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Tracking the role and dynamics of areas of endemism in the formation of the North American warm desert biotas

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Abstract: Exacerbated rates of climate change have made it vital to understand how changing climates alter regional floral and faunal distributions in order to prescribe effective conservation strategies. Identification of areas of endemism (areas that generate and maintain unique lineages through time) and transitional areas (regions between areas of endemism) may offer an improved approach to understanding how species and biotas will respond to future climate change, and hence another tool for protecting regional biodiversity. Transitional areas tend to have the highest species richness as the result of the intermixture of species dispersing out of two or more areas of endemism, and thus, these regions are often the focus of conservation efforts. However, conserving transitional areas may be inadvisable for conservation efforts because these regions are often only ephemerally rich during periods of environmental change, such as glacial or interglacial cycles. In order to gain an enhanced understanding of the evolutionary dynamics of areas of endemism and identify areas that may be most stable through climate change events in the North American deserts, we conducted a multi-organism evolutionary biogeographic analysis (Phylogenetic Analysis for Comparing Trees; PACT) to further investigate the impacts of climate change on the evolutionary and distributional dynamics of North American desert biodiversity. Preliminary results suggest that areas of endemism in the North American warm deserts have more stably retained biodiversity through historical climate change than transitional areas, although transitional areas may serve as important regions for individualistic refugia to changing climate.