Ecology, density and distribution of sitatunga (*Tragelaphus spekii*) in central Uganda

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SYNOPSIS

Well-regulated hunting can provide crucial funds for conservation, especially in areas ignored by tourists. Sustainable harvest management requires knowledge about populations and habitats. Sitatunga is a semi-aquatic African antelope that provides economic incentive for wetland conservation, yet we know little about this species. This research will address gaps in knowledge using three technologies: radiotelemetry, mark-resight population estimation, and genetic analysis. GPS telemetry will facilitate estimation of home range size, habitat use, and activity patterns.

(View From a Machan into Papyrus Cut Lanes)

Mark-resight techniques allow estimation of population size and demographics, while supplementing individual space-use data. Genetic analysis will characterize the genetic diversity of the population, and can be used to estimate the extent of immigration and genetic mixing among populations. This research will improve local harvest management and provide a framework for sitatunga management throughout its range. This project will expand on existing wildlife management techniques, which can be translated for use in North American game populations. Enhanced harvest management for sitatunga can motivate landowners to conserve wetlands and can contribute to sustainable economies in rural Africa.

Objectives and Methods

Objective 1 – Estimate home range size and habitat use of adult sitatunga. We will fit sitatunga with GPS radiocollars to document movement patterns, and we will identify individuals from images taken at viewing platforms and from trail cameras. Camera data in conjunction with movement data provides a temporal and spatial record of habitat use for individual sitatunga, which will allow for modelling of habitat selection and population density. We will calculate utilization distributions (UD), which represent an animal's space use. Once a home range is identified, we will use UDs to establish how space use varies according to habitat type; and we will relate these data to habitat selection using resource selection functions (RSFs) and resource utilization functions, linking environmental covariates to patterns of space use.

Objective 2 – Estimate density of sitatunga in the Mayanja River of Uganda. We will use both telemetry and camera data to develop a spatially explicit capture-recapture (SECR) model of density. Linking RSFs with SECR, we can calculate abundance based upon habitat types. Once we have developed a density model for sitatunga in the study area, we will extrapolate the model to other areas of sitatunga range.

Objective 3 – Assess dispersal of sitatunga among subpopulations and determine connectivity of sitatunga habitats. We will use DNA from harvested individuals, captured individuals, and scat piles to determine genetic structure and variability of sitatunga in the Mayanja River valley. From these results we can infer immigration, dispersal, and patterns of paternity for population segments.

Results

The first field season of this project was April-August 2015. During this time, we recorded 212 encounters with sitatunga with observers at machans. We deployed 28 trail cameras and recorded 287 sitatunga encounters. Image classification and individual identification of each encounter is ongoing, with 20 unique individuals identified from images captured in May. Identifying suitable spot detection software for individual identification is ongoing. We collected 28 hide samples for use in DNA analyses; we are currently obtaining proper permits for importation of these samples into Canada

Significance

At completion of this project, we will have estimates of population size, genetic structure, and demographic parameters of the sitatunga population in the Mayanja River, Uganda. We believe that this will result in improved management decisions for the herd and the harvest. Improved harvest management can result in sustained hunting revenue, which will enhance economic development in the local area and conservation of habitat. For other regions of sitatunga range, managers will be able to extrapolate population size, which can guide conservation and management for the species across sub-Saharan Africa. This work expands on existing use of RSFs, by relating the probability of a sitatunga using a habitat type to the landscape level and generating an abundance estimate. This method has potential to benefit animal conservation across the world, not just Africa.

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Further Information:
www.wildlifediscoveries.com

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