

ABSTRACT

The population of black rhinoceros has declined in African range states since 1960s due to poaching and habitat loss. In Kenya the species population declined from an estimated 20,000 in 1970 to less than 500 animals by 1990. However, through increased security and translocation, Kenya has witnessed a modest increase in population of this critically endangered species. The current population size is 623. Kenya like other range countries conserves black rhinoceros sub-populations as a meta-population, which employs conservation translocation as its primary conservation tool. However, translocation is a complex process that requires knowledge of habitat suitability and carrying capacity for each reserve. Knowledge of carrying capacity is important in determining whether the current population of black rhinoceros in Ruma National Park is within the ecological carrying capacity. Furthermore, knowledge of both habitat and diet preference and how this differs between the sexes is crucial for determining the absence or presence of competition for ecological resources. Between 2011 and 2012 Kenya Wildlife Service re-introduced twenty-one black rhinoceros to Ruma National Park. However, habitat use and carrying capacity of black rhinoceros in the park has not been determined since their translocation. The general objective of this study was to investigate habitat use and ecological carrying capacity for the black rhinoceros population in Ruma National Park. The specific objectives of the study were to determine whether level of elevation, rockiness, shade, distance to fence, roads, and human settlements predict habitat use by black rhinoceros; determine differences in habitat and diet preference between female and male black rhinoceros; and to determine the ecological carrying capacity of black rhinoceros in Ruma National Park. Data on environmental and anthropogenic factors were collected in 30 sampling plots each measuring 20 m by 20 m and analyzed using binomial logistic regression. Indices of habitat preference were estimated separately for the sexes by dividing the total number of locations in all habitats by the total area of kernel home range. Difference in diet between the sexes was determined using Jaccard's coefficient. Carrying capacity was estimated using the habitat use method. The results of the study show, first, that none of the environmental and anthropogenic factors predict habitat use by black rhinoceros. Second, there was no significant difference in habitat preference between female and male black rhinoceros $U = 16.50$, $p = 0.306$. However, there was a 60 % dissimilarity in diet selection between the sexes. Third, Ruma National Park can sustain a maximum of 65 black rhinoceros. The results that suggest that there is available space for black rhinoceros population growth and that the current population is within ecological carrying capacity will be beneficial to Ruma Park management team in decision making and conservation planning for this critically endangered species. However, future conservation plans for black rhinoceros population in Ruma National Park should include reintroduction of more female black rhinoceros so as to address the male-biased sex ratio.