

FIRST ECOLOGY

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3.6.3 The elephant and the rhinoceros

The creation of the Chitwan National Park in Nepal has saved the greater one-horned rhino (*Rhinoceros unicornis*) from near-certain extinction. This impressive species was confined to the margins of lowland rivers in the Himalaya, though until recently it had a population that ran into tens of thousands. Hunting and habitat destruction during the last 100 years had reduced it to only two groups of about 100 individuals by the early 1960s.

In Chitwan, this amounted to an effective breeding population of just 21–28 individuals (Figure 3.8). Today, with substantial protection, the total population has increased to more than 400 animals, while Kaziranga National Park in India now has 1500 individuals. Much of the credit must go to the rhinos themselves. Their spectacular recovery after the ending of poaching has been possible because they have retained a very high genetic variation.

We would normally expect genetic variation to be low in a population reduced to such a small size. Ironically, the rhino appear to have held on to much of their variation because their decline was so rapid.

Two demographic factors contributed to this: the rhino have a long generation time (12 years) and females produce only one calf every four years. Thus the extent of inbreeding was limited over the very short period of their decline.

The poaching of rhino has devastated all five rhino species, particularly the two species in Africa (Figure 3.9). Despite legislation and a policy in some countries to shoot poachers on sight, the high price of the horn ensures that the slaughter will continue. Because of their masculine associations, the horns are prized as dagger handles and, when ground to a powder, as an aphrodisiac. While it probably makes the dagger unusable, it certainly has no physiological effect on the libido of the human male.

Nevertheless, the high price fetched by the horn is a major temptation to local peoples with meagre incomes. The dramatic decline of the African rhino species follows from intense poaching rather than habitat loss. Of the hundreds of thousands of black rhino (*Diceros bicornis*) that ranged over sub-Saharan Africa in historical times, just 65 000 were alive in 1970 (Figure 3.10). In 1990 there were



Figure 3.8 Indian rhino (greater one-horned rhino) in Chitwan National Park, Nepal.

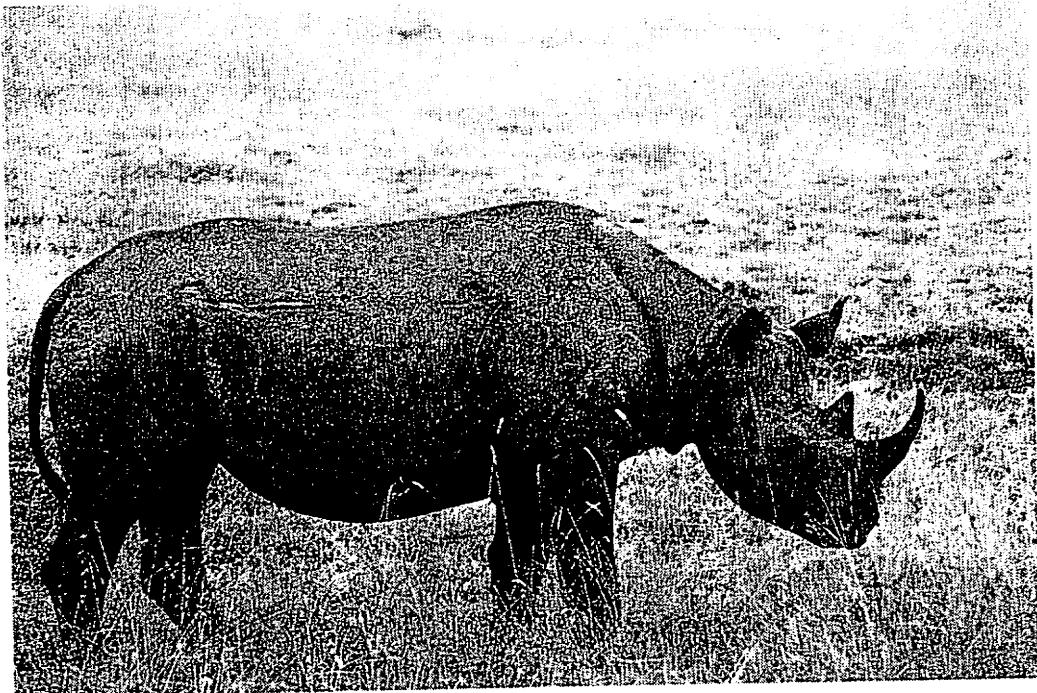


Figure 3.9 Black rhinoceros (*Diceros bicornis*).

3800 distributed among 75 populations. Only 10 of these populations had more than 50 individuals.

The total population of the black rhino has been separated into relatively isolated pockets for some time. Based on their horn shape and body size, seven subspecies have been identified. One is now extinct. Present evidence suggests that these subspecies have become genetically differentiated only recently, and that breeding between them could be a viable conservation strategy.

The picture is less encouraging for one race of the white rhino. Although the southern race (*Ceratotherium simum simum*) has been through a major reduction in numbers, it has recovered to around 3000 individuals on various reserves in southern Africa. In contrast, just 22 of the northern race (*C. s. cottoni*) were left in the wild in 1990, and its future is much more bleak. Moreover, the white rhino shows very distinct genetic differences between the two races, probably because their geographical ranges have not overlapped in recent times. Consequently, conservation biologists have decided not to interbreed them.

In Asia, the security of the rhino populations and their habitats are more closely interlinked, as forest clearance and agriculture have led to habitat fragmentation. With only 50 Javan rhinos (*Rhinoceros sondaicus*) left, there have been fierce arguments whether to leave them all in the wild, possibly combining subpopulations on a single reserve, or to transfer some to zoos for captive breeding.

As for the horn, so for the tusk: the international trade in ivory has led to the slaughter of large numbers of African and Asian elephants. Laos and Cambodia once had 40 000 elephant but now have fewer than 4000. Much of the decline in the Asiatic elephant is associated with habitat loss, whereas poaching has been much more serious in Africa. Unlike their Asian counterparts, both male and female African elephants bear tusks and so both are slaughtered. Their dramatic decline in Kenya, from 130 000 in 1973 to 16 000 in 1989, led to a government ban on the ivory trade and a very public ceremony in which the President, Daniel arap Moi, set fire to a large pile of impounded tusks.

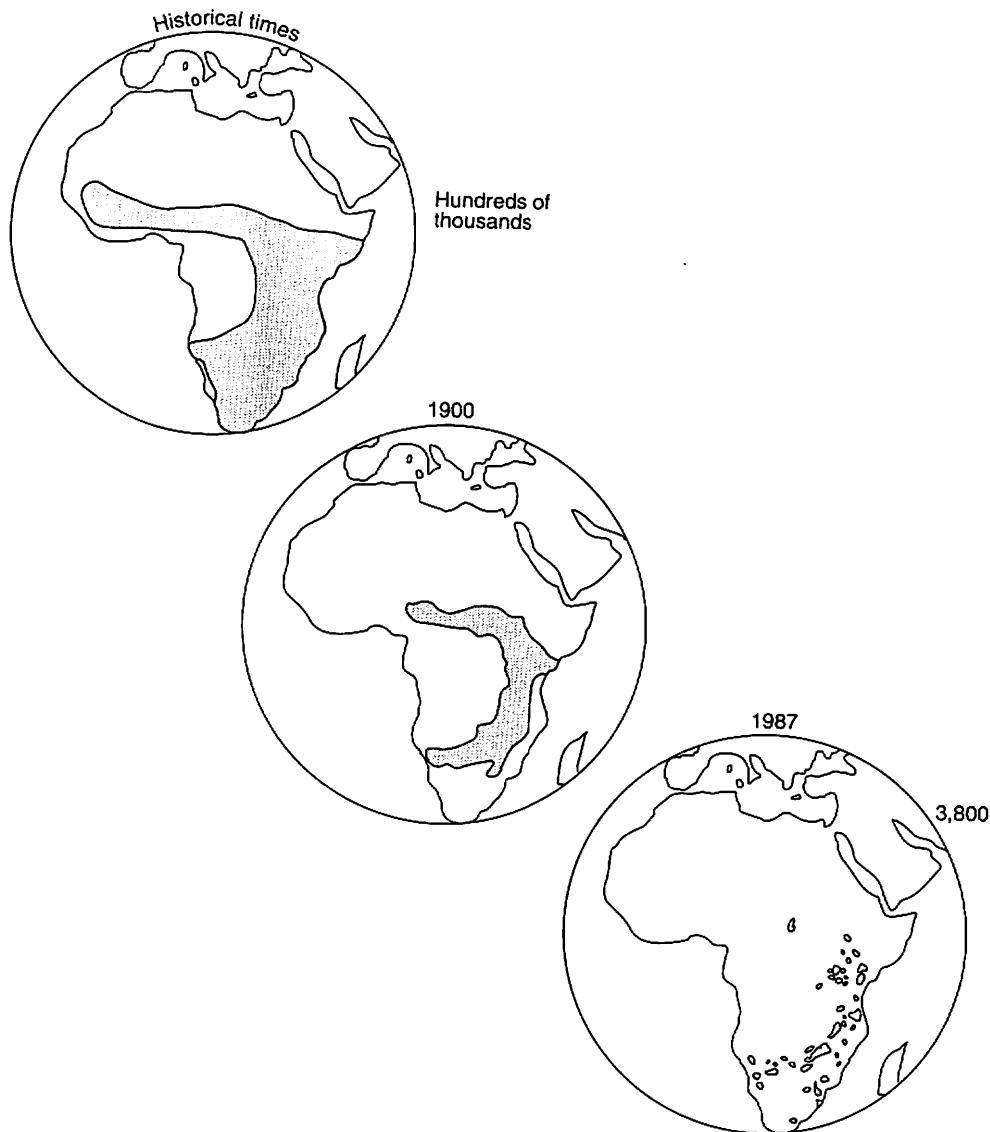


Figure 3.10 The decline of the black rhino in Africa.

Large tusks attract a larger price, so poachers favour the larger adults, especially the males. An elephant might live between 40 and 60 years, though today most adults are under 30 years old. Unfortunately, males do not begin breeding until they are around 30. A 1988 survey of the Mkomasi Reserve in Tanzania could find no adult males at all.

Changing the age structure of these populations not only affects their future growth, it also has

social implications for the herds. Herds are normally led by elderly females, the matriarchs, whose knowledge of waterholes and foraging routes is passed on to the younger members of the group. Today most herds in Africa are led by females in their early 20s and teens.

The loss of the elephant also has important implications for the African landscape. Their browsing on shrubs and trees is crucial to maintain

an open savanna. Grasses can then thrive, providing food for grazers such as gazelle, wildebeest and zebra. Less obvious are the many smaller vertebrates and invertebrates, who directly or indirectly rely on an open bush. Elephant and giraffe are key-stone species, maintaining the grassland community of the dry savanna and an open scrub of the wetter parts of Africa.

However, there are complications when the elephant population is close to its carrying capacity. Regeneration of the shrubs and trees can then be severely reduced (Plate 11). Elephant will push over trees to browse, and their trampling damages grassland regeneration, particularly around waterholes. This is a problem in some southern African reserves where poaching is effectively controlled. The regeneration of the vegetation is being suppressed

and habitat quality is threatened for future generations. Here herds have been systematically culled to reduce the pressure on the vegetation. In Zimbabwe, areas have been designated by the government where native agriculture runs side by side with a game management and conservation strategy, as part of the effort to control poaching. Government marksmen carry out organized culls, taking selected elephants, and this helps to maintain the integrity of the elephant herd by managing its age structure. Meat from the kill is distributed among the local villagers, while the skin and tusks have, in the past, been sold on. The proceeds are being used to fund conservation and to provide compensation to farmers in the form of additional food. Local people are thus being encouraged to tolerate and, indeed, value their wildlife resources.

Box 3.3

EARNING FROM THE PAST

Professor Gary Haynes
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The crisis-clock is ticking for African elephants. Most of them will be able to survive only in crowded refuges, which offer dwindling resources and ever-shrinking carrying capacity. Eventually, the pressures of so many elephants in so few places may reduce biodiversity in their ranges to the point where their own long-term survival is unlikely.

This seems to be how their ancient relatives, the mammoths and mastodonts, died out too. The mammoths of Eurasia and America – open-land grazers and mixed feeders – disappeared forever at the end of the last ice age, about 11 000 years ago, and so did the mastodonts, woodland browsers. Their bone accumulations now provide us with important lessons about extinction, especially when they are compared with the bone heaps left from starved African elephants. In North America, a rapid cycling of climatic conditions from cold and dry to

warmer and stormier led to major changes in the plant communities used by mammoths and mastodonts. As the extent of their feeding ranges shrank, many died out in locales undergoing profound ecological change with the climatic fluctuations. Other populations must have clustered at favoured resource points, such as water-holes surrounded by the kinds of open ground and marshy habitats that supported the animals' main source of forage. The competition for food and water weakened the mammoths and mastodonts, and young animals died in great numbers. Older females also perished. The social cohesion of normal herds broke down, and groups fragmented as each mother wandered away in company with only her youngest offspring to find food and to avoid competition. Fights between adult females and males must have been more common under these conditions.