Final Evaluation Report

We ask all grant recipients to complete a project evaluation that helps us to gauge the success of your project. This must be sent in **MS Word and not PDF format**. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please DO NOT fill in and submit this form until the project has been completed.

Complete the form in English. Note that the information may be edited before posting on our website.

Please email this report to jane@rufford.org.

Your Details	
Full Name	Beevans Biseko Biseko
Project Title	Abundance, distribution and Conservation of Gerenuk (*Litocranius walleri*) around Lake Natron Ecosystem.
Application ID	43501-1
Date of this Report	06/11/2025

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
To estimate the current population size and structure of Gerenuk			✓	The current population density of the Gerenuk has been established. Observation method through road transect technique was used to collect data for estimating the population size and structure of Gerenuk in Natron ecosystem. We conducted a road count survey using a slow moving vehicle passing through roads and established trails as transects. A total of 25 road transects with unequal length were surveyed was surveyed in dry season and same number in wet season. The survey was conducted in the morning starting from 0700 to 1000 and evening starting from 1600 to 1800 using a vehicle moving at an average speed of 15 to 20 kph. Observation in each transect was done by three observers. A total of 172 individual Gerenuk was counted in a total survey period. Wet season counts were 88 while dry season counts were 84. We observed no significant statistical variation in Gerenuk counts (U'=84.5, P=0.806, C.I 95%) between dry and wet season. The overall mean group sizes for was (2.56±0.19) in both season. In the

				entire survey period, female individuals comprised the highest percentage. Female Gerenuk were 71.51% (n=123), 26.16% (2=45) were male and 2.33% (n=2) were unidentified. The density estimate (individual ± SE km-2) of Gerenuk for the entire survey period was 0.79 ± 0.15 km-2. The manuscript for publication on the population density and structure of gerenuk in the studied area is on the final step of preparation, and will be submitted to the journal for publication soon.
Assess the status and trend of the species habitat for the last twenty years to understand how the Gerenuk habitat structure and size have been changing over time			✓	Status and trends of land use and land cover change of the study site has been documented. The land cover change was analysed using QGIS Software version 3.30.Landsat and Sentinel 2 images from the year 2003 to 2022 was downloaded from the Earth Explorer (earthexplorer.usgs.gov) web platform to assess how the habitats have been changing over time. Only images captured during the dry season (July to September) with minimal cloud cover (20%) was selected. Dry season images are favoured because they have substantially less cloud cover (Borges et al. 2020). The acquired images were firstly pre-processed to enhance their quality and prepare for analysis. Pre-processing procedures included radiometric and atmospheric correction to remove

				sensor and atmospheric effects, image enhancement techniques were carried out to improve visual quality and mosaicking multiple images into a single composite image for each time period. All images were geometrically corrected and projected into World Geodetic System (WGS) 1984. This was followed by visual enhancement to increase the visual quality of the images before clipping the area of interest (AOI). The supervised image classification was performed by using the maximum likelihood algorithm to create the desired land cover categories that was followed by ground truthing. Then change detection analysis by subtraction method was performed to identify and quantify changes in land use and land cover for the past 20 years. Further, accuracy assessment using Kappa value was performed to assess the accuracy of land cover classification and change detection. Final maps showing the land cover classes produced. (The map was sent alongside this report). Generally, the analysis indicated the loss of grassland cover and water
Establish the environmental determinants of species distribution in its habitat			✓	The key environmental and anthropogenic factors that can potentially influence the species abundance have been determined. These include number of trees cut, habitat type, landscape elevation and season.
Carry out community conservation			✓	Community conservation awareness was raised.

awareness				In total, 37 households were visited. In the entire survey, we managed to meet about 96 local community members who were willing to cooperate with the team and who were also available. Our original 60% projection was not attained, only about 10% of the population was covered. This is partly due to the scattered nature of these pastoralist communities that ultimately constrained our limited fund. We managed to conduct two theory and practical training sessions on ecological monitoring techniques, the first sessions comprised of five game rangers, and the second involved five local people who became a permanent part of the project and they participated in the entire project period. Finally two workshops were conducted at the Department of Wildlife Management involving postgraduate students and academics and researchers. The first workshop was about introducing the project and seeking feedback on the methodology and the outcome intended. The second workshop was meant to present project progress and findings especially on the ecological part of the project. Upon validation the findings were published on the African journal of

				Ecology. Workshops involved a total of 50 participants. 200 brochures, one policy brief and 15 T-shirts were printed and distributed.

2. Describe the three most important outcomes of your project.

a). Improved Scientific knowledge in the ecology and conservation of Gerenuk. The project has established the population status of gerenuk and the key environmental determinants influencing their abundance within the Lake Natron ecosystem. This project has improved our understanding on the ecology of Gerenuk in the fragmented Lake Natron ecosystem contributing valuable knowledge to the scientific community and informing future conservation planning. After seeking and securing additional funding from the Sokoine University of Agriculture the project extended its survey to include Grant's gazelle the medium sized antelope found to associate with Gerenuk and therefore exposed to similar anthropogenic threats in this ecosystem. The findings have been published in the peer-reviewed journal *African Journal of Ecology*. Please see the link doi.org/10.1111/aje.70008. The publication extended the project's impact across the wider community.

b). Another important outcome of my project is the significant improvement of my ecological research and analytical skills. Through the Rufford Foundation's support, I successfully completed my master's research, fulfilling the requirements for the award of my master's degree. The project provided me with valuable hands-on experience in data collection, analysis and interpretation thus strengthening my quantitative and ecological skills that will be instrumental throughout my conservation career. Moreover, these new competencies have enhanced my effectiveness as an Assistant Lecturer, enabling me to better teach and mentor BSc. wildlife management students. By sharing the knowledge and experience gained from this project, I will help shape future conservation professionals who can contribute to wildlife conservation efforts both within Tanzania and beyond.

"*I am deeply grateful to the Rufford Foundation for their generous support, which made it possible to uncover critical threats facing the threatened Gerenuk in a fragile, human-dominated landscape. This grant has been truly transformative by strengthening my ecological research skills, deepening my passion for conservation and inspiring a lifelong commitment to protect wildlife and their habitats in Tanzania and beyond*".

c). Strengthened Partnerships with Local Stakeholders
The project facilitated collaboration between the department of Wildlife Management of Sokoine University of Agriculture with local leaders, village game scout, and conservation authority Tanzania Wildlife Management Authority (TAWA) which is the responsible authority for managing the Lake Natron ecosystem. These partnerships have laid the groundwork for continued partnership and joint action for improving the conservation of Wildlife species in the project area and beyond.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.
When planning community conservation awareness meetings, the project encountered resistance from the community who associated our activity with the relocation of people from protected areas, so the community member were too reluctant to attend meeting despite assurance from the village leaders. Another challenge was the settlement pattern of residents in the project area. The targeted community member who directly interact with our focal species and their habitat daily are scattered far apart and was real challenging to meet them in collective village meeting. To address this we conducted environmental conservation education by visiting and meeting people in their homes while respecting their request of not being photographed, filmed or having their names recorded. Through this we successfully achieved the project objective.

4. Describe the involvement of local communities and how they have benefitted from the project.

By adopting a household-based approach, communities actively participated in sharing local ecological knowledge, identifying areas of abundant wildlife and discussing human–wildlife interactions that affect both livelihoods and biodiversity in the Natron Ecosystem. This increased their awareness on sustainable resource use, the importance of conserving the most critical habitats and practical strategies that can potentially reduce anthropogenic pressures on wildlife.

A total of five local people were trained and involved as field assistants in the entire survey. While another eight local people were involved as our local guides in the area in which each of them was familiar. This group comprised of pastoralists who know the area much more better as they have been herding cattle in these areas for so many years enough to know places with high likelihood of spotting Gerenuk.

5. Are there any plans to continue this work?

Yes. The future plan is to extend this work to other areas where the gerenuk is believed to occur. The current project covered a small proportion of the Gerenuk range distribution and has highlighted the potential threat with negative implication

for species abundance in its natural habitat, particularly the threats posed by anthropogenic activities. Literature indicates that about 90% of the gerenuk population occurs in partially protected landscapes where continued human activities such as settlement expansion, livestock grazing, tree cutting for domestic and commercial purpose are significantly altering and fragmenting habitats. This underscores the urgent need to expand the ecological survey and conservation efforts to other potential habitat where the target species inhabit.

Upon securing additional funding, the project intends to scale up its activities in other key landscapes with three key specific objectives;

i. **Ecological Surveys** to generate robust data on the abundance, population structure, and spatial distribution of gerenuk across different habitats.

ii. **Assessment of Anthropogenic Pressures** to evaluate how human induced threats such as tree cut, livestock grazing, human settlement patterns and agriculture affect the long term viability of gerenuk populations in the other remaining habitats.

iii. **Knowledge Sharing and Collaboration**. This objective is meant to disseminate findings through local stakeholder meetings and presentations at national and international conferences such as The 15th TAWIRI-International Scientific-Conference, 3rd to 5th December 2025, Arusha International conference centre, Arusha, Tanzania with the aim of improving understanding of anthropogenic threats to wildlife in shared and partially protected landscapes such as Tanzania's Game Controlled Areas (GCA) and Wildlife Management Areas (WMA).

This future work will directly support national conservation efforts and priorities by providing scientific evidence to guide policy and management decisions under Tanzania's Wildlife tourist hunting regulation 2015 as amended in 2019, the National Biodiversity Strategy and Action Plan. By integrating ecological research along with community and other stakeholder engagement, the project seek to contribute to more effective protection of the gerenuk and promote harmony and sustainable coexistence between wildlife and people in multiple use landscapes of Tanzania. Furthermore, the projects seek to contribute to the global conservation efforts by aligning with international conservation frameworks such as the Convention on Biological Diversity (CBD) and the Sustainable Development Goals__ (SDGs 13 and 15). The project will contribute to the wider global conservation efforts by addressing biodiversity loss, promoting ecosystem resilience and supporting sustainable utilization of natural resources.

6. How do you plan to share the results of your work with others?

The results of this project have been and will continue to be disseminated through multiple platforms to reach a wider and diverse audiences, both academic, general public, Wildlife Management Authorities and decision makers. To date, I have made two public presentations at Sokoine University of Agriculture and published one peer-reviewed paper in the African Journal of Ecology (doi.org/10.1111/aje.70008) and the second manuscript which describes the population structure of Gerenuk and Grant's gazelle is currently at final stage of preparation. In addition, I have developed a policy brief to be shared with the Tanzania Wildlife Management Authority which is responsible authority for managing multiple use protected areas (such as Game controlled areas and Wildlife Management Areas) to inform management decisions. Looking ahead, and subject to availability of financial support, I plan to present the findings at 15th TAWIRI-International Scientific-Conference scheduled on 3rd to 5th December 2025, Arusha International conference centre, Arusha, Tanzania, as well as at other international conferences, thereby contributing to both national and global conservation dialogue.

7. Looking ahead, what do you feel are the important next steps?

Looking ahead, the important next steps for this project is to both expand research and strengthen the conservation impact. First, it is critical to extend ecological surveys to additional threatened landscapes where gerenuk populations are believed to exist under anthropogenic pressures in order to gain a more comprehensive understanding of their abundance, spatial distribution and their population structure. Second, the project plan to assess and Map the remaining suitable patches available for gerenuk and document the bottleneck hindering their movement between these patches especially the male sub adults on the mission of dispersing and colonizing their own new territory. The other important thing is to quantify the illegal activities which may potentially threaten the species' long-term sustainability in the other threatened habitats where the species occurs.

Another key step, the project plan to engage and build stronger partnerships with local communities to ensure their participation in conservation activities and enhancing stewardship and awareness of habitat conservation and sustainable resource use. This includes continued household-based conservation education to improve habitat management practices and enhance sense of ownership. The project also aims at focusing on school children to instil in them the sense of environmental stewardship and create future conservationist. Other plan is to train a group of local Gerenuk guardian who will keep reporting on the incidence of illegal activities degrading the habitat in order to strengthen local capacity of ecological monitoring and threat detection. This will provide a comprehensive understanding of spatial-temporal pattern of illegal activities in Gerenuk known range. Finally, we plan to share findings with policymakers, wildlife managers and the wider scientific community through reports, Policy brief and presentation in local and international

conferences. These steps will ensure that research outcomes inform management strategies, support national and international biodiversity targets and promote coexistence between wildlife and local communities in multiple use and shared landscapes.

8. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

Yes. The Rufford Foundation logo was prominently displayed in multiple project activities and outputs to ensure clear recognition of the Foundation's support. The logo was included on presentation materials in the two research dissemination presentation at Sokoine University of Agriculture, on T-shirts produced for conservation awareness and on a policy brief which is under preparation for submission to the Tanzania Wildlife Management Authority. Furthermore, the Foundation was acknowledged in a peer-reviewed article published in the African Journal of Ecology, where its support was noted on the opening page. Collectively, these efforts provided the Rufford Foundation with significant visibility within academic, institutional and community platforms.

9. Provide a full list of all the members of your team and their role in the project.

- **i.** Beevans Biseko Biseko_Project Leader
- **ii.** Sami Madundo_ Geospatial analyst
- **iii.** Prof. Alfan Rija_Research Project advisor/supervisor, Manuscript reviewer
- **iv.** Dr. Robert Byamungu_Project advisor
- **v.** MS. Anitha Malisa_ Field assistant
- **vi.** Ms Zainabu Ismail_ Field assistant

10. Any other comments?

I would like to sincerely thank The Rufford Foundation for the financial support that made this project possible. The grant not only enabled me to generate valuable ecological data on the gerenuk and the threats it faces, but also created opportunities to engage local communities in conservation education and build stronger partnerships with key stakeholders in Tanzania. The outcomes of this work have laid a strong foundation for future research and conservation action in partially protected and shared landscapes of Tanzania. I look forward to building on these achievements and to continued collaboration and support from the Rufford Foundation in advancing grassroots conservation efforts of these antelopes in threatened habitats.

Some photos from the field:

Top left and right: Beevans in the field searching for gerenuk. Bottom: Beevans with a local leader.

ANNEX – Financial Report

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