

Abstract Submitted
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Collapse of biodiversity in fractured metacommunities CHARLES FISHER, PANKAJ MEHTA, Department of Physics, Boston University — The increasing threat to global biodiversity from climate change, habitat destruction, and other anthropogenic factors motivates the search for features that increase the resistance of ecological communities to destructive disturbances. Recently, Gibson et al (*Science* 2013) observed that the damming of the Khlong Saeng river in Thailand caused a rapid collapse of biodiversity in the remaining tropical forests. Using a theoretical model that maps the distribution of coexisting species in an ecological community to a disordered system of Ising spins, we show that fracturing a metacommunity by inhibiting species dispersal leads to a collapse in biodiversity in the constituent local communities. The biodiversity collapse can be modeled as a diffusion on a rough energy landscape, and the resulting estimate for the rate of extinction highlights the role of species functional diversity in maintaining biodiversity following a disturbance.

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