

tural heritages is limited to the monuments. Many landscapes and the neighbourhood of the monuments thus fall outside the purview of the governments' responsibility and, as such, are increasingly vulnerable to misuse, damage, encroachments of commercial activities, and even extinction in the face of modernization, leading to unrecoverable cultural, social, and environmental, loss.

At a time when awareness of the need for architectural conservation is taking root more firmly than hitherto quite widely in the world, the relevance of landscaping around historical sites seems destined to gain in importance. The undersigned proposes to study the different steps taken by

governments and private agencies in India as well as in other countries regarding this subject. Useful critical analysis of those steps, and comments on specific guidelines, should result from this study.

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The Namibian Free-ranging Cheetah

The Cheetah Conservation Fund (hereafter cited as CCF or the Fund) has been active in Namibia since April 1991. The Fund's mission is to secure habitat for the long-term survival of Cheetahs (*Acinonyx jubatus*) and their ecosystems through multidisciplinary and integrated programmes in research, conservation, and education. The Fund conducts independent and collaborative research, disseminates information, and recommends conservation management techniques. Our research focuses on: identifying important farmland ecocomplexes and component ecosystems that are necessary to sustain healthy Cheetah populations; collecting biological samples to understand the overall health and genetic make-up of the wild populations; and radio-tracking Cheetahs to learn more about their movements through farms and to monitor Cheetahs in areas where new livestock and wildlife management practices are being tested. Programmes developed in Namibia are being adapted for use in other African countries where the Cheetah is in need of protection.

Limited research has been done on Cheetahs outside of protected reserves where the larger populations are found but these are in direct conflict with livestock farmers and by them domestic animals are killed in considerable numbers. The CCF is addressing this conservation issue by working directly with those people who have problems with this predator, and who, in the end, will determine if the Cheetah is to have a future habitat on their lands.

The largest remaining population of Cheetahs is found in Namibia, where 90% live in a contiguous area of over 275,000 sq. km of commercial livestock farmland that produces cattle, sheep, goats, and wildlife. Farmers have successfully removed most of the other large predators, and many would like to do so with the Cheetah, to reduce livestock losses. Cheetahs are known to kill small stock and calves up to six months of age, but are blamed for far more losses than they are actually responsible for. Although classified as a protected animal, a Cheetah may be shot in order to protect one's life or property. The problem is that most farmers practise preventive management — eliminating the Cheetah indiscriminately by either shooting whenever one is seen or after live-catching them in traps.

Assessing the Current Situation

To assess the Cheetah's situation today, we looked back into recent history to understand the circumstances which have led to its success as indicated by numbers on Namibian farmlands, and its subsequent rapid decline. These circumstances can be attributed largely to the farming environment and to ecological changes that have occurred on the farmlands. The first phase of our long-term programme was an in-depth survey in districts of the country

where Cheetahs still exist. Our survey included identifying general statistics, Cheetah distribution patterns, the vegetation and overall conditions of the land, the availability of prey, farmers' interaction with Cheetahs and other animal wildlife, and numbers of livestock and current livestock and game management practices. Some 385 farms, covering over 2,600,000 hectares (15% of the cattle farms of Namibia) were surveyed in the north-central region of the country.

Over the years, the biodiversity of these extensive farmlands has changed drastically. There has been an overutilization of the land due to a lack of understanding of the limitations of the ecocomplexes and their component ecosystems. With the development of waterholes in the early part of the century, more of the animal wildlife became resident on the farmlands and began competing with the livestock for water and food. Consequently the animal wildlife, competing with the domestic livestock, was killed off in high numbers.

In the 1960s the vegetation of the land began to change, due to a severe drought, overgrazing, and the previous reduction of large herds of migratory game. Along with the farmland development came also the conflict with large and dangerous predators. Protective measures for livestock

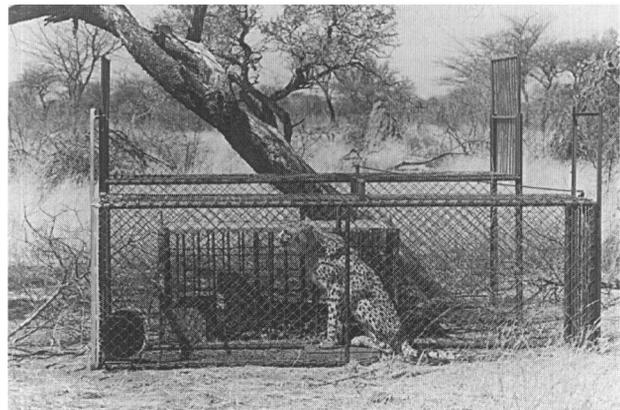


FIG. 1. Two Cheetahs recently caught in a live-trap at a 'playtree', with obviously sloping trunk, where Cheetahs often come to mark their territory. Traps or capture cages are legally set by farmers in Namibia. One Cheetah is in the capture cage in the foreground while a second is in a smaller holding cage behind. The two cats will be radio-collared and released by the Cheetah Conservation Fund after tranquilizing them, taking a complete set of measurements, and collecting blood samples for analysis of the overall health and genetic make-up of the free-ranging Cheetahs. Adult Cheetahs' home ranges can extend up to 1,500 km² on Namibian livestock farmlands. Cheetahs prefer to prey on wild game rather than on livestock. (Photo: Laurie Marker-Kraus.)

were seldom employed, owing to the extensive farming methods needed for success. After the 1960s the Cheetah population began to increase, probably due to the reduction in the numbers of large predators, the 'development' of water, and the resident animal wildlife populations.

Through the 1970s a wet cycle produced good grasses, and farmers stocked heavily — to two to three times the number of cattle that was recommended. In the late 1970s, when the first signs of the worst drought of the century appeared, the degenerative effects of a single species, cattle, on the land began to show. Grasses were disappearing, and bush was taking over. In many areas as much as 60% to 90% of the open grassland became heavy bush. Due to the effects of the drought on the grazing-land, many farmers resorted to catching the migratory game in order to protect their pastures for domestic stock, as the game had been 'claiming more than their fair share'. Between 1981 and 1983, the game populations in the country declined by 50%, due to the effects of the drought and of game-cropping. During this time another problem also arose. The kudu (*Strepticerus* spp.) population, one of the Cheetah's main prey, declined by nearly 80% from a rabies virus, thus further reducing the Cheetahs' potential food-source.

During the wet years of the 1970s, when prey was abundant, the Cheetah population had also increased. But in the 1980s, with grass cover low from the drought and wildlife numbers drastically reduced, the farmers began a war on the Cheetahs. Thus during the 1980s as many as 700 to 800 Cheetahs per year were reported to have been killed or otherwise removed from the wild, and over a 10-years' period their numbers declined to half. From 1980 to 1991, CITES reported that 6,782 Cheetahs were removed by Namibian farmers from the free-ranging Cheetah population.

'Playtrees' and Trapping

Cheetahs are primarily live-caught at what are commonly known in Namibia as 'playtrees'. These playtrees appear to be powerful focal points in the Cheetahs' range. They tend to be trees with sloping trunks (Fig. 1) which the Cheetah can easily run up, with large horizontal limbs from which the Cheetah can observe its surroundings. The animals leave their excreta on the limbs and urine on the trunk as markers. Three species of trees have been identified as used for playtrees, but the Cheetahs primarily use large Camel-thorn Trees (*Acacia erioloba*), the others being Shepherd's Tree (*Boscia albitrunca*) and Bastard Umbrella-thorn Tree (*Acacia luederitzi*).

Namibian Cheetahs appear to be unique in their use of playtrees. Not all farms have playtrees, and we have now termed these as pass-through farms, as the Cheetahs move quickly on their way to the next playtree. Some favoured farms have several playtrees, others just one. The live-

traps, set at these trees, are two-metres-long wire cages with drop-doors at either end and a trigger in the middle. The trap is placed near the playtree, and a thorn-bush 'boma' makes the trap the only passage to the tree. The Cheetah's urge to get to the tree is so strong that it will readily use the trap as a passage and walk in, thus triggering the doors. When one Cheetah has been caught, it is held in a holding cage within the boma, and its vocalizations will attract other Cheetahs which in turn will be caught (cf. Fig. 1).

The majority of this catching is indiscriminate, as the livestock-killing 'problem' animal is not singled out. In each region, there are certain farmers who catch continuously by leaving their traps open all the time. The survey information so far gathered suggests that this type of continuous, indiscriminate catching opens up territories, thus creating a vacuum and drawing in more Cheetahs than would normally be in the area, which in turn increases the farmer's potential problems. Ongoing research will shed further light on the full significance of the playtree. For example, does scent-marking the playtree affect the social stability of a Cheetah population in a specific area by altering one individual's proximity to another, and does this assist with avoidance and/or attraction?

Needs for Survival

For the Cheetah to survive, it must have a habitat and a prey-base. These essential elements can only be maintained through a holistic approach on the farmlands which incorporates land-use, livestock, and wildlife. We need to work towards a balance between the economic needs of the people and the survival of the species. The long-term goal of CCF is to develop a conservancy for Cheetahs on Namibia's commercial farmlands in cooperation with the farmers and the local human communities. Conservation of this last large stronghold for Cheetahs will determine whether the species will survive for future generations.

We believe that the Cheetah deserves a place on this Earth. Cheetahs are only one of the estimated 33 million species of biota living on our planet. Does it really matter if the Cheetah becomes extinct? It is tempting to think that the loss of only one species will not matter or at least will not affect us. But we must remember that all things on Earth are to some extent connected, and that Cheetahs are an integral part of the earthly superecosystem, which comprises the main, central part of The Biosphere.

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The Natural Hazards Research and Applications Information Center

The Natural Hazards Research and Applications Information Center is a national clearinghouse for data relating to the economic loss, social disruption, and human response, associated with natural disasters and related technological risks. Creation of the Center was recommended following an interdisciplinary research project led by the celebrated geographer Gilbert F. White to assess the status of hazards research and applications in the US.* White founded the Center in 1975 and served as its Director until 1984 and again from 1991–1993. Housed

within the Program on Environment and Behavior of the Institute of Behavioral Science at the University of Colorado in Boulder, the Center is now in its 20th year of existence and is financed by a consortium of seven federal agencies (National Science Foundation, National Oceanic and Atmospheric Administration, Federal Emergency Management Agency, US Army Corps of Engineers, US Environmental Protection Agency, National Institute of Mental Health, and US Geological Survey) and the Insurance Institute for Property Loss Reduction. The main