

## Final Evaluation Report

---

Your Details	
<b>Full Name</b>	Misganaw Tamrat Gessese
<b>Project Title</b>	Habitat use, home range and activity pattern of endangered Swayne's hartebeest and potential impacts of livestock grazing on its survival
<b>Application ID</b>	24529-2
<b>Date of this Report</b>	24/03/2022

**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
Determining habitat use of the endangered Swayne's hartebeest and impacts of livestock grazing on its survival				Swayne's hartebeest preferred grassland habitats. Densities of livestock are much higher than hartebeest in the study sites. This indicates that there should be site specific conservation activities for the survival of the relict Swayne's hartebeest population.
Determining home range of the endangered Swayne's hartebeest				Swayne's hartebeest home range estimates did not vary across seasons. Swayne's hartebeest are almost sedentary animals. Hence, grasslands management must be a priority activity for its conservation. Controlled burning of grassland patch could be one of the management activities.
Conducting the activity patterns of the endangered Swayne's hartebeest				Swayne's hartebeest's main activities are feeding and moving at early morning and late afternoon, but much time budgeted for resting during the middle of the day for both seasons.

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

This project comes with a very interesting results which are very useful for conservation management plan of the Swayne's hartebeest (*Alcelaphus buselaphus swaynei*), the three outstanding results are as follow:

**a).** This study revealed that Swayne's hartebeest exclusively preferred grassland habitat throughout the year, shortest available grass height in all seasons and were attracted to burned grassland areas. This reflects that Swayne's hartebeest conservation is largely based on the management of the grassland habitat. Swayne's hartebeest almost abandoned the taller grass height, and consistently preferred the shorter (below 30 cm) available grass height areas. Swayne's hartebeest are highly attracted to burned grassland areas. Since Swayne's hartebeest avoid taller grasses and highly attracted burned grassland patches, we suggest that fire played an important role in maintaining habitat quality in grassland, and that management should continue using controlled burning as a tool for the conservation of Swayne's hartebeest. The results of this study were already published at journal of BMC Ecology (<https://bmcecol.biomedcentral.com/track/pdf/10.1186/s12898-020-0275-3.pdf>).

**b).** Our study also reveals seasonal home range of the endangered Swayne's hartebeest (*Alcelaphus buselaphus swaynei*). The home ranges of two study groups of Swayne's hartebeest were examined in different seasons (wet, dry and early-dry seasons). The two groups were separated by 6 km of riverine forest. The means  $\pm$  SD of the 95% and 50% KDE home range sizes across the three seasons were  $4.81 \text{ km}^2 \pm 2.74$  and  $1.19 \text{ km}^2 \pm 0.80$  for Group 1, and  $6.46 \text{ km}^2 \pm 3.54$  and  $1.18 \text{ km}^2 \pm 0.58$  for Group 2, respectively. However, the home range sizes did not vary significantly among seasons. This confirmed that home range size of Swayne's hartebeest is less influenced by seasonality. The results of this study also published at Journal of Mammalogy (<https://academic.oup.com/jmammal/articleabstract/102/2/396/6144854?redirectedFrom=fulltext>).

**c).** The study also revealed the daily activity patterns of Swayne's hartebeest. Two groups of Swayne's hartebeest were tracked in open grassland areas for 1 year. Each group's daily activities (0700–1900 h) were recorded at 15-min intervals on 5 days every month. Activities were grouped into five behavioural categories: feeding, resting, traveling, vigilance, and other. A total of 26,382 activity observations (Group 1:  $n = 10,160$  dry season,  $n = 3,030$  wet season; Group 2:  $n = 9,982$  dry season,  $n = 3,210$  wet season) were recorded during the 1-year study period. For Group 1 during the dry season, resting was the most observed activity (33.1%) followed by feeding (28.7%). During the wet season, time spent resting (46.8%) increased while feeding (25.3%) decreased slightly. Similarly, during the dry season, Group 2 was observed resting (32.0%) most, followed by feeding (30.4%). During the wet season, time spent resting (54.1%) by Group 2 increased substantially while feeding (24.4%) decreased. During both seasons, time spent feeding peaked in the early morning (0700–1000 h) and late afternoon (1500–1800 h). The diurnal activity patterns of Swayne's hartebeest followed diurnal variation in ambient temperature. Again, the results of this study also published at Journal of Mammalogy (<https://academic.oup.com/jmammal/articleabstract/102/2/396/6144854?redirectedFrom=fulltext>).

### **3. Explain any unforeseen difficulties that arose during the project and how these were tackled.**

We did not face any major unforeseen difficulties. Due to the conflict in the northern part of Ethiopia, there was a bit of an insecurity feeling among the people in general even if the war was some 700 km away from our field site.

This study achieved most significant importance of the management of the less available grassland habitat in the study area for the conservation of the Swayne's hartebeest. The habitat use of the endangered Swayne's hartebeest is identified. Grassland is the prime habitat preferences of Swayne's hartebeest. They highly preferred shortest grass height. The burned grassland patches in the strongly attract Swayne's hartebeest. This study confirmed that controlled burning of the grassland areas in the Swayne's hartebeest prime habitats will be an important habitat management practice. The home range of the endangered Swayne's hartebeest is determined. The research results improve our understanding of seasonal invariability

of home ranges unlike the diurnal activity dynamics of Swayne's hartebeest. The study revealed that Swayne's hartebeest is a sedentary herbivore that tends to have fairly stable ranges. The dynamic nature of resource availability in different seasons explains the variation in activity patterns of the Swayne's hartebeest over time. The Swayne's hartebeest as Endangered, and several subpopulations have been extirpated within their historical range, the only sites are Maze National Park and Senkele Swayne's Hartebeest Sanctuary where Swayne's hartebeest still occurs where their population is under pressure from overgrazing, lack of water, and human settlement, and may need translocations of animals into other safer areas to maintain a sustainable population.

#### **4. Describe the involvement of local communities and how they have benefited from the project.**

The data collections for this project spanned 2 years and the local communities were directly involved in the research work. More than 126 individuals were trained and hired for the days that they spend for the research activities. The practical activities and their trainings improved the perception and awareness of conserving the endangered species.

#### **5. Are there any plans to continue this work?**

Yes, there should be urgent practical conservation practices that I need to continue working of this endangered species. The species is very vulnerable in habitat use. It has long time experience of extinction from its wider historical geographic ranges. Recently, the two subpopulations are under pressure of threatening factors. For instance, Senkele Swayne's hartebeest Sanctuary is devoid of water sources, has very small area, surrounded by intense human settlements and shared with thousands of domestic animals. Similarly, Maze National Park has very threatened with overgrazing and human encroachment. These indicate that the species needs further conservation attention. There should be urgent provision of water during the hard dry season. There should be a reduction of livestock pressures in the two protected areas. Searching out possible translocation areas for permanent solution of the current Swayne's hartebeest conservation challenges in southern Ethiopia might.

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

The results of this study have been disseminating in several ways. The protected area officials and representatives of the local communities had been informed with a 2-day conference on awareness creation and the way forward for the conservation of Swayne's hartebeests. I have also documented the results of this study in the two protected area offices and the Ethiopian Wildlife Conservation Authority and regional wildlife offices. The results of this study are also published in two different journals to share the results to the wider scientific communities.

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

Although the two subpopulations geographic range are protected area, the current situations do not seem to support the relict species sustainably. Practical

conservation must be implemented. For instance, at Senkele Swayne's Hartebeest Sanctuary there should be artificial supply of water during the dry season, fencing the boundary may be implemented to reduce domestic animal intrusion, identifying possible translocation areas and finding corridors to help the hartebeests could be urgent conservation measures. Similarly, several practical conservation measures must be applied at Maze National Park too. For instance, partitioning of grassland areas for hartebeests and domestic animals, managing burning activities and development of benefit sharing with the local communities could be the important next step for the conservation of Swayne's hartebeests.

**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, I posted The Rufford Foundation logo during the field training and two presentations at University of Oslo.

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

I (**Misganaw Tamrat**), am the PI of this project and responsible for designing the study, training the field assistants, collecting and analysed, and writing the first draft of both papers.

**Professor Nils Chr. Stenseth** was my immediate supervisor and he followed-up all activities at every step in the groundwork.

**Prof Afework** is very knowledgeable and was a great help in this project at all steps, from field work to writing up of the manuscripts.

**Dr. Paul** is an expert in Geographic Information System, image analysis and habitat suitability modelling and he provided the necessary GIS training documents and followed the accuracy of field work design and data collection. Finally, all the project members revised the subsequent versions of the manuscript and approved the final manuscript.

**10. Any other comments?**

The Rufford Small Grant has tremendous contribution for the development of my scientific carrier and investigation of basic conservation challenges of the relict Swayne's hartebeest subpopulations in Ethiopia. I have achieved my PhD study mainly with the support of two consecutive Rufford grants. The updated population status and conservation challenges of Swayne's hartebeest are well investigated. I have also a plan to work on reducing the conservation challenges of Swayne's hartebeest in the future.