

## Frogs still in a dark place?

### Reply to Parris et al., 2023

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## **Frogs still in a dark place?: reply to Parris *et al.* (2023).**

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Lists of threatened species are a critical foundation for conservation actions. In contrast to some other nations (e.g., the USA), Australian legislation, the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), imposes no obligation for monitoring or regular review of the status of species on its list of threatened species. Most of the animal species formally regarded as threatened in Australia were listed in 2000, typically under listing criteria that differed from current practice, and where eligibility against those criteria was not explicitly described. As such, there is inbuilt inertia in the list, and some species presently listed do not meet current eligibility criteria, and their ongoing inclusion potentially distorts conservation investment from species in more need, and fails to recognise conservation success.

Recovery is a highly nuanced concept (Westwood *et al.* 2014) and the term is not defined explicitly in the EPBC Act. In Woinarski *et al.* (2023), we considered it to be a reduction in extinction risk such that the species no longer met eligibility criteria for listing as threatened. We did not assume that this would need to be to the prelapsarian state (i.e., return to initial population size and across its entire former distribution), although of course management that achieves this outcome is ideal.

In Woinarski *et al.* (2023), we attempted to assess the fit of all 495 animal species listed under the EPBC Act to the current eligibility criteria. We were not advocating for de-listing of those species that fail to meet the eligibility criteria. As we state in our paper, the assessment criteria used under Australian legislation largely mirrors those of the IUCN Red List, but the EPBC Act contains explicit inbuilt safeguards against de-listing, including: (i) that, whereas the public can nominate species for adding to the list, nominations for de-listing can only be made by the independent Threatened Species Scientific Committee; and (ii) the Act will not permit de-listing if listing is contributing to the conservation of the species (even if the species no longer meets eligibility criteria). Finally, while our

study proposes species whose extinction risks have notably reduced, formal assessments carried out under the EPBC Act, including considerations to de-list species, would explicitly include a public call for all available relevant data, including grey literature and unpublished information such as some of the reports cited in Parris *et al.* (2023).

Our study was straightforward for taxonomic groups for which there has been recent comprehensive review of status, most notably for birds (Garnett and Baker 2021). However, it was more challenging for some other taxonomic groups, including frogs and invertebrates. As is the case globally, many Australian frog species suffered rapid catastrophic declines – including extinctions – from chytridiomycosis caused by the fungal pathogen *Batrachochytrium dendrobatidis* from about the late 1970s. Many are still threatened by chytrid, and other factors. However, fortunately, other Australian frog species that experienced major declines after their initial exposure to chytrid have subsequently stabilised or shown some or substantial recovery (Scheele *et al.* 2014). For example, Scheele *et al.* (2017) noted that recovery has been observed for the threatened *Taudactylus eungellensis*, *Litoria rheocola*, *L. nannotis*, *Mixophyes balbus*, *M. iteratus* and *Mixophyes fleayi*, albeit in some cases this is tenuous and dependent upon careful ongoing conservation management (Scheele *et al.* 2019). Two (*Litoria rheocola* and *L. nannotis*) of the species listed as threatened because of decline caused by chytrid have already been de-listed, and were amongst the four frog species we considered as recoveries.

The case for the other two frog species we included as recoveries, *Litoria raniformis* and *L. dayi*, is more contestable. As indicated by XXXX, declines are still occurring in parts of the range of both species. However, in both species, their populations have stabilised in other important parts of their range – e.g., McKnight *et al.* (2017) for *L. dayi* – to the extent that they are unlikely to be eligible for listing under Criterion A (rate of population decline). This is because their **overall** population decline is unlikely now to exceed the eligibility threshold of 30% over 10 years or three generations (probably 9-12 years for these species), a criterion they validly met when first listed in 2000, after and while still undergoing severe declines following their exposure to chytrid. *Litoria raniformis* would also fail to qualify for listing under Criterion B (small geographic range, few locations and ongoing decline), as it remains widespread (exceeding the eligibility threshold of 20,000 km<sup>2</sup> for Extent of Occurrence and 2,000 km<sup>2</sup> for Area of Occupancy) (Figure 1). Furthermore, the persistence of some populations of *L. raniformis* is being facilitated by some human activities: for example Clemann and Gillespie (2012) noted that it ‘commonly occurs in artificial waterbodies’. The partial recovery and reduced extinction risk of *L. dayi* has been recognised with formal downlisting from Endangered to Vulnerable in 2019. However, as suggested by XXXX, we acknowledge that the small area of occupancy and extent of occurrence of *L. dayi* may justify ongoing listing under Criterion B, if the overall population size is continuing to experience some decline, and if it now occurs at <10 locations.

We are grateful for the advice and further information provided by Parris *et al.* (2023), and welcome their ongoing efforts to support the conservation of *Litoria raniformis* and *L. dayi*. Notwithstanding any dispute about these two species, our fundamental points remain valid: (i) the existing Australian threatened species list should be subject to mandatory periodic trend monitoring and review based on comprehensive assessments of all relevant information about the status of listed species, to enable structured review of the objectives of the Act, and investment priorities; (ii) the majority of

Australia's threatened species are not recovering, and our review highlights the associated characteristics (threats, actions and species) of this ongoing trend; (iii) but some currently listed species have recovered or are recovering, in some cases to the extent that they no longer meet eligibility criteria under the EPBC Act, and it is important to recognise, celebrate and learn from such cases of recovery and conservation success.

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Figure 1. Change over time in the Australian distribution of *Litoria raniformis*, demonstrating broad-scale persistence across much of its large area of occupancy and extent of occurrence. Data from the Atlas of Living Australia. **A** May 2004-April 2010; **B** 2010 – 2016; **C** 2016 – 2022 (Atlas of Living Australia occurrence downloaded at <https://biocache.ala.org.au/occurrences/search?&q=qid%3A1681702973483&disableAllQualityFilters=true> accessed on 17 April 2023). The dense clustering of records in the greater Melbourne region and parts of the Murray River system reflects a combination of high reporting rates due to high human population, high fauna survey effort associated with high development pressures and areas of focused research and monitoring.

