The impact of protected areas on biodiversity conservation under different climate and land use change projections

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Increasing conservation efforts are required to avert biodiversity decline caused by climate and land use changes.

In a recent study (Hari et al. in prep), we combined climate change scenarios (RCP2.6 and RCP6.0) and land use change projections to assess their impact on future species distribution for a large number of mammals, birds and amphibians. Future projections of land use change were derived from the Land Use Harmonization dataset v2 (LUH2), which does not make any explicit assumptions about the area under protection in these scenarios.

Here, we extend the scope of our future biodiversity projections by adding new land use scenarios explicitly accounting for different "Nature Futures" in the sense of different levels of biodiversity conservation (i.e., current protected areas or 30x30 target). In the first conservation scenario, we fix the protected areas based on the World Database on Protected Areas (WDPA), thereby assuming that protected areas will remain the same in the future as it is today. In a second category of scenarios, we create land use scenarios compatible with the Global Biodiversity Framework's "30x30" target based on the spatially optimized dataset by Jung et al. (2021) combined with LUH2.

We then quantify how incorporating different levels of protected areas for conservation change the future species richness based on our land use filtering approach. We also analyze how these two scenarios of land management for conservation interfere with different levels of global warming and what are the implications for the climate resilience of different biodiversity conservation choices.