Dr. Kathryn L. Cottingham
Editor-in-Chief, *Ecology*
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Dr. Cottingham,

We are writing to submit the manuscript "Maintenance of community function through compensation breaks down over time in a desert rodent community", by Renata M. Diaz and S. K. Morgan Ernest, as a Report in *Ecology*.

Understanding how community function responds to species loss, particularly as systems change over time, is a core question in community ecology. Using a 30-year manipulative experiment on desert rodents, we show how changes in functional redundancy and niche complementarity, driven by both metacommunity dynamics and changes in habitat conditions, have affected the impact of species loss on community function over time. Strong compensation, driven by the dispersal of functionally redundant species from a regional species pool, temporarily buffered community function against species loss. However, over time, decreasing functional overlap between these same species has caused this compensatory effect to break down. Simultaneously, changes in community composition due to niche complementarity have partially decoupled changes in functional redundancy from the overall impact of species loss on community function. These results provide a unique long-term, experimental perspective linking core ecological concepts to the pressing practical question of how ecological systems will respond to the combined effects of species loss and rapidly changing habitat conditions in the Anthropocene. Therefore, we hope this work will be of great interest to *Ecology*'s broad ecological readership.

This manuscript is also posted as a preprint on bioRxiv at https://www.biorxiv.org/content/10.1101/2021.10.01.462799v1, and the data and code to replicate these analyses are archived on Zenodo at https://doi.org/10.5281/zenodo.5544362 and https://doi.org/10.5281/zenodo.5539881. Rodent censuses were conducted with IACUC approval, most recently under protocol 2018088239_01 at the University of Florida. Finally, we note that, while data from this long-term study have been used in numerous other publications, the key data and results for this manuscript have not been published elsewhere.

Thank you very much for your consideration of this manuscript,

Renata M. Diaz and S. K. Morgan Ernest