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# Towards the restoration of the Mesoamerican Biological Corridor for large mammals in Panama: a multispecies approach

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## Abstract

Habitat fragmentation is a primary driver of wildlife loss, and the establishment of biological corridors is a conservation strategy to mitigate this problem. A key example is the Mesoamerican Biological Corridor (MBC), established to connect protected forest areas between Meso- and South America to allow dispersal and gene flow of forest organisms. However, its effectiveness has been questioned, and recent studies indicated that it is dysfunctional for large terrestrial mammals in Panama, the narrowest section of the MBC. While most corridor planning initiative focus on single species, here, we used a combination of methods to identify important corridors within the Panama portion of the MBC for an assemblage of nine large mammals. We divided the nine species into two groups depending on their sensitivity to habitat disturbance, and hypothesized the multispecies connectivity scenarios to be different between the two groups. For each group, we estimated landscape resistance using (i) resource selection functions from empirical occupancy data collected across Panama, and (ii) step selection functions with GPS telemetry data from white-lipped peccary *Tayassu pecari*, puma *Puma concolor*, and ocelot *Leopardus pardalis*. Based on the resistance surfaces modeled, we estimated connectivity with circuitscape algorithm. Finally, we compared the different multispecies connectivity scenarios, and assessed their performance. On the basis of our results, we propose areas to conserve in priority for establishing effective corridors that would facilitate the movement of large mammals in Panama. This study represents the first effort to assess the effectiveness of the MBC (i) at a country scale, and (ii) for several species simultaneously, to accurately inform the local authorities in conservation planning. The approach we present can also be used in other sites, and/or for other species.

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