

Understanding the mechanisms limiting the buffalo population in Niassa National Reserve, Mozambique

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Abstract: The Niassa National Reserve (NNR), Mozambique is one of the vastest protected areas in Africa (42,140 km²) and includes around 39,000 local residents within the limits of the reserve. NNR suffered from 10 years of independence war (1964-1974) and 15 years of civil war (1977-1992), during which wildlife population decreased substantially. Despite important conservation efforts, the density of ungulate community remains strikingly low compared to other similar savanna systems, especially buffalo which is considered as a key asset for the local trophy hunting industry and has logically become a management priority for the NNR. We addressed this issue through three main protocols. First, we investigated data from 5 aerial surveys (2002-2011) to explore relationships between buffalo distribution and environmental covariates at the end of the dry season, a period reflecting large scale and long-term equilibriums with key resources. Second, we investigated space use and habitat selection strategies at annual and seasonal scales by GPS tracking the movements of 9 buffalo herds in contrasted areas over 3 years. Third, we assessed the potential direct and indirect impacts of household's livelihood on buffalo and natural resources using questionnaires in contrasted villages. Results show that both the spatial arrangement of permanent rivers and residual water in seasonal tributaries strongly drive buffalo distribution within NNR in the dry season. Home range sizes were among the largest on record for the species with large seasonal movements in response to segregated resources. Bushfires appeared to strongly constrain habitat selection and the magnitude of their extension to greatly limit the availability of forage for buffalo. No obvious avoidance of human activities (villages/road proximity) was observed by the first two protocols, but responses to the questionnaires suggest a potentially severe impact of poaching on buffalo population dynamics. Results provide valuable information for wildlife managers. At such a large scale, due to the heterogeneity of environmental covariates, management actions must be adapted to the contrasting zones within NNR.

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