Conservation of the leopard and other carnivores in Sri Lanka

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While much attention has been given to the plight of the island's only mega-herbivore – the elephant, efforts to conserve the leopard, *Panthera pardus* (and other carnivores) leave much to be desired. Carnivores are found at the top of the food pyramid and so their presence in an area is always a good indication of its ecological richness and diversity[1]. The existence of 14 species of carnivores in Sri Lanka points to the presence of a much larger ecological community in the wild. Large carnivores such as the leopard also range over large areas and hence any conservation measures designed for them would also help protect biodiversity across a much wider area. On the other hand, large carnivores also cannot be maintained at high density even in the most favourable habitat; there is a well-defined upper limit to their numbers.

Until the turn of the last century, the leopard was numerous and widespread in Sri Lanka. So abundant it was that the Government at that time paid a reward of Rs 5 for every leopard that was killed. From 1854 to 1867, when almost 80% of the island was forested, at least 293 leopards were killed, and from 1867 to 1886 an additional 289 leopards were exterminated in the Mannar District alone. In the Vanni District, between 1880 and 1892, a total of 1012 leopards were killed from Vavuniya and Mullaitivu[2]. These are nevertheless under-estimates of the true number killed, given that they were based on the number of skins brought to the Jaffna Kachcheri for reimbursement. Only the worst skins reached the Kachcheri, since the good ones were sold to the Moor traders for higher prices. Assessment of predator numbers is usually prone to underestimate the true totals given the secretive nature of the animal[3]. Such figures nevertheless highlight the fact that the leopard in Sri Lanka enjoyed wide distribution and good numbers until the introduction of firearms and poison. That the leopard still survives, albeit in small numbers, across a wide area in Sri Lanka is a testimony to its exceptional adaptability as a predator to changes in prey density, carnivore competition, vegetation patterns, hunting conditions, and human disturbances. It is less susceptible to man's disruptive activities than many other large mammals mainly because of its ability to thrive in seral stages of vegetation succession, the catholicity of its diet, and its capacity to survive on small prey. As Kingdon[1] points out, the leopard is an animal that is designed to be invisible to both its prey and enemies.

Although the prognosis for carnivore conservation may look bleak, it is not entirely hopeless. The numbers of big cats and other predators are plummeting worldwide[4]. African lions have declined from an estimated 200,000 in 1980 to between 12,000 and 18,000 today. Wild dogs, which were so widespread and abundant across much of sub-Saharan Africa are now reduced to between 3000 and 5500 animals. The Amur leopard, which shares the habitat with Siberian tiger, is on the verge of extinction, having been reduced to some 33 adults, but poaching still goes on. In Sri Lanka, at the turn of the century, the number of leopards in the island was estimated at 1660, when at least 50% of the land was forested[5]. Since then however, the forest cover has declined to less than 23%, while the human population has increased to over 19 million. Any assessment of leopard numbers is bound to be difficult, given the secretive nature of the felid and its capacity to exist in unlikely localities without betraying its presence. Perhaps between 400 and 600 leopards may survive in Sri Lanka[6]. While it is impossible to be certain that this conservative estimate is correct, it is clear that the numbers of the leopard in Sri Lanka can now be measured in 'hundreds' whereas in the last century, it would have been estimated in 'thousands'. According to the theory of Conservation Biology, for a population of leopards to sustain itself without inbreeding, it must have enough genetic diversity. This translates into the maintenance of about 100 breeding pairs, which requires a total population comprising between 500 and 1000 animals. This does not mean that all small populations are *ipso facto* doomed to extinction. A number of species of mammals have escaped extinction and ultimately flourished after their population sizes were small for many years[7].

As Kingdon[1] observes, the major limiting factor on leopard populations is undoubtedly people, and the commonest source of conflict is stock raiding, but very occasionally some individuals may become habitual man-eaters. The current strategy for conserving the leopard in Sri Lanka is based on the premise that people and predators do not mix. Conservation measures to date have largely depended on legislative protection of the species and setting aside of national parks and nature reserves to ensure that people and predators are kept apart. But such an approach may not be adequate to ensure the long-term survival of the leopard. If the leopard is to survive in the wild, then healthy populations of the species must be maintained both within and outside protected areas. But it is in the unprotected areas outside national parks and reserves that the leopard is coming under increasing threat from intensification of agriculture and an upsurge in human numbers and their livestock. Habitat modifications outside protected areas may lead to the constriction of the life-support systems of the leopard. Agricultural expansion is encroaching on wildlife dispersal areas and forest corridors that are crucial for the integrity of the protected area network. This has brought wildlife and people into increased contact and conflict with one another over diminishing unfenced land. As Rosie Woodroffe from University of California, Davis, who is involved with a study of wild dogs in East Africa points out (as quoted in ref. 4), 'Even if national parks are the core of conservation strategy, you cannot separate people and parks. They have to live together. There is no alternative'. Nevertheless, there are strong arguments for the maintenance of at least a few critical-habitat sanctuaries, for threatened wildlife, where human activities are strictly restricted. Species recovery is more likely to be rapid within such sanctuaries than in wildlife reserves where human activities are permitted. USA has set aside 435 such critical-habitat sanctuaries covering an area of 38 million acres for the protection of 542 species.

Peaceful co-existence between people and predators is difficult but not impos-

sible to achieve. In the Gir Forest of India the only extant population of the Asiatic lion continues to share its habitat with pastoralists known as Maldharis. Both man and beast here appear to have reached a common understanding, which allows the lions to survive and the people to wander among them unharmed[8]. But as David Quammen argues[9], 'Is it ethical to expect Indian peasants to live with things that eat them in a way that we ourselves would not tolerate?' In northern Australia, where the saltwater crocodile, *Crocodylus porosus* (salty) is the most dangerous big predator, the 'use it or lose it' approach to wildlife management advocated by Graham Webb seems to ensure the coexistence of crocodile and people[8]. There is a sustainable trade in crocodile products, from croc hide to croc burgers. Many people may tolerate even dangerous and unpleasant wild animals in their neighbourhood as long as they can extract some benefit from them. Every species has to 'earn' its place in the sun[10]. As Laurence Frank (quoted in ref. 4) of University of California, Berkeley who is studying the carnivores in Laikipia District (10,000 km^2) in central Kenya points out, 'Predators must have a positive financial value in order to induce people to make the effort and spend some money to protect livestock'. The fundamental force driving a species' decline is usually the relative rate of investment by people. It is doubtful if leopards can co-exist peacefully in areas where livestock graze, for stock raiders are likely to be killed. They are also at risk from diseases such as distemper transmitted from dogs.

The greatest threat to any wild felid comes from the increasing use of poison in agricultural areas[3]. Given its propensity for scavenging, the leopard is more susceptible to taking poisoned meat. Therefore an important conservation measure that needs to be adopted is strict control of the use of agro-chemicals in areas of agriculture and livestock farming. As Myers[3] points out, chlorinated hydrocarbons being totally unselective are liable to kill at several stages along the food chain. They pose a far more serious threat to the leopard than guns, spears, snares, traps, and all other forms of combating the animal put together. If the indiscriminate use of agro-chemicals is not controlled, then there is a real danger that the leopard could disappear from the wild areas within a short time. The final disappearance of the tiger in Java and Bali was rapid and deliberate even though it occurred at a time when conservation was already the accepted national policy in Indonesia[7]. The critical element in the decline of the tiger in Java was identified as poisoning by agricultural settlers to whom the tiger was an unwelcome neighbour[11]. The leopard is also widely poached for its skin, even within protected areas. Thus the leopard is subject to the vicissitudes of the illegal fur trade coupled with the acceleration of the destruction of its habitat. Therefore the leopard may be among the most seriously threatened species of large mammals in Sri Lanka.

Today in Sri Lanka, the leopard survives in a few small populations of unknown size. If habitat and other resources are available and if the area is well protected, a species may increase rapidly. If several small, isolated populations persist, gene flow may possibly be maintained artificially by an occasional exchange of individuals. Conservation of carnivores would require a much better understanding of reproductive biology and the impact of diseases. Conservation areas that support leopards in Sri Lanka must be of sufficient size to ensure that at least minimum viable populations could survive within their boundaries. Outside protected areas, the best opportunity for leopard conservation appears to lie in some form of multiple-use-pattern of forest development[3]. If conservation of the leopard and other carnivores is to succeed in the island, the needs of the predators should be balanced with those of the people. Otherwise, disenchantment with conservation will antagonize the people and make them less willing defenders of the top carnivore in Sri Lanka.

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