

# Protect corridors to save tigers, leopards, say researchers

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Research by Clemson University scientists shows that big cats would be better served by extending conservation efforts beyond source habitats to a larger landscape scale. Credit: Sandeep Sharma

Research by Clemson University conservation geneticists makes the case that landscape-level tiger and leopard conservation that includes protecting the corridors the big cats use for travel between habitat

patches is the most effective conservation strategy for their long-term survival.

Sandeep Sharma and Trishna Dutta, with colleagues from the Smithsonian Conservation Biology Institute, reveal their findings in articles in the *Proceedings of the Royal Society B: Biological Sciences* and *Evolutionary Applications*. Their articles say that forest corridors play an essential role in maintaining the flow of genes between [tiger](#) and leopard populations in central India and are paramount for sustaining the [genetic variation](#) required for their long-term persistence.

In the first ever gene-flow analysis of these big cats, Sharma and Dutta analyzed the genes of the estimated 273 tigers and 217 leopards living in four distinct populations in the 17,375-mile Satpura-Maikal region of central India, then used computer modeling to compare contemporary and historical gene flow among the region's tiger and leopard populations.

The genetic data showed that the region's [tiger population](#) divided rapidly twice in history: First into two clusters about 700 years ago, when great swathes of central India's forestland were cleared for agricultural use during the early Mughal era; then into four clusters around 200 years ago when the British Empire cut vast tracts of timber to build railroads and ships. This period also corresponded with a huge increase in tiger hunting.

Today these big cats live at high densities in the four protected areas. Some of the areas are connected by relatively contiguous corridors of forest, while others are connected by sparse and fragmented corridors.

The [genetic data](#) assembled from nearly 1,500 hair and [fecal samples](#) indicates that while the flow of genes between the four tiger and leopard populations has decreased over time, clusters linked by contiguous forest

corridors have maintained a high rate of gene flow. Reserves that have lost connectivity between them have seen the greatest decline in [gene flow](#).

The research suggests that given the fact of limited financial and human capital, the [big cats](#) would be better served by extending conservation efforts beyond source habitats to a larger landscape scale.

"The viability of the forest corridors connecting tiger habitats has a direct affect on a tigers' chance of finding an unrelated mate and on the ability of tiger populations to maintain genetic diversity," Dutta said. "As we know, genetic diversity allows species to survive disease and habitat stress and encourages long-term survival."

Currently, central India's tiger corridors have no legal protection and the Indian Ministry of Environment and Forests recently gave permission for coal mining development in a key forest corridor connecting two of the habitats in the study.

"Mining brings with it many ancillary habitat disruptions," Sharma said. "There are settlements, roads and infrastructure that will have an inevitable impact on the corridors and possibly obstruct the flow of genes between the habitats."

In cases where habitats become islands and a genetic bottleneck occurs, dramatic human intervention is required to save isolated populations of cats from the perils of inbreeding.

Wildlife biologists are sometimes forced to move animals from one population to another. In places where breeding and migratory patterns have been disrupted or populations have been cut off, costly manmade corridors have been required.

In Northwest Montana, for example, the Montana Department of Transportation built 41 fish and wildlife crossing structures, 16 miles of wildlife fencing, 39 jump-outs and many wildlife-crossing guards to mitigate the expansion of U.S. 93 and prevent habitat isolation.

"Moving animals is inefficient, costly and stressful for the animals. There is also no guarantee that the animals will mate," Sharma said. "And building manmade corridors is very expensive and logistically challenging. Since we now know that the existing corridors play such a vital role in long-term survival, the best way to enable their success is to take a landscape-scale approach to conservation and protect the corridors from further damage."

**More information:** [rspb.royalsocietypublishing.org ... 67/20131506.abstract](https://rspb.royalsocietypublishing.org/doi/10.1098/rspb.2013.1506)  
[onlinelibrary.wiley.com/doi/10 ... 1/eva.12078/abstract](https://onlinelibrary.wiley.com/doi/10.1111/eva.12078)

Provided by Clemson University

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