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A TIGER PROBLEM IN INDIA

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ABSTRACT: During the past decade, India has done wonders in re-establishing populations of rare and threatened wildlife. Project Tiger, initiated in 1973, has stimulated a successful conservation movement in India. But tigers, like all animals, do not recognize man's property lines and, as populations increase in the forest reserves, more and more tigers forage outside of the parks, killing livestock and people. The current methods and regulations of dealing with troublesome tigers (and elephants) that stray from the sanctuaries due to overpopulation social pressures, lack of food, old age, or other reasons may soon become inadequate as the value of human life increases and for other reasons. Whenever wildlife is being protected, the population must also be managed and controlled as needed.

INTRODUCTION

I am happy to fill the vacancy suddenly created in the scheduled program. I will show some slides and tell you about an interesting problem in India as to how an endangered species can become a vertebrate pest. I was one of 19 American scientists who were sponsored by the Indian Government and the U.S. Fish and Wildlife Service (with PL480 funds concerning endangered species) to participate in a "Workshop on Techniques in Wildlife Research and Management." We met in beautiful Kanha National Park, Madhya Pradesh (central India) January 4-22, 1982. The objective of the workshop was to have the international team of specialists and their Indian counterpart scientists present a concentrated short-course on the state-of-the-art of field techniques in wildlife research and management which are applicable to Asia. The "students" were 60 Indian forest officers (wildlife managers), university faculty, researchers from government scientific and technical institutions, and from regional international organizations. Several were from neighboring countries.

It was a tremendous group of people and a very strenuous short-course for the students, as it covered 15 or so major subject areas of which mine, of course, was animal control. My counterpart was Mr. Jagat J. Dutta, Chief Wildlife Warden of the State of Madhya Pradesh, and we will be coauthoring our section of the Workshop Proceedings on Animal Damage Control Techniques. In our paper we have a lot to say about controlling wild animals until we deal with elephants (*Elephas maximus*) and tigers (*Panthera tigris*). When these animals forage outside of a park or sanctuary, we do not have good control solutions. That some of these animals will leave the parks is inevitable as all wildlife preserves are, in reality, only biological islands. All native animal species inherently overpopulate, hence some must disperse or be driven out by more dominant individuals, or venture out to seek food.

The problem with tigers is not so much the damage they do to livestock out of the parks, for which compensation can be paid, but tigers can create a much more serious problem in the loss of human life. This has involved many dozens of people in the past few years, and I think the problem can only get worse under the present management schemes. In this paper I will try to describe the situation and then pose some of the questions which I think must be answered before this complicated problem can be resolved in a manner where both people and tigers can be preserved in reasonable harmony. Like most vertebrate pest problems, its solution does not require much new biological information, but rather the answer involves political (organization), economic, social and religious matters.

A DECADE OF CONSERVATION

Indians are to be commended on their recent advances in wildlife conservation. They have made great strides toward the preservation of the country's rich wildlife heritage. However, as Saharia (1982) points out, the conservation ethic in India was actually inscribed in the sylvan surroundings of the Ashrams of their sages, which were the seats of learning in the country's ancient past. Different animals have been associated with different gods and were thus provided with religious sanctity and ensured conservation. It is difficult for an American to comprehend how some people in India are willing to give their lives to protect a wild animal. Likewise, in some India game sanctuaries the warden would be risking his life to venture unguarded outside of his park due to irate villagers who oppose the park's infringements upon what they deem as their rights to the forest and its components.

India is rich in wildlife variety, with about 350 species of mammals and 1200 species (2100 kinds) of birds (Saharia 1982). In Schedule 1 (as amended) of their Wildlife (Protection) Act, 1972, we find listed as rare and threatened 66 species of mammals, 38 species of birds and 18 species of amphibians and reptiles. India's cheetah is extinct, and in a 1972 national census, it was estimated that only 1,827 Royal Bengal tigers remained of what was estimated to have been 40,000 at the turn of the century. In Kanha National Park the tiger population had increased to about 80 by January 1982. According to Saharia, the Asiatic lion, the "Sinh" which adorns the country's national emblem, is only found in a small pocket of the Gir Forest of Gujarat. At Kanha, the extremely rare barasingha or swamp deer (*Cervus duvanceli branderi*) (in 1970 only 66 individuals) has increased remarkably to perhaps 300 individuals.

According to Panwar (1979, and personal communication), other main predators in Kanha other than the tiger include perhaps 30 leopards or panthers (*Panthera pardus*) and wild dog or dhole (*Cuon alpinus*) which hunts in packs. The main scavenging mammals are the hyena (*Hyaena hyaena*) and the more abundant jackal (*Canis aureus*), which sure looks like a coyote (*Canis latrans*). Some of the omnivorous sloth

bears (*Mellursus ursinus*) were present, but I only saw sign where they had been digging for termites. The main herbivores are the abundant chital or spotted deer (*Axis axis*), sambar (*Cervus unicolor*), muntjac (*Muntiacus muntjak*), black-buck or hiran (*Atilope cervicapra*), 4-horned antelope or chausinga (*Tetracerus quadricornis*), gaur (*Bos guarus*), wild pig (*Sus scrofa*), and a favorite food of tigers, the abundant common langur (*Pesbytis entellus*).

WILDLIFE ADMINISTRATION

In India, Forestry and Wildlife are administratively together. They are under state control, even if called a national park, and the states are free to legislate and evolve administrative machinery and management policies for their forests and wildlife (Saharia and Pillai 1982). Most states have a department of forests under a separate ministry and have a chief wildlife warden as a deputy chief conservator of forests. The chief wildlife wardens exercise statutory powers under the Wildlife (Protection) Act, 1972. Important sanctuaries and national parks are managed by park or sanctuary superintendents. In the Central (National) Government, the Inspector General of Forests is the Chief Executor of Forestry and Wildlife in the Forestry Division of the Department of Agriculture in the Ministry of Agriculture. The Indian Board of Wildlife advises government, and it is composed of officials and naturalists of eminence. The Prime Minister is Chairperson. The management of most of the zoological parks is also done by foresters. With the 42nd Amendment in the Constitution of India in 1976, the Central Government received the power to ensure the protection of forests and wildlife. Forests and sanctuaries of national importance can be acquired by the Central Government for state supervision. In 1980 the Central Government promulgated the Forest (Conservation) Ordinance, 1980, which prevents any state forest land from being denotified or diverted to any nonforestry purpose without prior consent of the Central Government.

A Task Force of the Indian Board for Wildlife recommended "Project Tiger" as a Central Sector Scheme. It was initiated in 1973, with the Project being viewed not only as an effort to save an endangered species but, since tigers are at the apex of the food chain of most Indian forest ecosystems, also as a means of preserving biotopes of sizable magnitude. According to Panwar (1982) there are 11 reserves (15,800 sq km) in 10 states. Project Tiger covers 2.1 percent of the forest area and about one-half percent of the geographical area of India. It has been a tremendous conservation movement.

THE TIGER PROBLEM

Since no national park, tiger preserve, or other sanctuary in India or elsewhere is large enough to exist as an ecosystem unperturbed by man, it is inevitable that individual tigers, elephants and other wildlife may stray out of the preserves and become troublesome--in fact, dangerous. All wildlife species are prone to overpopulate, including the predators like tigers which are at the top of the food pyramid. Project Tiger, without doubt, has been extremely successful in saving endangered species, and it and those responsible deserve much acclaim. However, it is very difficult to successfully adopt adequate wildlife management and wildlife control schemes both at the same time. There are numerous examples in other national parks of the world which clearly demonstrate that one "can love a protected species to death." Overprotection is not biologically sound, and it usually is foolish to "let nature take its course." Nature is the struggle of organisms to acquire some degree of equilibrium but if man enters the scene, he must plan for the most desired equilibrium and manage and control the wildlife with such an objective in mind (Howard 1974).

One can set the goal in a particular forest to be the establishment of as near natural food chain as possible, with the apex of the food web being tigers. However, few animals recognize forest boundaries as a barrier that they are not supposed to cross. Furthermore, if the forest and park area is large enough to support an adequate food base of ungulates to support tigers, how can the ungulate population be prevented from overpopulating, then overgrazing and eventually lowering considerably the carrying capacity of the area for themselves? This will result in a declining prey base for the predators. The "natural balance" that predator-prey populations attain does not mean that there is always enough prey for predators and always enough predators to keep the prey in check. This is not nature's way. And look at the variations in weather and many other factors which cause tigers and their prey to be constantly struggling toward an equilibrium.

The current methods of controlling tigers and the existing regulations do not appear adequate to cope with a steadily increasing density of tigers, hence the potential for more conflicts. I feel that Project Tiger, which has been so successful in saving the endangered tiger, must have better procedures to follow when tigers (and elephants) stray from the parks. The value of human life is rapidly increasing. With about 85% of the Members of Parliament in India from rural areas, it is urgent that more realistic control procedures be developed that better address the economic, political, social and religious aspects of the neighboring people before political, rather than biological, action is taken against the tiger (and elephant) in certain areas.

CONTROL METHODS

I am not proposing that tigers be declared game animals; but when they are classified as an endangered species, there is less likely to be funds available and protection categories seldom include proper management and control alternatives. For example, the State of California has a legislative measure to be voted on that would legislate the mountain lion (cougar), *Felis concolor*, as a protected species instead of leaving it as a game mammal under jurisdiction of California Department of Fish and Game, which has the authority to close the season any time the population of lions, which has remained quite stable for many years, appears threatened. It is much better to have biologists managing the

cougar than politicians. And as a game animal, there is money to spend to protect the species, for game animals provide funds from excise taxes on arms and ammunition.

By not having any sport hunting in India, the economic base for protecting this type of wildlife becomes more precarious. Except for the small amount made from tourism, wildlife in India becomes an expensive resource. If some procedure could be devised so that the surplus and pest vertebrate wildlife in parks could be utilized, especially as additional income for the village people living adjacent to the parks, many current problems might be resolved. By stationing scouts or guards throughout the parks, poaching is becoming less of a problem. But if the villagers had a way of legally profiting from surplus park wildlife, most of the incentives for poaching would disappear.

Once tigers (elephants, etc.) stray from the forests onto agricultural land, is there really any chance of ever permanently changing such behavior, especially if the population densities of these animals in the parks are being regulated by natural density-dependent factors rather than by man? The Indian Government is trying to encourage private forestry and wildlife enhancement, but without economic incentives it is often going to be difficult to encourage private expenditures for wildlife that are owned and protected by the government. A much better incentive might be to give landowners more authority to control wildlife species that damage their crops or endanger their lives, since tigers, elephants, and other rare and threatened species usually no longer have value as live animals once they have become mankillers. Nobody wants them; they are too dangerous. Should government give up ownership once a protected animal leaves its sanctuary, if the local population of that species is healthy?

A serious problem is how does government dispose of an unwanted tiger or elephant that has become a serious vertebrate pest, when no zoological garden or other outlet wants it alive? Sure, wardens know how to destroy such animals, but what do you do with the body? Bury it? Ivory, of course, will be taken by government, but often the skin, hide, etc., also has value. Can these values be used to help compensate villagers for damage done and for being excluded from traditional "public" forest lands?

The various research needs concerning frightening devices and other ways landowners might prevent tigers and other wildlife from entering their land need to be prioritized. How effective are gas lights? Actually, the various techniques that have been tried and the degree of success achieved needs to be assembled from all areas in India because over the centuries many ideas have been tested. To avoid habituation, probably the best type of frightening devices would be those that are activated into motion and the production of sounds only when the animal(s) to be frightened appears. If a cleared strip of land can be provided around the borders of a park, perhaps human-shaped scarecrows holding what looks and sounds like a gun could be activated so as to rise into view whenever a large animal entered the open spaces and tripped a sensing device. Physical barriers, electric shock, taste and odor repellents, and aversive conditioning against livestock and crops do not sound too promising as control methods.

Since park wardens have such good information about their wildlife animals, perhaps old tigers could be drugged and their teeth examined to see if they are becoming a hazard to livestock and people due to worn teeth, and, if so, disposed of. Salt licks, water development and other habitat manipulations can be utilized, but the protected animals will still tend to overproduce beyond the carrying capacity of the area. Perhaps more basic information about the ecology and behavior of tigers is needed, especially concerning innate dispersal movements and population pressure types of dispersal. How can troublesome animals be predicted in advance by their behavior? What environmental factors may contribute to making individuals become pests? Careful study should be made of all man-eaters. It appears tigers usually attack people who are sitting or crouched. Carrying a stick seems to provide some protection.

To establish fences to keep wildlife from leaving the reserves is not feasible, but in some locations cattle can be fenced out of the forests. Local grazing practices need to be considered. It will help if tigers are prevented from feeding on livestock remains or human cadavers in shallow graves. Since many man-eaters are wounded animals, possibly tighter gun control is indicated in some areas. Clearly there is no simple solution to this tiger problem in India.

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