributed to the extinctions. When bureaucrats refused to include an option for captive breeding in the recovery plan of the melomys and a nomination to list the forest skink as threatened was blocked, these officers operated with legal impunity.

Second, the power of the act pivots narrowly on a small set of 'matters of national environmental significance'. Biodiversity-rich islands are not specifically included in this set, even though they make a distinctive contribution to Australia's biodiversity and island endemics are highly susceptible to extinction. The powers under the act to protect threatened species also operate far better (although suboptimally) for cases where impacts are acutely defined (such as proposals for major developments) than for cases where threatened species face more pervasive, diffuse and chronic threats, such as introduced predators (the likely primary cause of two of these extinctions).

Third, accountability is very poorly described in the act, such that extinctions can occur without it clearly being the responsibility of any minister, government, department, landholder or official.

Fourth – and the trigger for our assessment – there is no obligation to formally and publicly inquire into extinction events: they simply happen and we move on.

Finally, there are no legal obligations for the national listing of threatened species to be comprehensive or regularly reviewed, for all threatened species to have recovery plans, or for recovery plans to be implemented. The long interval between when substantial decline of the forest skink was recorded and when it was listed as threatened meant it was not afforded, until far too late, any priority for research or management. And despite the melomys having a recovery plan, we found no record of any activity devoted to its conservation.

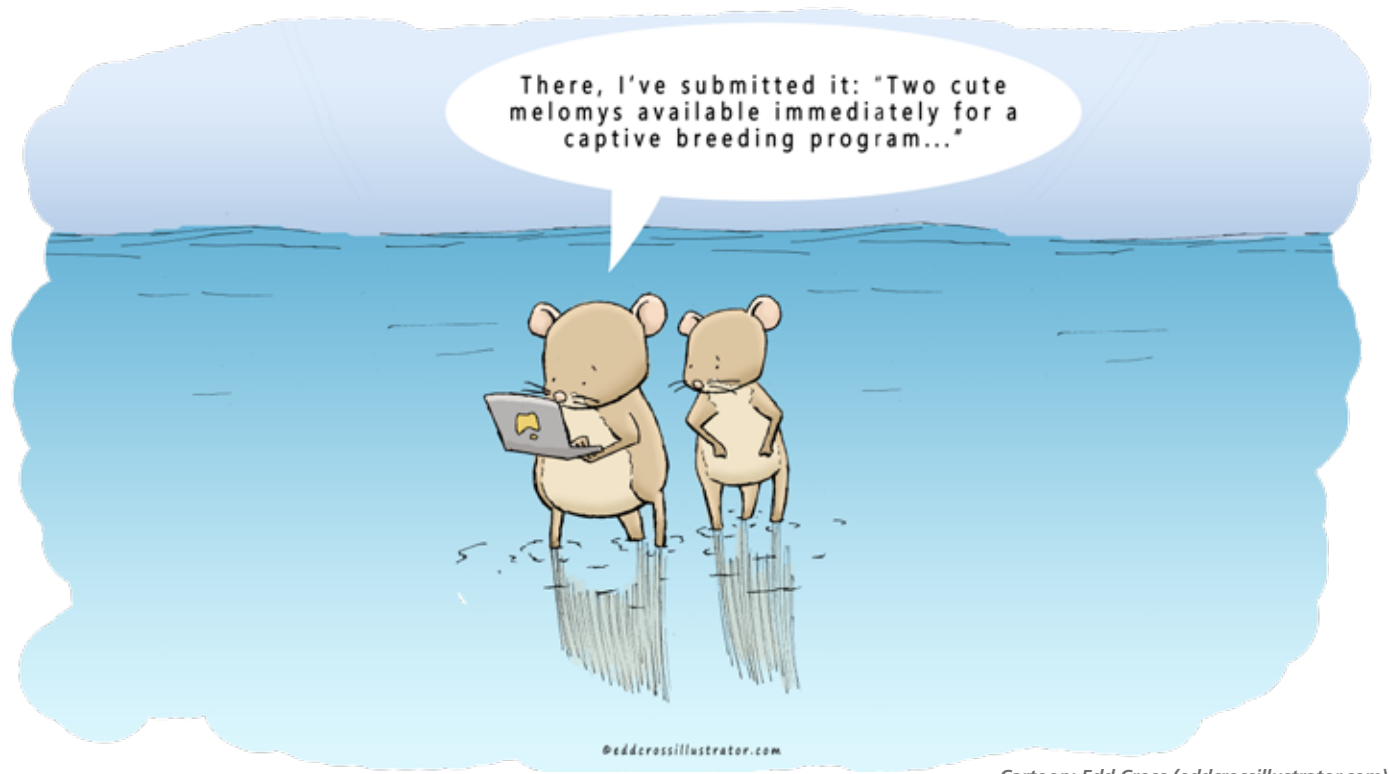
Shortcomings in national policy also contributed to the extinctions. Our principal conservation policy, *Australia's Biodiversity Conservation Strategy 2010-2030*, is tepid about biodiversity loss. The United Nations 2015 sustainable development goals require countries to 'take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species', but there is no such target in our biodiversity strategy – indeed, extinction is barely mentioned. This deficiency has been partly addressed with the recent (2015) development of Australia's first Threatened Species Strategy, which has an explicit commitment to avert extinctions.

A second policy failing is lack of funding, with the Australian government spending markedly less on the environment, relative to its assets and needs, than most other developed countries. Current trends are for further declines in this meagre tithe. The money spent on trying to save the three species was miserly. Applications to fund management-focused research for the pipistrelle and melomys were rejected under the Caring for Our Country program, Australia's then-premier funding arrangement for conservation.

Third, policy at the time was influenced by the concept of conservation triage, that the available funding for conservation should be prioritised for species perceived to be particularly valuable (evolutionarily distinctive, charismatic or useful) and not frittered away on apparently hopeless cases with little perceived value. Our three victims were all fairly nondescript species with little evolutionary distinctiveness and could be considered to be of no use for humans. The extinction of such species is likely to be an inevitable consequence of the triage approach.

Fourth, although we are an island nation and so should be attuned to the need for strong biosecurity, quarantine for most Australian islands is woeful. Many invasive species harmful for the distinctive native species have been and continue to be introduced, including to Christmas Island.

Finally, our national approach to greenhouse gas emissions is decidedly suboptimal, and insufficient to constrain climate change, which will ratchet up the loss of Australian biodiversity or the difficulty of maintaining it. The melomys may have been the first species to go extinct due to rising sea levels associated with human-caused global climate change. ▶



Cartoon: Edd Cross (eddcrossillustrator.com)

Management and advocacy shortcomings

There was very little effort to save the three species or manage the putative threats. Nor was there much attempt to measure the success of, and then to refine, the limited actions taken.

Part of the problem was shortcomings in research. Researchers mainly contribute to species recovery by identifying the ecological drivers of decline, and providing advice on how to manage threats most effectively. This did not happen for the three species, mainly because of very limited and episodic funding for research. Identifying drivers was particularly challenging for the Christmas Island species, for there were many possible threats that defied ready elucidation, and the species' rapid decline allowed little time for thorough, staged investigations. Because researchers could not provide a clear, evidence-based focus for allaying threats, managers were left impotent.

Another concerning feature was the almost complete lack of public reporting of research and monitoring results, limited though they were. These were assembled mostly in unpublished reports to government and not readily available to the public or researchers.

Because the information was scarce, the public had little basis for concern and advocacy. This meant that little pressure was exerted on politicians and government agencies to save the three species, or – in a vicious cycle – for them to invest in the research that would demonstrate the imminence of extinction. This is a recurring pitfall for threatened species with the misfortune of inhabiting areas remote from most people, or that lack charisma or evolutionary distinctiveness.

One other notable feature, for which the evidence is obscured in the intricate internal mechanics of government agencies, is that individual bureaucrats may have contributed to these extinctions by their action or inaction. Governance standards should be sufficiently robust that the fate of species does not hang so capriciously on the foibles of individuals who occupy pivotal roles in environmental agencies.

Remedies

We concluded there was no single cause for any of the extinctions, but that a range of shortcomings in law, policy, management, research, monitoring and advocacy collectively and

idiosyncratically led to the losses. Remedying any one of these failings may have allowed the species to survive. Remedying them now will make future comparable extinctions less likely.

Hindsight renders the shortcomings far more apparent than they may have been at the time. Such retrospective assessment is instructive, and all of those who have some responsibility for protecting our biodiversity should learn from these lessons.

We think there is support in our community, within government departments and among politicians for avoiding extinctions. Public inquests into extinctions would help build this support and ensure that losses are not totally in vain. ■

READING: Woinarski JCZ, Garnett ST, Legge SM, Lindenmeyer DB. 2017. The contribution of policy, law, management, research, and advocacy failings to the recent extinctions of 3 Australian vertebrate species. *Conservation Biology* 31(1):13–23

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