THE UNIVERSITY OF BRITISH COLUMBIA
Faculty of Forestry

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Dear Associate Editor:

We were grateful for your handling of our manuscript, "A four-step Bayesian workflow for improving ecological science," for Concepts and Questions in *Frontiers in Ecology and the Environment*, and are writing to ask if you would consider accepting a revision. After digesting the reviews, we reached out to Dr. Collins to discuss our concerns that this paper is offering a novel viewpoint that is very timely, but that may be under-appreciated by statistical experts in the field. He suggested we reach out to you regarding this.

This is our second review at a high-impact ecology journal and our second set of split reviews, and we believe this captures part of the novelty in our paper. In both cases, we had one reviewer being extremely positive, and the other(s) feeling the paper needed to be longer, showcase a more complex statistical example and give generally more detail. Part of the novelty of our paper, however, is making the workflow we outline (which is also novel, as we detail below) approachable. As Reviewer 2 notes:

> I commend the authors on condensing a large swath of information into a short, easily digestible piece of work. While a part of me wanted more (more steps, more examples, more elaboration), I think the real value of this lies in its brevity and the paired Markdown file.

We argue that part of the barrier to taking up the methods we outline is that related Bayesian approaches are often presented as overly complex and dense. We chose an example that is simple, but shows the power of the workflow we outline (and the analysis shown was published in *PNAS*, so we do not see it as too simple for a valid example). Further, we have had the manuscript read by a number of new-comers to simulating data and/or Bayesian analyses and all have commended how simple and approachable the paper is.

This is one part of the novelty of our manuscript, but the other is the specific workflow steps we outline. Combining simple but powerful and organized steps centered around data simulation into a scientific and statistical workflow is considered new according to the broader literature, with *Nature Reviews* publishing a major paper on the novelty and importance of this type of workflow recently (this may be the Gelman publication Reviewer 3 mentions, van de Schoot *et al.*, 2021), that has been recently followed by extensions to other fields (for example in medicine, veterinary and cognitive sciences, Grinsztajn *et al.*, 2021; Schad *et al.*, 2021; Mielke *et al.*, 2023; Hess *et al.*, 2024) but not yet ecology (to our knowledge). Indeed, *Philosophical Transactions of the Royal Society A* has just commissioned a special issue on the value of the type of workflow we outline across different fields. We thus believe the reviewers' comments that this is not novel are made in error (there is

not an equivalent paper by Gabry, he has published only very specifically on visualization within workflows, and the two papers cited by Reviewer 1 are specific to data assimilation for ecological forecasting, not data simulation for improving ecological approaches across the sub-disciplines of the field). While we understand some statistical experts may feel that they follow these steps already, the wider ecological community has no clear paper or method to follow for these steps, and the process of combining them into a useful workflow is new to the greater statistical community.

After reviewing the comments from the reviewers we feel that we could address most of them, some of which are simple clarifications, and some of which highlight areas of misunderstanding. We realize, however, that we are unlikely to convince many statistical experts in the field of the value in this paper, as they will continue to find it too simple and believe it outlines what they already do. But we think this does a major disservice to a new generation of ecologists who are eager to take up this workflow—using a Bayesian, maximum likelihood, or other inference approach—and believe *Frontiers in Ecology and the Environment* is the place to help break through on this new workflow, and we think even some of the reviewers see this tension (e.g., Reviewer 1 who was 'fairly torn') and may be convinced by a revision addressing their concerns.

We hope you will consider our request for a chance to revise this manuscript and would be happy to answer any questions or provide additional responses to reviewer concerns.

Sincerely,

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