



TECHNICAL COMMENT

Preserving 40% forest cover is a valuable and well-supported conservation guideline: reply to Banks-Leite *et al*

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Abstract

Banks-Leite *et al.* (2021) claim that our suggestion of preserving $\geq 40\%$ forest cover lacks evidence and can be problematic. We find these claims unfounded, and discuss why conservation planning urgently requires valuable, well-supported and feasible general guidelines like the 40% criterion. Using region-specific thresholds worldwide is unfeasible and potentially harmful.

Keywords

Extinction threshold, general principles, habitat amount, habitat restoration, landscape structure, planetary emergency.

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INTRODUCTION

Conservation planning usually combines general principles with site-specific rules (Groom *et al.* 2005). In our review (Arroyo-Rodríguez *et al.* 2020), we combined empirically supported general principles to describe biodiversity-friendly scenarios in human-dominated landscapes. One such principle is based on extinction thresholds: as most species require 10–30% forest cover in a landscape for population persistence (Andrén 1994; Swift & Hannon 2010), we suggest that a *conservative* general guideline would be to maintain $\geq 40\%$ forest cover in landscapes to ensure persistence of *most* forest species (“40% criterion” hereafter).

Banks-Leite *et al.* (2021) argued that the 40% criterion lacks evidence and is problematic, and advocated for using regionally defined thresholds to guide conservation and restoration. As discussed below, we found their criticisms unfounded, and the idea of basing conservation actions on unique, regionally defined thresholds impractical and potentially harmful.

VALUE OF THE 40% CRITERION

We are in a state of planetary emergency, with forests increasingly lost and degraded by human activities. Therefore,

identifying general conservation guidelines such as the 40% criterion has never been so urgent and valuable. Banks-Leite *et al.* argue that applying a “fixed” threshold to “any given landscape” is “unhelpful and potentially dangerous” because extinction thresholds vary among species and regions. These claims are misleading, as we specify in our study that the 40% criterion is not fixed, and should be adapted to some contexts, such as in tropical regions with low matrix quality (p. 1410 and Fig. 1b in Arroyo-Rodríguez *et al.* 2020). However, the 40% criterion is adequate for *most* species in *most* landscapes.

Banks-Leite *et al.* also raised concerns regarding the lack of social and economic considerations in our guidelines. However, the stated aim of our review was to illustrate an optimal human-modified landscape *for biodiversity conservation*. We agree that alternative scenarios may optimize other outcomes. Ideally, a multicriteria planning process would evaluate trade-offs among different scenarios (e.g. Neugarten *et al.* 2016; Vollmer *et al.* 2016), and we see great potential for future research to inform such planning.

SUPPORT FOR THE 40% CRITERION

We disagree that the 40% criterion lacks evidence. We cited two global reviews of dozens of studies indicating that most species have extinction thresholds at 30% habitat amount

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(Andr n 1994; Swift & Hannon 2010). By suggesting 40% (and not 30%), we attempt to be more conservative, and compensate for variation and uncertainties associated with the estimation of habitat thresholds (Rompr  *et al.* 2010). Interestingly, two of the three studies we ‘*ignored*’ also support a 40% criterion: Macchi *et al.* (2019) demonstrate that most (71%) forest birds in the Chaco region have extinction thresholds at >38% woody cover, and Melo *et al.* (2018) found that extinction thresholds average 34% for birds at tropical latitudes. Although Banks-Leite *et al.* (2014) found that 30% forest cover would safeguard Brazilian Atlantic forest vertebrates, other studies in the same biome document higher thresholds for woody plants (40%, Rigueira *et al.* 2013) and forest-specialist birds (46%, Morante-Filho *et al.* 2015). Therefore, a 40% general target is more consistent with the evidence than the 30% preferred by Banks-Leite *et al.*

FEASIBILITY OF THE 40% CRITERION

Banks-Leite *et al.* suggest that economic constraints in regions requiring massive restoration efforts make the 40% criterion unfeasible. We disagree. In 50% of Earth’s forested biomes we have already reached the criterion or have sufficient unaltered forest to meet the criterion, and 27% more biomes have sufficient forest cover to reach the 40% target with restoration (Dinerstein *et al.* 2017). In the 23% of biomes in which forest cover is <20% (Dinerstein *et al.* 2017), we agree that a lower threshold is likely a more feasible target.

Banks-Leite *et al.* also argue that the 40% criterion creates confusion among policy makers and undermines public trust in science. This speculation is baseless, as the scientific discussion about extinction thresholds is not under public dispute. We rather suggest the opposite: scientists, as members of society, have a responsibility to inform policy makers and the general public on appropriate use of science in addressing societal issues and concerns (Lees *et al.* 2020).

ON THE USE OF REGIONALLY DEFINED THRESHOLDS

Banks-Leite *et al.* advocate for regionally defined thresholds because we have the ‘*technical capacity*’ to determine optimal regional forest cover scenarios. We found this suggestion unfeasible and potentially harmful for conservation, as it would require information on extinction thresholds of a wide variety of taxonomic groups, each of which will likely have a different threshold. As this information is absent in most regions, we simply do not have the time and resources to identify taxon- and region-specific extinction thresholds across the globe. We agree that, when available, regionally defined thresholds might be more appealing to decision-makers, but if we insist on using region-specific thresholds everywhere, then deforestation and lack of restoration will continue, and species will go extinct while we spend decades collecting data.

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AUTHORSHIP

All authors proposed key points for the response. VAR synthesized them and wrote the first draft, with subsequent changes by all co-authors.

NOVELTY STATEMENT

Preserving at least 40% of landscape forest cover is a valuable and useful general principle for biodiversity conservation with enough empirical support. Advocating for using regional-specific thresholds is unuseful and unfeasible given the current planetary emergency.

PEER REVIEW

The peer review history for this article is available at <https://publons.com/publon/10.1111/ele.13689>.

DATA AVAILABILITY STATEMENT

No new data were used.

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