



# Spatial distribution modeling of the savannah buffalo (*Syncerus caffer brachyceros*) and the western hartebeest (*Alcelaphus buselaphus major*) in Niokolo-Koba National Park

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## ABSTRACT

**Objective:** This study aimed to model the spatial distribution of the savannah buffalo (*Syncerus caffer brachyceros*) and the major hartebeest (*Alcelaphus buselaphus major*) in Niokolo-Koba National Park (PNNK) to identify priority areas for conservation.

**Methodology and results:** Occurrence data collected in 2023–2024 were combined with environmental variables in Maxent. The models showed good predictive performance (AUC 0.92 for savannah buffalo, 0.95 for western hartebeest). Predator density mainly influenced savannah buffalo distribution, while poaching was the key factor for western hartebeest.

**Conclusions and applications:** Both species preferred areas near waterways and receiving 900–1,050 mm of rainfall annually. Favorable areas (>50%) cover 1,496 km<sup>2</sup> for buffalo (16.4% of the park) and 697.5 km<sup>2</sup> for western hartebeest (7.6%). Highly suitable habitats (>67%) cover 1,437.5 km<sup>2</sup> and 744.9 km<sup>2</sup>, mainly in the central and eastern parts of the park. These results provide critical information for population management, park planning, and anti-poaching strategies.

**Keywords:** savannah buffalo, western hartebeest, spatial modeling, poaching, predators, PNNK, conservation