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5-061 Centennial Centre for Interdisciplinary SCS II

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Dear Editors,

We are pleased to submit our manuscript “**Convergent ecological effects of native and introduced megafauna on other animals or ecosystems**” for consideration as a Research Report in *PNAS*. This research is original and is not under consideration elsewhere.

For ~55-35 million years until the extinctions of the Late Pleistocene and Holocene, mammalian megafauna were ubiquitous across most landmasses. These animals exerted profound influences on vegetation, other animals, and on ecosystem processes. Recently, humans have introduced numerous megafauna species, partially counteracting these declines in functional and numeric dimensions (e.g., Lundren et al. 2020 *PNAS*).

However, introduced megafauna---as with other introduced species---**are thought to have fundamentally novel impacts on ecosystems because they lack long-term community-wide coevolutionary history**. If this is the case, as widely claimed (e.g., Rubin et al. 2021 *Science*), **then we should be able to empirically identify if a megafauna is introduced or native based on their measured ecological effects**. If not, then the central claim of invasion biology—that introduced and native megafauna are ecologically different—would require re-evaluation.

We tested this hypothesis by compiling a comprehensive meta-analytic dataset of 2,162 responses from 186 studies to compare the effects of native versus introduced mammalian megafauna herbivores on animal abundance and diversity and ecosystem properties and soil nutrients. **We found no evidence that nativeness or locally ‘invasive’ megafauna have distinct effects relative to native megafauna or intact megafauna communities in Africa—which are the closest surviving proxies for the once pervasive Late Pleistocene megafauna communities.** Finally, we assessed whether the degree of variance explained by nativeness or ‘invasiveness’ were more informative than randomized nativeness and ‘invasiveness’ values. **Our results suggest that nativeness and ‘invasiveness’—for megafauna—are no more informative than a random guess.**

We believe that this manuscript will be of great interest to your readers. Nativeness continues to be a powerful motivating force and is central to numerous conservation policies and considerable scientific literature**. Our manuscript thoroughly and comprehensively—using the largest dataset of its kind—tests the biological reality of nativeness. We believe this work will help shape future ecological thought and will set new directions for conservation policy.** Moreover, we highlight a persistent problem in assessments of the impacts of introduced species: the lack of a proper control to make inferences about nativeness *per se*.

We declare no conflict of interest. All data used in analyses are available in the Supplementary Materials. Please do not hesitate to contact me should there be any questions regarding this submission ([erick.lundgren@gmail.com](mailto:erick.lundgren@gmail.com), +1 585.645.9974).

Thank you for your consideration of this manuscript.

Sincerely,



Erick Lundgren, PhD

Postdoctoral Researcher

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