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Letter to the Editor

Analyses of extinction risk are an important part of the conservation process – Reply to Monks

It is the sheer number of unknowns that makes conservation a challenging enterprise. Limited information on species' biology, and threats to their persistence, are inherent features of conservation biology. Thus, conservation efforts rely upon expert opinion to fill in the gaps to make assessments of extinction risk. For instance, a recent global analysis of the conservation status of reptiles used a large international team of herpetologists to develop threat assessments using IUCN Red List Criteria (Böhm et al., 2013), a process involving a degree of subjectivity and reliance on expert opinion.

A similar approach was adopted to estimate extinction risk of New Zealand (NZ) reptiles, using an expert panel and NZ Threat Classification System criteria (Hitchmough et al., 2010). The criticisms by Monks (2013) of our analysis of extinction risk determinants in NZ lizards (Tingley et al., 2013) can therefore be interpreted as a broader comment on potential limitations of extinction risk analyses, rather than a critique of issues specific to our study. We built upon preliminary analyses conducted by Hitchmough et al. (2010), of which Monks (nee Hoare) was a co-author. Importantly, Hitchmough et al. (2010) used the same 2009 threat rankings and examined similar correlates of extinction risk (body size, habitat use, predation). However, our study was based on a more appropriate analytical approach and a more comprehensive dataset of intrinsic traits and extrinsic threats, and was developed independently of the information used by the panel.

Monks (2013) claims that the expert panel used all four of our key predictors of extinction risk (body size, range size, habitat specialisation, rainfall) when assigning conservation rankings, due to limited empirical data for some species. However, removing species that were assigned a 'Data Poor' qualifier (i.e. species for which expert opinion was most heavily relied upon) does not significantly diminish the explanatory power of our model, with R^2 changing from 65% to 61%. Furthermore, Monks' (2013) assertion is misleading. Firstly, our study updated the taxonomy of the herpetofauna atlas to obtain precise and current estimates of range size. We also controlled for the potential circularity of including range size as a predictor by excluding species that were qualified Range Restricted or One Location due to their geographic range. Importantly, this did not alter our general conclusions. Secondly, the panel used a simple measure of habitat specialisation as a proxy for area of occupancy. In contrast, we used GIS layers to calculate the number of habitat types occupied by each species (correcting for range size). Thirdly, Monks (2013) claims that the panel considered habitat loss, and thus indirectly considered rainfall as it may correlate with historical land use change. However, our analyses included human population density and habitat loss. Thus, the influence of rainfall is likely to extend beyond land use change, and it is incorrect to suggest that the panel considered rainfall. Accordingly, the panel only used two of our main predictors (body size, range size) in their deliberations, and they did not include the same level of detail as in our study. The other two predictors did not influence the panel's decisions. In addition, Monks (2013) ignores other important variables that were not included in the highest-ranked model (human population density, predators, activity) that provide novel insights into the threats facing NZ lizards.

We argue that our study helps, rather than hinders our understanding of extinction risk, and plays an important role in the conservation process. Our study was not the final say on the issue, but rather a stage in a feedback loop that is central to conservation. Using our model, we highlighted 12 species that were predicted to have a higher extinction risk than that assigned by the panel, and predicted initial conservation rankings for eight data deficient species. The updated 2012 conservation rankings for NZ lizards (Hitchmough et al., 2013) were released after the publication of our study and, where changes occurred, our predictions were correct in 50% (4/8) of instances (Monks' response confirms our study was completed independently of the panel). For the remaining species, our model was more conservative than the panel, assigning 3 of 4 species to the category below that selected by the panel. Thus, even if Monks (2013) is correct in stating that our study only "summarizes the rationale of the expert panel", our model still provides a quick and reliable way to assign a preliminary threat ranking for newly discovered species. In contrast, Monks' (2013) proposal to use a meta-analytical approach based on population trend data is good in theory, but would be expensive, time-consuming and take decades to achieve, particularly given the limited knowledge of most threatened lizards. Does our study on extinction risk in NZ lizards hinder our understanding of threats to this group? No, it represents an important step in the feedback loop that constitutes the conservation process.

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