LETTER

Sinks as saviors: Why flawed inference cannot assist tiger recovery

A recent study of tigers in Chitwan, Nepal (1) stirred controversy by challenging the "source-sink" approach that underlies current global tiger conservation strategies (2). The observed lack of difference in tiger density estimates inside the protected area compared with a multiple-use area outside is offered as evidence. Based on this result, the study questions the relevance of strictly protected tiger reserves involving regulation of extractive uses and relocation of human settlements. The study offers an alternate vision of sustainable, syntopic "coexistence" of tigers and humans as a solution to increasing human resource demands on tiger habitats.

Long-term substantive studies contradict this alternative view. Tiger densities in better-protected reserves are three- to five-times higher than in areas with poorer protection and extractive human uses (2, 3). At other ecologically comparable sites, such as Kaziranga and Corbett (2), which curtail human uses, tiger densities are five-times higher (17–19 tigers per 100 km^2). Even in Chitwan, tiger densities were much higher historically, under stricter regulation of extractive uses (4).

Curiously, all evidence reported in this study itself strengthens the prevalent "source-sink" view. Naive tiger densities (the number of individual tigers divided by the area of the camera trap array) were 1.33- to 3-times higher inside the protected reserve. Additionally, between 2010 and 2011 the number of individual tigers photo-trapped within the reserve increased from 12 to 18, but it decreased from 6 to 4 outside. At a "fine scale" of measurement (combined trapping area ~80 km^2), this difference in tiger density is obvious. Furthermore, results from the small cell (1 km^2) occupancy analysis indicate that tiger densities are higher inside the reserve because detection probability is monotonically related to density at such cell sizes. Astonishingly, despite all contrary evidence, the authors conclude that estimated densities do not differ solely based on statistical insignificance. This anomaly likely arises because the spatially explicit capture-recapture models used are confronted with sparse data (only four to six tigers were photo-captured outside) in very small areas (50 km^2 inside, 30 km^2 outside), generating unreliable estimates of tiger densities (5).

Based on inference likely rooted in survey design flaws (5), the authors boldly attack a "prevailing belief" that tigers cannot spatially overlap with humans at fine spatial scales. Past studies show that tigers do coexist at "fine scales" in human-dominated landscapes, but with unacceptable levels of conflict, including predation on humans, as in Chitwan (4). Furthermore, although prescribing a radical reversal of current "source-sink" strategy focusing on protected areas, the authors' two-season study ignores multisite, long-term studies of tiger population dynamics that do support this approach (2–4).

Global spatial analyses show >70% of wild tigers now live and reproduce in 6% of source habitats in protected reserves, and their survival in surrounding landscape sinks depends on replenishment from sources (2–4). The sober reality is that the species has been extirpated from 93% of its former range because of conflict-ridden coexistence with humans. Hence, the authors' prescription of tiger population sinks over sources as a future recovery strategy is doomed to failure.

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