

CASE STUDY: FINDING THE MIDDLE ROAD – GROUNDED APPROACHES TO MITIGATE HIGHWAY IMPACTS IN TIGER RESERVES

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Tigers (Fig. 37.1) are one of the world's most endangered large carnivores with an estimated global population of approximately 3200 individuals. They currently occur in 13 countries, representing 7% of their former range (Dinerstein et al. 2007). The survival of tigers in the wild depends largely upon the willingness of the tiger-range countries to ensure adequate protection of sufficiently large areas from inappropriate development and activities such as roads and poaching. Tigers are threatened by roads and traffic. Research on Amur tigers in Russia suggests that direct mortality due to wildlife-vehicle collisions (WVC) can reduce survivorship and reproductive success of surviving animals (Kerley et al. 2002). Tigers have been affected in western Malaysia through construction of the North–South highway and another highway that bisected a bottleneck area in Taman Negara National Park (Kawanishi et al. 2010).

The current rate of mortality of tigers due to WVC in India appears to be relatively low, with approximately 20 documented tiger deaths in various reserves over the past 15 years (Prakash 2012), although this number is likely

an underestimate due to non-detection or non-reporting. Furthermore, as the size of the tiger population declines and the road network expands, the direct and indirect effects of mortality due to WVC and fragmentation of tiger habitats will become of greater concern. In addition to direct mortality, the death of individual tigers results in social instability. The death of a territorial male can lead to infighting of transient males trying to establish territories and infanticide by the new territorial male, and it also affects tigresses due to unstable male ranges, possibly leading to depressed birth rates. Axis deer, a principal prey species for tigers in India, are also commonly killed by WVC, resulting in reduced food for tigers.

Furthermore, roads are used for illegal activities including hunting of tigers and their prey (see also Chapters 2, 36 and 56). In eastern Russia, at least six Amur tigers were poached over a 10-year period along one road (Kerley et al. 2002). In 2010, poachers apprehended in southern India confessed to the illegal hunting of axis and other deer species in Bandipur, Bhadra and Biligirirangaswamy Tiger Reserves by driving on roads at night.



Figure 37.1 A tiger crosses a road in Bandipur Tiger Reserve, southern India. Source: Photograph by and reproduced with permission of H. S. Basavanna.

In India, the National Wildlife Action Plan 2002–2016 (Government of India 2002) specifically prescribed regulation and mitigation measures for threats to wildlife posed by roads. However, there have been few serious attempts to implement the policy on the ground.

37.1 Night closures and alternative roads in nagarahole–bandipur tiger reserves

India has prioritised the conservation of tigers by establishing 47 tiger reserves, spread across the whole country, which get additional legal protection and funding. The Nagarahole (643 km²) and Bandipur Tiger Reserves (990 km²) are important conservation areas for tigers, with over 100 breeding tigers (Sanderson et al. 2010). Seven major roads pass through these two contiguous tiger reserves (Fig. 37.2) nestled in the Western Ghats in the Indian state of Karnataka.

A 27.3 km stretch of the Mysore–Mananthavadi Road (State Highway (SH-17D) passes through the southern part of Nagarahole. In July 2008, based on a proposal made by conservationists to government officials and a presentation to other stakeholders, the road was closed to all traffic at night (18.00–6.00 hrs) except emergency vehicles. However, as varied interest groups opposed the closure, upholding the closure needed persistent follow-up and support of well-intentioned

government officials and media. In a particular instance, conservationists forged alliances with animal rights groups who were opposed to the use of this road to illegally transport livestock to slaughter houses in violation of officially prescribed transportation standards. Finally, after various stages of turnovers, the closure of the road by the government was upheld in the court.

Under a World Bank-funded project, the Mysore–Mananthavadi Road was proposed to be upgraded to a high-speed highway. An alternative alignment was identified that would reduce the length of the road within the tiger reserve to 17.3 km and offer better access to 11 villages that were previously poorly connected. Combined with the night closure to traffic, realigning the road outside the reserve would further decrease the impacts of traffic during daylight hours when vehicles were allowed to pass through the tiger reserve. However, the alternative road was in poor condition and needed substantial investment from the government. In 2012, US\$3.2 m was released by the state government to repair and upgrade the alternative road after the government was convinced of the conservation and public welfare merits. Now, a 10 km stretch of the road through the tiger reserve has been officially decommissioned and a corresponding alternate alignment authorised and developed outside the reserve.

Based on the experience of Mysore–Mananthavadi Road, in 2010, the government ordered nighttime

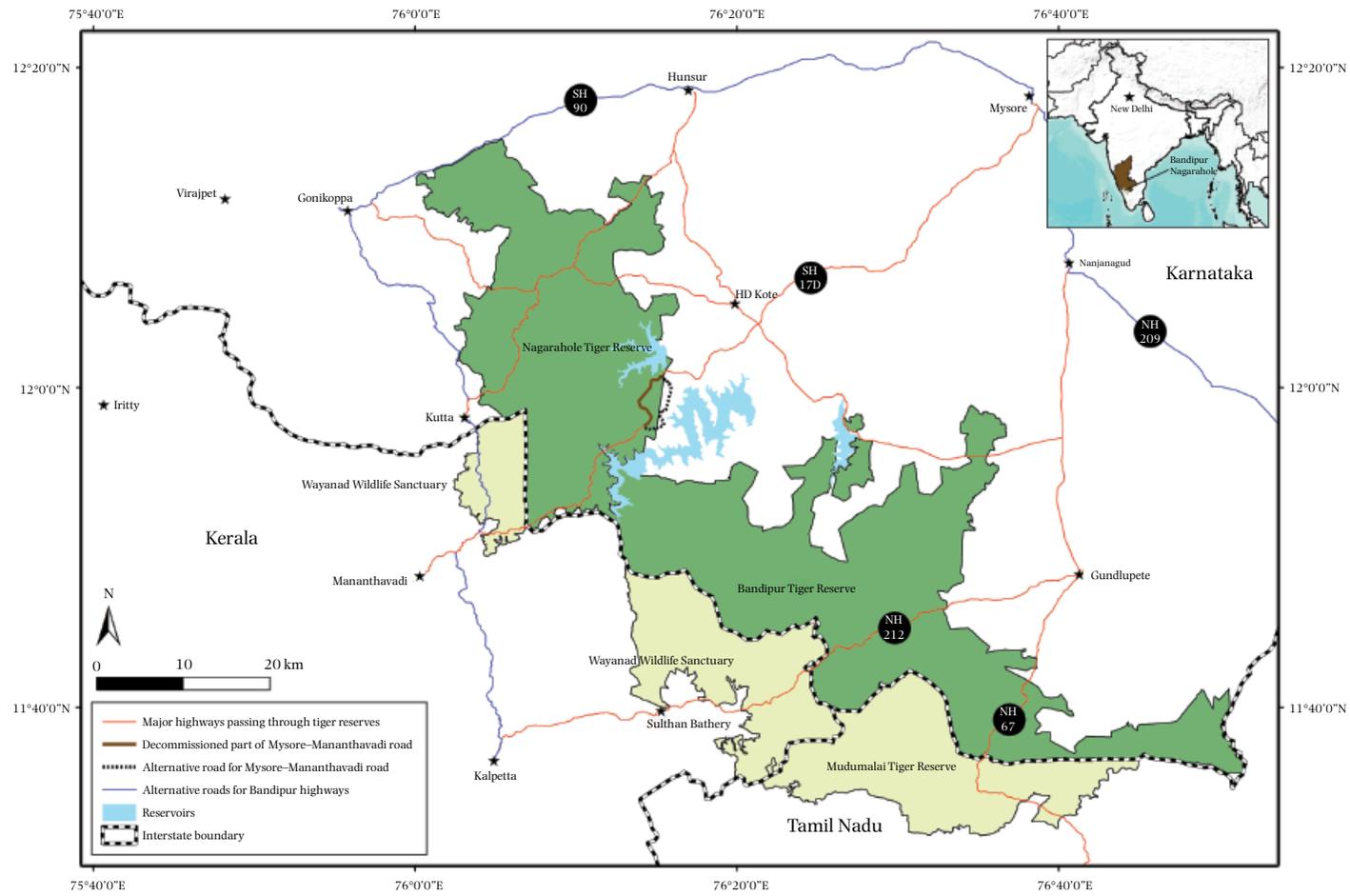


Figure 37.2 Roads through Nagarahole and Bandipur Tiger Reserves and alternate solutions provided.

closure (from 21.00–06.00 hours) of the two highways NH-67 and NH-212) passing through Bandipur Tiger Reserve which was challenged in the court. The government counsel, including key policymakers, were persuaded about the conservation merits of the night closure but also provided an alternative solution to reduce the impacts on night-time transportation. One of the alternate roads passed along the boundary of Nagarahole (SH-90, Fig. 37.2) which was less damaging than passing through the core of the reserve at night. Apart from this, 22 km of the alternative road passed through Nagarahole and Wayanad, while 29 km of the highway traversed through the core of Bandipur and the adjoining Wayanad Wildlife Sanctuary. However, as with the Mysore–Mananthavadi Road, the alternate road was in poor condition. Hence, the court ordered the repair of the alternate road for which the government made the required budgetary allocations (US\$8.03 m) and repair works have been completed. Led by these examples, other state governments have implemented night closure or diversion of roads from protected areas including Mudumalai Tiger Reserve in Tamil Nadu and Gir National Park and Velavadar Wildlife Sanctuary in the state of Gujarat.

Working closely with the media was an effective tool to increase public awareness and help create the atmosphere to build public acceptance and support. Educating drivers to slow down in protected areas is an important aspect of our campaign because commuters drive at high speeds in these areas. Improved scientific understanding of road impacts on tigers and other species in India is required.

37.2 Science to support conservation

We carried out a preliminary study to assess the relative use of roadside habitats by large mammals on the Mysore–Mananthavadi Road. Tiger, gaur, chital and elephant were more frequently detected along a closed section of the road than one with traffic (Gubbi et al. 2012). Our data also showed that existing culverts built for drainage were seldom used by wildlife, contrary to arguments advanced by developers seeking to expand this road (Hosmat & Gubbi 2010). Our results broadly vindicated the need for measures to mitigate the impact of roads and traffic in sensitive wildlife habitats.

37.3 Future course of action

These experiences offer key lessons on managing the impact of roads for tigers:

- The most effective mitigation strategy is to remove roads from tiger landscapes, particularly from source populations, and reroute them outside of important habitats and prevent the construction of new roads in those areas.
- Effective mitigation of road impacts requires engagement of all levels of government and the community.
- Dedicated wildlife crossing structures will likely be required in tiger landscapes because standard drainage structures are ineffective at mitigating the negative effects of roads and traffic on tigers.
- International funding agencies are financing the rapid rate of construction of roads in many tiger-range countries, and they must become involved in measures to ensure these developments do not further endanger the persistence of tigers.

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