

# Is Relocation a Viable Management Option for Unwanted Animals? – The Case of the Leopard in India

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A RAGING DEBATE CONTINUES between social and wildlife scientists in our country on the relocation of people from parks to decrease conflicting interests of wildlife conservation and the local people. The goal of such relocations is to enhance the conservation of threatened species like the tiger. Another facet of the same issue which is as important but not usually considered is of animals creating problems to human lives in man-modified landscapes. The common method of dealing with the latter is the relocation of the animals causing the problem.

Animal problems in human-dominated landscapes are of different shapes, sizes and intensities – ranging from a sighting of a potentially dangerous species (leopards/snakes/elephants, etc.) to attacks on people (by rabid dogs, aggressive monkeys, leopards or other wild animals). Over-population of wild animals (over-populated zoos, captive facilities, rescue centres), feral cattle (raiding crops) and feral dogs (attacking people and livestock) can also be categorised as animal problems. Thus, stray dogs, leopards, monkeys, and snakes are removed from an area where they are perceived to be a problem and released elsewhere – almost never informing the people that such releases are taking place near their inhabitations.

Figures of relocated animals are difficult to come by, but GSPCA (Gujarat Society for Prevention of Cruelty to Animals), a Vadodara-based animal welfare organisation rescued 1000 snakes, ~100 monkeys and ~40 raptors in 2005 and released them into a ‘good’ habitat. Two hundred and fifty rhesus monkeys were moved from an urban area and relocated into rural areas (Panwar

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and Mishra 2004). More than 150 leopards were relocated over two years (2001–2002) in Maharashtra (Maharashtra State Forest Department data). In North Bengal, at least twenty-five leopards were relocated to specific forested areas (Gorumara NP, Chapramari WLS, Buxa TR and Jaldapara WLS) over five years (WWF-India 1997). An average of fifty leopards trapped outside Gir National Park, Gujarat are relocated into the National Park each year (Vijayan and Pati 2001; Khan et al. 2003). Information on relocations of stray/feral dogs, excess ungulates in zoos, etc. is not available, but obtained from discussions with people who work in the field; the scale of such relocations should be cause for serious concern.

Linnell et al. (1997) reviewed relocation as a management strategy to deal with problem carnivores. In most of the cases, the individuals leave the site of release and head in the direction of home, traveling large distance in the process. Many instances have been documented of leopards traveling hundreds of kilometers back to their territories following relocation (Hamilton 1981; Linnell et al. 1997). In India, immediately after capture the animals are usually maintained by the local Forest Department where facilities, resources and trained people are not available to take care of wild species in captivity. This leads to injury, stress, and deterioration of the animal's health prior to its relocation in the wild. Snakes are also seen to attempt to head back home and relocated snakes and leopards are seen to have higher mortality rates (Hamilton 1981; Sealy 1997). Landscape features (barren land, urbanised areas, water bodies) may not always allow the animals to reach home, making them take up residence in areas along the way and leading to an overall increase in the spread of conflict (Belsare and Athreya *unpublished*). Furthermore, from an ecological point of view, there are likely to be disruptions in their social structure due to removals and relocations. For instance, fights between an introduced adult leopard and the resident male could lead to the death of the territory holder and subsequent infanticide of the cubs in that territory (Karanth and Madhusudan 2002).

To make matters worse, the removal of a few individuals from an area does not deplete or eliminate the number of individuals (in species such as the leopard), at the removal site. Because of carnivore biology, when individuals are removed, vacant territories are created which are immediately colonised by younger sub-adults or other immigrants (Bailey 1993). This can be seen in western Maharashtra where following the removal of a leopard from a site, livestock attacks are still reported and more leopards continue to be trapped from the same area. This could even explain why leopards are still present in Pauri, Uttarakhand where large numbers are killed and removed. A study in Utah, USA provides an idea of the numbers involved. The area occupied by twelve mountain lions that were trapped or killed following livestock attacks was immediately occupied by seventeen different and younger individuals (Linnell et al. 1997). Capture and relocation is not a long-term solution. Relo-

cation only leads to transfer of conflict and affects human lives near the site of release. The welfare of the individual animals is also compromised.

Management of any issue has to be based on a sound understanding of the various aspects of the problem, be it relocation of people or of animals. In the case of leopards in human-dominated areas, the managers in Maharashtra had to deal with two crucial issues: (1) How to manage large numbers of leopards in a human-dominated landscape so that conflict is minimised (2) How to prevent high densities of carnivores from taking up residence in a human-dominated landscape.

To address the first question, trapping episodes in Ahmednagar Forest Division (a sugarcane dominated landscape with densities of 200 people km<sup>2</sup>), western Maharashtra between December 2004 and 2006 were examined. We found serious human–leopard conflict (in the absence of relocations) to be uncommon (Athreya and Belsare, 2006). Most of the trappings (leading to subsequent relocations) were due to pressure from the local politicians, media and public following sightings of the leopards, attacks on livestock or domestic dogs, or when leopards fall into the open wells that are common in rural Maharashtra. Our recommendation to the managers to better manage the high densities of leopards in the croplands was to reduce unnecessary trapping which in turn reduced the number of leopards requiring to be captured and relocated. For the first time in more than a decade, human–leopard conflict has declined even in areas where a large number of leopards still inhabit croplands. Furthermore, from the study of the human–leopard conflict in Junnar where fifty people were attacked in two years between 2001 and 2003 and more than 106 trappings of leopards was reported, our analysis provided evidence that high density of leopards in the croplands was related to the proximity to a release site of leopards (Athreya et al. *in press*). Translocation is a scientific procedure meant for augmenting or increasing the population of a given species near the site of release (IUCN 1987) and not for dealing with problem animals (Hamilton 1981; Linnell et al. 1997). Therefore, this unscientific management action of capture and releases only worsened conflict levels.

Leopards are a highly adaptable species and can live near human inhabitation if their food and habitat requirements are met with. The proclivity of leopards towards domestic dogs and pigs is well known (Mukherjee and Mishra 2001; Edgaonkar and Chellam 2002; Khan et al. 2003; Athreya et al. 2004) and it is also well known that carnivore densities are dependent on their prey density (Carbone and Gittleman 2002). The large number of feral animals present in our countryside is likely to be the most important factor allowing a species like the leopard to sustain itself in human-dominated areas setting a stage for conflict but only a scientific study addressing this issue will be able to provide definitive management recommendations.

The lack of reliance on scientific thought, the protocol of addressing a problem after it has arisen and not before, the anthropomorphic view that re-

locations are the solution, and the lack of feral animal control have contributed to the human–leopard conflict levels we see in India today. Fifty-one people were attacked by leopards in Junnar, western Maharashtra between 2001 and 2003 of which eighteen died. In Sanjay Gandhi National Park Mumbai, twenty-four attacks on people were reported between March 2002 and March 2004 of which six occurred within the boundary of the Park (Maharashtra Forest Department records). In 2004 the number of attacks increased with thirteen attacks reported only in the month of June of which ten people died (Maharashtra Forest Department records). In north Bengal, 121 people were attacked between 1990 and 1997 (WWF–India 1997), of which ten died. A study carried out in one of the areas affected by human–leopard conflict (Talala sub-district/taluka) adjacent to the Gir National Park, Gujarat reported twenty-seven leopard attacks on people between 1990 and 1999, of which four were fatal (Vijayan and Pati 2001). All these sites are in proximity of forests where leopards have been relocated for at least a decade (Athreya et al. *in press*). A large number of people are attacked each year in various parts of India due to leopard, tiger, lion and elephant incidents and it would be interesting to assess the role of translocated animals in these attacks.

Prior to our work, the managers were replying only on heuristic explanations provided by ‘experts’ to try and deal with human–leopard conflict. Loss of habitat and prey base in the croplands was touted as the reason and therefore the leopards were removed from the croplands and released back into the forests. No management action can hope to be successful if it is based on inaccurate information. More importantly, our work shows that once the cause is identified, proactive management solutions can be simple and immediately effective. Often wildlife scientists rue the fact that managers in India do not want to incorporate scientific inputs to obtain effective management recommendations. This may be true in part but it is also not uncommon that many Indian wildlife scientists in the past and even in the present provide recommendations based on partial science even after years of carrying out studies. The situation is worsened when the voices of well-meaning conservationists and naturalists rise above those of the scientists, blurring the distinction between people who are capable of assisting the managers meaningfully and those who will only worsen the situation.

Relocation, a procedure commonly used to deal with people or animals which are a problem is a reactive procedure and involves large amounts of resources. Proactive measures which would save on the relocation and the resources can be devised only after a careful analysis of the problem, be it conflict between villagers and wildlife in protected areas or in croplands. The general lack of good scientific and managerial input in India today allows us to only deal with a situation after conflict has reached alarming proportions – the case of the tiger in Sariska or human–leopard conflict in many parts of India and it is important that this method of looking at conflict is changed.

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