~250 to ~750 over the period 1964-2003. Rhino range size increased from 15km^2 in 1964-66 to 31.5 km^2 in 1981-82 suggesting that either carrying capacity decreased or that rhinos occupied larger areas due to reduced intra-specific competition. There is an urgent need for a study of current range size. A preliminary model of possible changes in browse availability suggests that rhino carrying capacity in the Crater may have declined from ~0.42 rhino km^{-2} to ~0.1-0.2 rhino km^{-2}. The current rhino density is approximately 0.064 rhino km^{-2}. Rhinos may be limited by the availability of browse towards the end of the dry season. To improve the accuracy of the carrying capacity estimate it is recommended that: (i) preferred and important browse species for the Crater rhino are determined; and (ii) the Crater vegetation (especially the distribution and quantity/quality of browse) is mapped. Habitat conditions for black rhino in the Crater could be improved through fire management (by reducing unpalatable shrub and tall grass and possibly increasing the number of leguminous shrubs in grassland and swamp habitats) and restoration of the Lerai Forest. Oldupai and Ndutu are other areas within the NCA that were evaluated for their habitat suitability for the establishment of additional rhino populations. Carrying capacities for these areas are estimated to be ~0.15 and 0.04 rhino km^{-2}, respectively. Oldupai appears to have greater available browse than Ndutu. It is suggested that Ndutu can only support rhino at very low densities and the likelihood of rhino ranging over very wide areas is high. Accurate mapping of browse and water resources is recommended before any translocation of rhinos to new areas is undertaken.

3.4 An ecological assessment of predation risk on rhinos in the Ngorongoro Crater

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It has been hypothesized that high levels of calf predation by spotted hyena and/or lion in the Ngorongoro Crater have prevented growth of the black rhino population in Ngorongoro over the past decade. This hypothesis was assessed by comparing predator risk to rhinos in the Crater to Etosha National Park, Namibia through an analysis of data on the numbers of lions, hyenas, rhino calves and other prey numbers. This analysis gave the following results: (i) Predator density was much greater in the Crater than Etosha (156 vs 3.1 predators per 100 km^2, respectively); (ii) The ratio of predators to total prey was greater in the Crater (1:45) than Etosha (1:59); (iii) The predicted number of rhino calves available to predators per year was greater in Etosha (17) than the Crater (0.1-0.8); (iv) The proportion of rhino calves to other suitable prey was greater in Etosha (0.08% by numbers; 0.03% by biomass) than in the Crater (0.003% by numbers; 0.001% by biomass); (v) The ratio of predators to rhino calves was greater in the Crater (1:0.0012) than in Etosha (1:0.03). Factors that heighten the risk of rhino predation in the Crater include large carnivore group sizes, the high predator density, good visibility for predators and a lack of suitable calving areas. The lethal management of predators to try to reduce predation on rhino calves in the Crater is believed to be unfeasible both logistically and politically. It is recommended that more breeding female rhinos are introduced into the Crater to bolster the rhino population and that more optimal rhino habitat in the Serengeti-Mara ecosystem is sought for the establishment of additional rhino populations.