Subtle temperature variations drive nesting habitat preference for white-backed vultures (Gyps africanus) in Hwange national park, Zimbabwe

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Abstract

The white-backed vulture (*Gyps africanus*) is a threatened avian species in the savanna ecosystem. In order to preclude this threat and the associated propensity of white-backed vulture extinction there is need to understand the environmental conditions that influence the vultures' population dynamics especially their nesting habits. In this study we used presence-only location data for white-backed vulture nesting sites to understand the selection of the vultures' nesting habitats using maximum entropy (MaxEnt). The presence-only data were collected in the years 2014 and 2015 through fieldwork in Hwange national park. In the (MaxEnt) algorithm, we used environmental variables (i.e., average breeding season temperature for white-backed vultures, elevation, prey density, slope, NDVI and distance to water sources) which are relevant to the ecology of vultures. We then used the Diggle's G-function with the Monte Carlo simulation to analyse the pattern of distribution of the nests. Results showed that vulture nests were significantly clustered at all distances (Diggle's G-function with Monte Carlo Simulation at α=0.01) in Hwange National Park. Modelling with MaxEnt was successful with both training (AUC = 0.98) and test (AUC=0.97) data. The contribution of individual variables to the model were as follows: temperature 0.83; prey density 0.12, elevation 0.02, NDVI 0.1, distance to water 0.01 and slope 0.01. The predicted map of vulture nesting habitat we produced suggests prioritization of vulture nest monitoring on the wooded, high temperature north western lowland zone of Hwange national park.

Keywords: Diggle's G: MaxEnt:Monte Carlo:NDVI:Remote Sensing

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