



Original research article

From intent to action: A case study for the expansion of tiger conservation from southern India



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HIGHLIGHTS

- To conserve the tiger it is critical to enable the persistence of the species across larger landscapes.
- Establishing protected areas for tiger recovery remains one of the means of landscape approach.
- While the gazetting of protected areas is necessary to enable this, it is not sufficient.
- It is essential to benchmark and monitor the process that enable the recovery of tigers.

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ABSTRACT

To conserve a large, wide-ranging carnivore like the tiger, it is critical not only to maintain populations at key habitat sites, but also to enable the persistence of the species across much larger landscapes. To do this, it is important to establish well-linked habitat networks where sites for survival and reproduction of tigers are complemented by opportunities for dispersal and colonization. On the ground, expanding protection to areas with a potential for tiger recovery still remains the means of operationalizing the landscape approach. Yet, while the gazetting of protected areas is necessary to enable this, it is not sufficient. It is essential to benchmark and monitor the process by which establishment of protected areas must necessarily be followed by management changes that enable a recovery of tigers, their prey and their habitats. In this paper, we report a case study from the Cauvery and Malai Mahadeshwara Hills Wildlife Sanctuaries of southern India, where we document the infrastructural and institutional changes that ensued after an unprecedented expansion of protected areas in this landscape. Further, we establish ecological benchmarks of the abundance and distribution of tigers, the relative abundance of their prey, and the status of their habitats, against which the recovery of tigers in this area of vast conservation potential may be assessed over time.

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1. Introduction

Historically, wild tigers (*Panthera tigris*) have been threatened by the loss and fragmentation of their habitats, direct persecution for their body parts, as well as by prey depletion (Dinerstein et al., 2007; Nowell and Ling, 2007; Linkie and Ridout, 2011; Joshi et al., 2016). Tigers currently occur in a mere seven per cent of their former range, and number less than 3500 individuals (Dinerstein et al., 2007; GTI, 2011), thereby eliciting a commitment from the 13 range countries to double their tiger numbers by the year 2022 (GTI, 2011).

Among the key global tiger conservation strategies are landscape-based approaches to sustain existing populations and to attain recovery goals (Sanderson et al., 2006, 2010; Wikramanayake et al., 2010). Landscape-based approaches emphasize habitat connectivity as a means of enhancing gene flow, providing opportunity for dispersal, thereby increasing the persistence of populations, reducing the risk of inbreeding depression and local extinction, and finally, avoiding costly interventions such as translocation. The landscape-based approach has two key ingredients: first, it involves identification of key source populations (Sanderson et al., 2010; Walston et al., 2010), and secondly, it involves the consolidation and improvement of potential tiger habitat in and around these sites, as well as an enhancement of habitat connectivity within the larger landscape (Gubbi et al., 2016).

To achieve this, tiger range countries have established protected areas (PAs) that constitute key nodes with viable tiger numbers (Wibisono et al., 2011; Jhala et al., 2015; Gubbi et al., 2016). India has designated Tiger Reserves, where special federal funding is provided to enhance protection and management capabilities, and to address livelihood issues of local communities dependent on tiger habitats, to enable maintenance or improvement of tiger and prey numbers (NTCA, 2015).

However, the mere gazetting of PAs does not automatically lead to improved tiger conservation outcomes. Conservation success of PAs is dependent on improving institutional capabilities that underlie reserve management and on-the-ground protection (Bruner et al., 2001; Hilborn et al., 2006; Nolte, 2016). Further, these improved institutional capabilities must also demonstrably translate into improvement of habitat status and of focal animal abundances to values as close as possible to an area's ecological potential. There are relatively few examples, especially from the developing tropics, of careful assessments showing improvement in institutional capabilities after creation of a PA, and of subsequent ecological recovery against pre-gazette baselines (e.g., Wegge et al., 2009). Such assessments can be useful not only in improving management strategies adaptively to deliver PA objectives (Hockings, 2003), but also in monitoring global tiger recovery targets set by various governments and multilateral conservation institutions (GTI, 2011). Further, while such institutional and ecological assessments are necessary, they may not be sufficient. Social and economic evaluations too may be necessary, given the fact that PAs are embedded within complex social and political landscapes that affect conservation outcomes.

In this paper, we report from the southern Indian state of Karnataka – one of the foremost regions globally for the long-term conservation of tigers – on institutional changes following the establishment and expansion of protected areas for tigers. We also set down a variety of ecological benchmarks, including tiger numbers, the distribution and relative abundance of prey, and the status of habitat, based on which the effectiveness and sustainability of the newly-established PAs may be assessed over time.

2. Study area

The Malai Mahadeshwara Hills Wildlife Sanctuary (906 km², MM Hills WS) and Cauvery Wildlife Sanctuary (1027 km², Cauvery WS) are part of an extensive (c. 6500 km²) forested tract that emerge as an eastward spur of the Western Ghats hill range (Fig. 1). Besides being a unique tract of dry woodland savanna and riparian habitats, this region has held vast potential for the conservation of large and wide-ranging endangered species such as the tiger and the Asian elephant. Yet, attention to this region has been rather scant in global and regional conservation planning and prioritization efforts (Sanderson et al., 2006; Wikramanayake et al., 2010). As recently as 2011, just 26% (~1729 km²) of this landscape, despite being dominated by forest lands under state control, was legally protected for wildlife. In one of the biggest PA expansions seen in recent decades in India, 1579 km² in this landscape falling within the state of Karnataka was gazetted as a PA (Gubbi et al., 2016). The elevation in legal protection of these forest tracts was the outcome of a constructive collaboration that engaged elected representatives, government officials, as well as members of civil society conservation groups (Gubbi et al., 2016). A key point of convergence across these groups was the need to maintain the value of this landscape as watershed of the River Cauvery, which sustains the farming and drinking water needs of 80 million people of southern India. Another salient aspect of these PA notifications was their acknowledgement that existing rights of traditional indigenous communities would continue as designated under The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (TSTOTFD, 2006).

Together with a similar PA expansion initiative in the neighbouring state of Tamil Nadu, over a four-year period between 2011 and 2014, the fraction of land under PA in this c. 6500 km² landscape rose nearly three-fold from 26% to 72%. This significant expansion of PA coverage has provided an unprecedented opportunity to help recover and sustain viable populations of large, endangered wildlife like tigers and elephants in this landscape.

The terrain in these PAs is undulating (232–1498 m above MSL) with scanty rainfall (average 700 mm/year). The vegetation is similar in both the PAs, dominated by tropical dry thorn and dry deciduous forests, interspersed with patches of woodland savannah, but also including tracts of moist deciduous and riverine forests along the Rivers Cauvery and Paalar, besides other larger streams. Geographic and demographic details about the study area are given in Table 1. The

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