



**HAL**  
open science

## **Denying that we may be experiencing the start of the Sixth Mass Extinction paves the way for it to happen**

Robert H Cowie, Philippe Bouchet, Benoît Fontaine

► **To cite this version:**

Robert H Cowie, Philippe Bouchet, Benoît Fontaine. Denying that we may be experiencing the start of the Sixth Mass Extinction paves the way for it to happen. *Trends in Ecology & Evolution*, 2025, <10.1016/j.tree.2025.06.001>. <mnhn-05122634>

**HAL Id: mnhn-05122634**

**<https://mnhn.hal.science/mnhn-05122634v1>**

Submitted on 23 Jul 2025


**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



HAL Authorization

# Denying that we may be experiencing the start of the Sixth Mass Extinction paves the way for it to happen

Robert H. Cowie <sup>1,\*</sup>, Philippe Bouchet<sup>2</sup>, and Benoît Fontaine<sup>3</sup>

Arguing that we are not currently experiencing a Sixth Mass Extinction, or at least playing down its possibility, gives support to those who would happily allow it to happen. Wiens and Saban [1], in a critique of the notion that we are already enmeshed in the Sixth Mass Extinction, cited a number of publications that have appeared over the last decade or more, including one of our own [2]. However, in that paper, we were careful not to state that we are witnessing the Sixth Mass Extinction, since, as Wiens and Saban [1] emphasized, we are not near the traditional, admittedly overly simplistic, though perhaps usefully heuristic, threshold for the definition of a mass extinction: 75% of all species going extinct in a short timeframe [3]. We also acknowledge that comparisons with background extinction rates are complicated, and that the current wave of extinctions is largely non-marine, while the previous mass extinctions have been largely marine, notwithstanding the demise of the giant dinosaurs. But we did, however, posit that at the current rate of extinction, as estimated by ourselves and others, whom we cited, and across diverse major taxa, we may well be headed in the direction of a new mass extinction event.

We were stimulated to write our review [2] by a paper by Briggs [4] in which he considered the Sixth Mass Extinction to be ‘a speculation without substance’. The basis from which he drew this conclusion was the then current version of the International Union for the Conservation of Nature (IUCN) Red List [5], which listed fewer than 1000 extinct species out of the roughly 2 million known species (0.05%). However, this approach is flawed; the correct approach is a comparison of the number listed as extinct with the total number evaluated. Currently, IUCN has evaluated 166 061 species and lists 926 as extinct on the Red List (0.6%) [6]. Yet Wiens and Saban [1] stated that ‘<0.1% of known species have gone extinct over the last 500 years’, so their calculation must have been based on the listed extinct species at their time of writing (955) out of 2.157 million known (‘described’) species (0.04%, i.e., ‘<0.1%’), an order of magnitude less than the correctly calculated proportion. This calculation drives their reasoning and leads them to false assertions, such as: ‘Importantly, the magnitude of current species loss is low’. Lomborg [7] took a similar stance, arguing that the IUCN data on extinct species are the only dependable and true data from which to calculate rates, but he also compared those data with total biodiversity, not with total IUCN Red List evaluations followed by extrapolation to total biodiversity. To assess the real level of total biodiversity extinction, the only way is by extrapolation from known data, be they Red List data or otherwise.

Many species are known to be extinct but have not yet been evaluated by the IUCN, as we have documented for molluscs [8]. And based on a random global sample of land snail species, including unlisted species, we estimated that around 10% had gone extinct over the last 500 years [9]. Extrapolating from this to all terrestrial biodiversity, and acknowledging that extinction in the marine realm has been negligible by comparison, we calculated a range of 7.5–13% for all of biodiversity [2]. Of course, such an extrapolation is certainly bold, but even if we were wrong by an order of magnitude, the number of extinctions is still huge, around 20 000.

Wiens and Saban [1] noted that 75% of extinctions occurred on islands, though only 20% of species occur on islands, as if to say we can ignore those because they are special, which of course they are – think Galapagos, Hawaii, Macaronesia, Ogasawara – but that is no reason to set them aside. Indeed, those numbers are based, according to their citations, largely on vertebrates and plants, which (i) do not have the same patterns of range sizes/endemism (and thus vulnerability) as invertebrates, and (ii) have been the subject of much more conservation attention than invertebrates, especially birds and mammals. These groups are not representative of the whole of biodiversity, since they are far more comprehensively known and evaluated by the IUCN. Because they are so well known, we have a more accurate sense of their extinctions, and because they are well known, and many are charismatic, they also experience much greater conservation attention than the multitudes of invertebrates, as well as plants.

As Wiens and Saban [1] reported, conservation actions for vertebrates have had some positive outcomes. This was also noted by Langhammer et al. [10], half of whose data were from studies in Western Europe, North America, Australia and New Zealand. But Wiens and Saban [1] also stated that ‘habitat preservation that benefits vertebrates might also be valuable for protecting plants, invertebrates, and other organisms’. However, the umbrella species concept has limits, and has seldom been tested for invertebrate conservation [11]. These taxonomic and geographic biases will of course enhance the success of conservation action compared with what is happening to invertebrates and to a great degree also plants, in, for example, the sub-Andean ranges, forests of Southeast Asia, Madagascar and oligotrophic lakes, or more generally in the Global South, and indeed on many oceanic islands.

Wiens and Saban [1] acknowledged the gravity of the situation. However, we suggest that (i) to deny (or even question) the Sixth Mass Extinction, or at least to deny or question that we may be at the start of the Sixth Mass Extinction, and (ii) to represent conservation actions and their successes in an overly positive light, have the potential to be taken as a green light by those who would embrace the supposed lack of a crisis, thereby facilitating the ongoing destruction. While it is difficult to find evidence either for or against the importance for general public perception of referring to the current situation as a potential mass extinction (no one has done the necessary surveys), it is important to counter the rise of extinction denialism, which may serve the self-interests of politicians and industrialists, wielders of power, who in many cases would rather ignore environmental issues [12]. While scepticism is a genuine component of scientific advancement, denying or even in this case ‘questioning’ the possibility that we may be at the start of a Sixth Mass Extinction, as Wiens and Saban [1] do explicitly (if only with their title), is grist to the mill of such powerful people (who may only read the title) and undermines biodiversity conservation [13,14]. Scepticism is one thing, but we feel that Wiens and Saban [1] take it too far.

### Acknowledgments

We thank Daniele Silvestro and Andrea Stephens for thoughtful comments on the manuscript.

### Declaration of interests

The authors declare no competing interests.

<sup>1</sup>Pacific Biosciences Research Center, University of Hawaii, Honolulu, HI, USA

<sup>2</sup>Institut Systématique Evolution Biodiversité (ISYEB), Muséum

National d’Histoire Naturelle, CNRS, Sorbonne Université,  
EPHE, Université des Antilles, Paris, France

<sup>3</sup>UMS 2006 Patrinat (OFB, CNRS, MNHN), Centre d’Ecologie et des Sciences de la Conservation (UMR 7204), Muséum National d’Histoire Naturelle, Paris, France

\*Correspondence: [cowie@hawaii.edu](mailto:cowie@hawaii.edu) (R.H. Cowie). <https://doi.org/10.1016/j.tree.2025.06.001> © 2025 Elsevier Ltd. All rights are reserved, including those for text and data mining, AI training, and similar technologies.

### References

1. Wiens, J.J. and Saban, K.E. (2025) Questioning the sixth mass extinction. *Trends Ecol. Evol.* 40, 375–384
2. Cowie, R.H. et al. (2022) The Sixth Mass Extinction: fact, fiction or speculation? *Biol. Rev.* 97, 640–663
3. Barnosky, A.D. et al. (2011) Has the Earth’s sixth mass extinction already arrived? *Nature* 471, 51–57
4. Briggs, J.C. (2017) Emergence of a sixth mass extinction? *Biol. J. Linn. Soc.* 122, 243–248
5. IUCN (2014) IUCN Red List. [www.iucnredlist.org/en](http://www.iucnredlist.org/en)
6. IUCN (2024) The IUCN Red List of Threatened Species. Version 2024-2. [www.iucnredlist.org](http://www.iucnredlist.org)
7. Lomborg, B. (2001) *The Skeptical Environmentalist: Measuring the Real State of the World*, Cambridge University Press
8. Cowie, R.H. et al. (2017) Measuring the Sixth Extinction: what do mollusks tell us? *Nautilus* 131, 3–41
9. Régnier, C. et al. (2015) Mass extinction in poorly known taxa. *Proc. Natl. Acad. Sci. U. S. A.* 112, 7761–7766
10. Langhammer, P.F. et al. (2024) The positive impact of conservation action. *Science* 384, 453–458
11. Fontaine, B. et al. (2007) Priority sites for conservation of land snails in Gabon: testing the umbrella species concept. *Divers. Distrib.* 13, 725–734
12. Oreskes, N. and Conway, E.M. (2010) *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues From Tobacco Smoke to Global Warming*, Bloomsbury Press
13. Lees, A.C. et al. (2020) Biodiversity scientists must fight the creeping rise of extinction denial. *Nat. Ecol. Evol.* 4, 1440–1443
14. Saunders, M.E. et al. (2025) Understanding and counteracting the denial of insect biodiversity loss. *Curr. Opin.2 Trends in Ecology & Evolution*, Month 2025, Vol. xx, No. xx