Reply to: Shifting baselines and biodiversity success stories

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REPLYING TO Z. Mehrabi & R. Naidoo *Nature* https://doi.org/10.1038/s41586-021-03750-6 (2022)

In the accompanying Comment[1], Mehrabi and Naidoo argue that the conservation usefulness of the Living Planet Database (LPD) is limited by its recent timeframe. We thank Mehrabi and Naidoo for their comments, and welcome discussion about the conservation implications of global population trends. We preface our response by stating that we unequivocally agree that ongoing conservation is critical for safeguarding Earth's biodiversity, and (re)emphasize that our results do not suggest that the planet's vertebrates are "doing ok." Our paper[2] shows that there are widespread declines in many vertebrate populations, and we identify where these are most severe. These declines are not negated by our finding that other systems are broadly improving. We report both increases and decreases to provide a balanced characterization of the data. We are upfront in the abstract that the data and results are for recent time-scales: 1970 to the present.

We raise two points about this the arguments presented in the Comment[1]. First, while we agree that 'shifting baselines' are a real conservation concern, and we support analyses that include pre-1970 population sizes (when those are available), trends in recent decades are also highly relevant to conservation policy. Since 1970 there has been an accelerating global environmental movement, matched to some extent by legislation and policy, particularly in the global north. At the same time, the world has seen increases in globalization, per capita consumption, and human population size. We need to understand trends over recent time frames to understand where (and potentially why) we are moving in the right direction and where we are not.

Second, assessments of population change should be anchored by data, and empirical estimates of populations are more widely available over relatively recent timeframes. While we also value indirect proxies (for example, expert opinion or species distribution models), they also have limitations that should be acknowledged; these proxies do not replace and should not be confused with direct trend estimates. If we want to engage in broad global comparisons we need broad global data, and the LPD is the most comprehensive dataset on animal population trends available.

Mehrabi and Naidoo are also concerned that populations that have been stable since 1970 will be over-interpreted as a conservation success, pointing to examples such as the Javan rhino, Iberian lynx and North American bison that experienced large declines before 1970 and have recently improved but have not yet recovered. We wholeheartedly agree that more conservation action is needed, but disagree that scientists should downplay successes. After massive population declines up to 1970, the most likely fate of a population would surely have been further decline. It is a success story when populations increase tenfold (Iberian lynx) or to substantial numbers (around 500,000 bison). For the critically endangered Javan rhino, preventing extirpation across five decades is a heroic feat that required substantial conservation investment, and each animal added should be celebrated as a success story in this context. Conservation is a long and hard game: we can celebrate wins while recognizing that more investment towards recovery is needed.

Finally, Mehrabi and Naidoo argue that we should guard against the misinterpretation that, "but for 1% of populations, on average the planet's biodiversity is doing ok." We strongly agree—for this reason, both our abstract and paper highlighted where broad-scale declines are occurring. Just because more systems were improving than declining does not obviate the need for conservation; improvements in one region (for example, Europe) do not negate the importance of losses in others (for example, Asia).

Our finding that 'not everything is declining' in no way implies that conservation is no longer needed. Beyond the few extreme populations, we explicitly highlighted that the aggregate trend masked variation and important declines in the remaining 98.6% of populations. Of the world's 57 taxa–region systems, ten (17.5%) showed evidence of strong systematic decline, within which 87% of populations were strongly declining. Seven of the ten declines had high uncertainty, but this highlights systems that urgently require better data. Here, precautionary policies would be appropriate. Even in the stable or increasing systems, around 15% of populations were also experiencing strong declines, and these populations could be the targets of conservation action.

In summary, considerations of historical baselines and contemporary trends are complementary. Within the trend data, our paper shows that almost one-fifth of Earth's systems and 15% of populations in the remaining systems have declined in recent decades; it is only in the context of previous apocalyptic estimates that such numbers could seem marginal.

1. Mehrabi, Z. & Naidoo, R. Shifting baselines and biodiversity success stories. *Nature* https://doi.org/10.1038/s41586-021-03750-6 (2021).
2. Leung, B. et al. Clustered versus catastrophic global vertebrate declines. *Nature* **588**, 267–271 (2020).

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Competing interests The authors declare no competing interests.

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