

Microhabitat preferences and anthropogenic vulnerability of cave roosting bats within Mount Elgon Biosphere Reserve: implications for bat conservation

Abstract

Bats play critical roles in supporting ecosystems as well as human communities. Despite these roles, their populations continue to decline. While human activities have been indicated to play a central role in such declines, the scale of such anthropogenic effects is poorly understood, especially in remote locations (E.g., Mount Elgon) some of which have been predicted to host endemic species of bats. Additionally, the role of human communities in conservation of these mammals has not been undertaken within hard-to-reach areas like Mount Elgon. This gap thus ought to be filled with studies on the status of bats in terms of threats as well as potential conservation pathways. Accordingly, this study contributed to closing this gap by (i) analyzing microhabitat preferences (physical and climatic characteristics) of cave-roosting bats and assessed (ii) vulnerability of cave bat roosts to anthropogenic disturbances; (iii) households' willingness to pay for ecosystem services of bats and (iv) households' willingness to pay for conservation of bats within Mount Elgon Biosphere Reserve, Uganda. A cross-sequential design combining longitudinal and cross-sectional study design was applied utilizing mixed methods research approaches. Kapchorwa district within the study area was selected because of the nature of the human population including different socioeconomic activities with potential effects on bat populations. Results indicated caves inhabited by bats were generally close to water sources, human settlement and cultivated areas. Anthropogenic factors were negatively associated with bat diversity. In terms of microclimate, actual vapor pressure and temperature of bat sites were significantly different across caves. These variables were significantly influenced by outside humidity and outside temperature at $p < 0.05$. In terms of anthropogenic vulnerability of cave bat roosts, all ($N=14$) of the caves hosting bats were vulnerable to anthropogenic disturbances. Up to half of these caves (50%, $N=14$) ranked "High" and "Medium" requiring urgent conservation interventions. Regarding ecosystem services, respondents indicated monetary and labor contributions to sustain the flow of these services from bats. Similarly, bids were made for the conservation of these mammals at landscape level. These bids (monetary and labor) for ecosystem services and conservation were influenced by sociodemographic factors e.g., education levels. This study thus reflects the status of bats within Mount Elgon Biosphere reserve with several anthropogenic factors that could potentially undermine populations of these mammals. There is thus a need for urgent conservation interventions integrating human dimensions for sustained outcomes. Additionally, further studies ought to be conducted and on a large scale and for a longer period within this area to explicitly understand the status of different species of bats as well as human dimensions. This will further support design of interventions for the respective species of bats.

Supervisors: