Maintaining tiger connectivity and minimising extinction into the next century

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Tigers have lost 95% of their historical range, and what remains is highly fragmented. According to this study, high traffic roads and densely populated urban areas are a severe impediment to tiger movement between fragments. Unplanned development in the future will result in loss of connectivity and an increased possibility of extinction for several tiger populations. To ensure future persistence, tiger populations need to be managed as a network of protected areas connected by corridors.

The study was undertaken by a team of researchers from the National Centre for Biological Sciences (NCBS), the Wildlife Conservation Trust (WCT), the Foundation for Ecological Research, Advocacy and Learning (FERAL), and the University of Montana.

The team used genetic information collected on field from tiger faecal samples, to understand how landscape features—like roads and agriculture—impact tiger movement in Central India, a global high priority tiger conservation landscape. Findings revealed that high traffic roads and densely populated urban areas are detrimental to tiger movement.

It is safe to assume that both, urban areas and road traffic, will burgeon in the future. To understand how tiger connectivity might be impacted by development, researchers simulated 86 different development scenarios. These included business-as-usual, constraints on landscape change and others with protected corridors delimited by the NTCA.

"Currently, there is movement of tigers and genetic exchange between protected areas. However, unplanned development, especially loss of forest cover around protected areas will have a strong negative impact on tiger connectivity in the future", says Prachi Thatte, a PhD student in Dr Uma Ramakrishnan's lab at NCBS, and lead author of the study. She adds, "Our results highlight the need for informed development plans that consider biodiversity and connected wildlife populations in addition to human development goals."

The good news is that tigers do not go extinct in the entire landscape! But several populations do go extinct. Depending on whether development and land-use change is unrestricted or managed to maintain forest cover, the extinction outcomes for tigers are different. Unrestricted landscape development results in 25% lower genetic diversity and reduction in tiger numbers as several small populations in the landscape go extinct. Pro-active measures—such as notifying buffer areas, protecting corridors and maintaining populations between Protected Areas (PAs) —are critical to maintaining viable long-term tiger populations at a landscape scale.

Aditya Joshi, a researcher with the Wildlife Conservation Trust and an author on the paper, says, "Conservation of corridors and forest areas outside of the protected area network is critical for long-term demographic and genetic viability of many endangered species and future growth and recovery of tiger populations."

India is a signatory to The Global Tiger Recovery Program, which aims to double the tiger numbers by 2020.

"Our results highlight that along with our efforts to increase tiger numbers within PAs, a lot more needs to be done to meet the targets we have set for the year 2020. To ensure both objectives are met, the need of the hour is to include conservation goals in regional developmental

plans, a nationally important exercise which is seriously lacking," says Srinivas Vaidyanathan, a researcher from FERAL, and co-author of the paper.

"We hope that such research will bridge gaps between science and policy in India" adds Dr Uma Ramakrishnan.

The research paper, "Maintaining tiger connectivity and minimizing extinction into the next century: Insights from landscape genetics and spatially-explicit simulations," was published in the *Biological Conservation* journal.

More information: Prachi Thatte et al. Maintaining tiger connectivity and minimizing extinction into the next century: Insights from landscape genetics and spatially-explicit simulations, *Biological Conservation* (2017). DOI: 10.1016/j.biocon.2017.12.022

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