

## The Rufford Foundation

### Final Report

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Congratulations on the completion of your project that was supported by The Rufford Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. The Final Report must be sent in **word format** and not PDF format or any other 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. Please be as honest as you can in answering the questions – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please complete the form in English and be as clear and concise as you can. Please note that the information may be edited for clarity. We will ask for further information if required. If you have any other materials produced by the project, particularly a few relevant photographs, please send these to us separately.

Please submit your final report to [jane@rufford.org](mailto:jane@rufford.org).

Thank you for your help.

**Josh Cole, Grants Director**

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Grant Recipient Details	
<b>Your name</b>	Abdullahi Hussein Ali
<b>Project title</b>	Role of Predation and Livestock Grazing as Factors Underlying Hirola Declines in Ijara, Kenya
<b>RSG reference</b>	11188-2
<b>Reporting period</b>	2012-2013
<b>Amount of grant</b>	£6000
<b>Your email address</b>	<a href="mailto:ali@primateresearch.org">ali@primateresearch.org</a>
<b>Date of this report</b>	October 2013

**1. Please 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
Compare relative role of range degradation and that predation in driving the continued decline of the hirola antelope			(ongoing)	We are comparing demography of herds in the sanctuary, conservancy, and community areas to understand the relative importance of predation and range quality in driving hirola declines. We also monitored both hirola and livestock resource selection and found a high degree of overlap in their diets. This portion of our work is on-going, and will continue until the batteries from the GPS collared individuals expire.
Collar herds in outlying areas in order to monitor movement and resource selection of this herds			on-going	We captured individuals at the periphery of this species' geographic range and fitted GPS collars on nine females from seven different herds to monitor movement and resource selection. This was a major undertaking and constitutes the first effort of its kind.
Promote community education and outreach			on-going	We continued to engage communities in project activities including capture, tracking, and sharing results from the project. Our team employs scouts from the surrounding Somali communities who continue to appreciate while conservation while we potentially improve livelihoods as well.
Make management recommendations to promote long-term wildlife-pastoralist co-existence in the area			on-going	As member of the Hirola Management Committee, one of us (Mr Ali) has made (and will continue to make) recommendations to the Kenya Wildlife Service and Ishaqbini Community Conservancy from the work through regular progress reports, meetings, and publications.

**2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).**

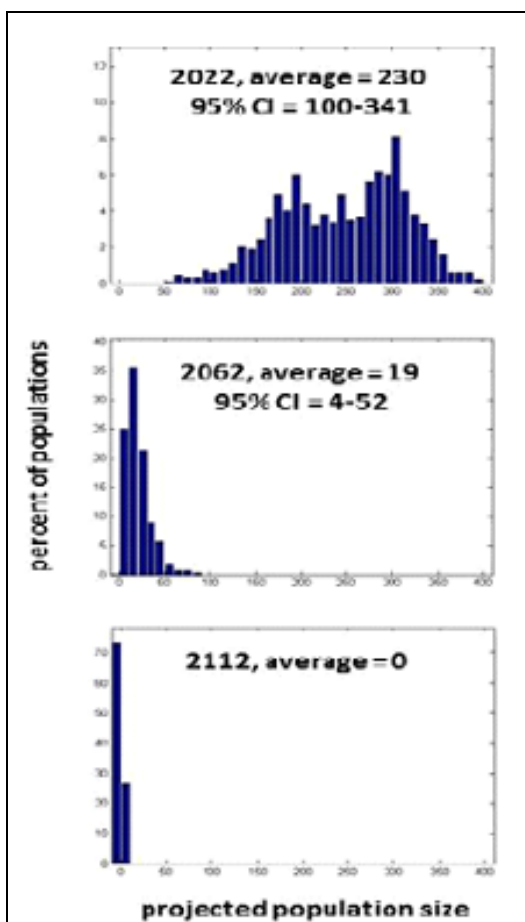
The translocation of herds into the sanctuary was postponed from May 2012 to August 2012 when the helicopter and veterinary crews were available, and also when weather

was more conducive to capture. Accordingly, we adjusted our project to these changes and we worked well with other stakeholders during this process.

### 3. Briefly describe the three most important outcomes of your project.

#### A. Demographic Analyses.

Using data collected from aerial surveys conducted between 1974-2011 (Kenya Department of Remote Sensing and Resource Surveys and Northern Rangelands Trust, unpublished data), we conducted a count-based population viability analysis of hirola to forecast likelihood of extinction 10, 50, and 100 years into the future. From these analyses, we predict that in the absence of management interventions, global extinction is predicted in the next 50-100 years (Figure 1). In light of this prediction, and with the help of the Rufford Foundation, we initiated the Hirola Conservation Project in January 2011 to understand the factors responsible for hirola declines, and to implement management to reverse these declines ([www.hirolaconservation.org](http://www.hirolaconservation.org)).



Since January 2011, we have been monitoring hirola demography throughout Ijara District. We are focusing on hirola herds under three different scenarios.

Setting 1) INSIDE PREDATOR-PROOF SANCTUARY, INSIDE ISHAQBINI (Plate 1). This setting is characterized by high-quality range and low abundances of wild dogs, lions, and other predators.

Setting 2) OUTSIDE PREDATOR-PROOF SANCTUARY, INSIDE ISHAQBINI. This setting is characterized by high-quality range and high abundances of wild dogs, lions, and other predators.

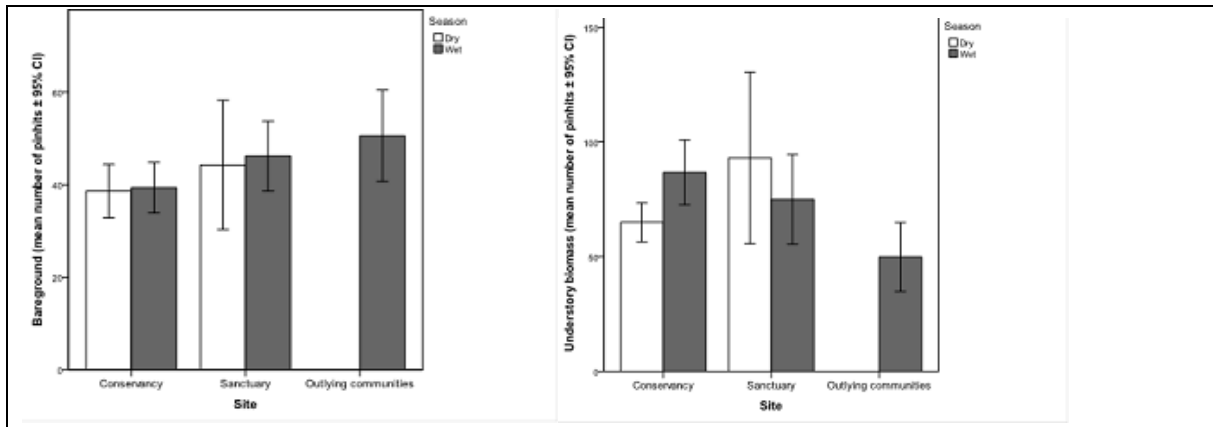
Setting 3) OUTSIDE PREDATOR-PROOF SANCTUARY, OUTSIDE ISHAQBINI. This setting is characterized by low-quality range and high abundances of wild dogs, lions, and other predators.

Figure 1. Results of population viability analysis of hirola aerial counts from 1978-2011. Graphs depict average and 95% confidence intervals of projected population size for hirola 10, 50, and 100 years into the future.



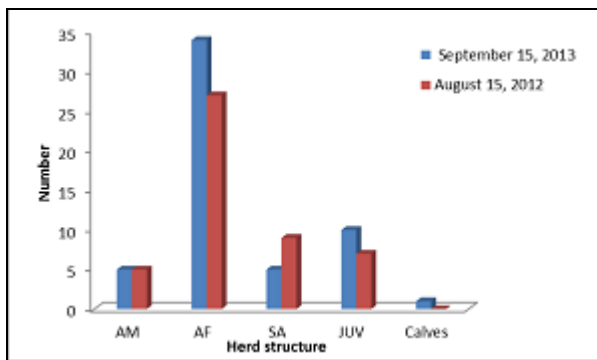
**Plate 1: A: transported by a helicopter B: Hirola released into the sanctuary C: Hirola in holding *boma* before release D: Mr Ali sensitizing communities on capture and translocation of hirola into the predator proof sanctuary.**

Setting 1 was created through the translocation of 48 hirola into the sanctuary within Ishaqbini in 2012. During translocation, with the help of capture technicians we fixed uniquely-numbered ear tags to individuals to aid in future identification. Surveys conducted every-other-month by our research team on understory plants have confirmed that animals within this sanctuary are experiencing high-quality range stemming from low abundances of wild herbivores and livestock (Figure 2).



**Figure 2: Extent of bare ground and understory biomass cross sites (mean number of pinhits  $\pm$  95% CI).**

In August 2012, the construction of the predator-proof sanctuary was completed in Ishaqbini. Encouragingly, it has been 14 months since herds were moved into the sanctuary and 12 females have given birth thus far (Figure 3).



**Figure 3: herd's structure inside the predator proof sanctuary**

Setting 2 represents the areas of Ishaqbini outside the sanctuary. Since initiating our work, we have identified eight adult (>3 years) females (the demographic class most responsible for driving population change in ungulates) with unique natural marks that we use to track eight herds of hirola numbering 55 individuals within Ishaqbini. These groups are faithful to particular areas and rarely stray outside the bounds of Ishaqbini. These animals experience high-quality range similar to those animals in Setting 1 (Figure 2), but are exposed to predators, principally wild dogs and lions.

Setting 3 represents the periphery of this species' geographic range across Arawale, Burathagoin, and Gababa communities. In 2012, we fitted GPS collars to nine adult females from seven different herds numbering 51 individuals (Plate 2). We use telemetered individuals to relocate associated herds to visually estimate demographic rates (birth, recruitment, survival) within each herd. These animals are experiencing low-quality range (Figure 2) and are exposed to wild dogs and other predators.

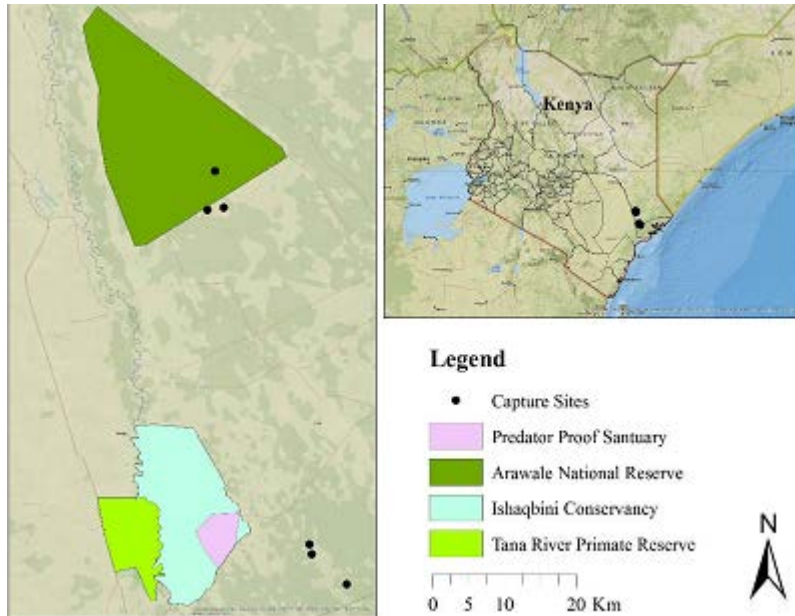


**Plate 2: Field assistant tracking one of the collared herds in Burathagoin area**

Individuals within all three herds are uniquely identifiable based on a combination of radio telemetry, ear tags, horn rings, shape, size, and scars and other natural marks. Sight-resight monitoring is possible within the relatively-restricted confines of Ishaqbini (both Settings 1 and 2), but not the vast expanses outside Ishaqbini (Setting 3) in the absence of telemetered individuals. We are also monitoring carcasses across the range; preliminary data indicates that hirola accounts for 10% of all the carcasses found in the area; detailed analysis on this will be in our subsequent progress reports.

#### **B. Movements and Resource Selection.**

In December 2012, and with the help of the Rufford Foundation and other partners, we captured nine adult females (>3 years old) from herds at the periphery of this species' historic geographic range in Arawale and the Burathagoin grazing fields of Ijara District (Plate 3). We fitted GPS collars on nine females from seven different herds to relocate associated individuals and to estimate demographic parameters. Our GPS radio collars (Vectronic Aerospace) are set to record one location every three hours for the next 3 years. Iridium satellite communication permits us to track herds within 24 hours of movement. The radio collared individuals can be tracked in real-time on our website ([www.hirolaconservation.org](http://www.hirolaconservation.org))



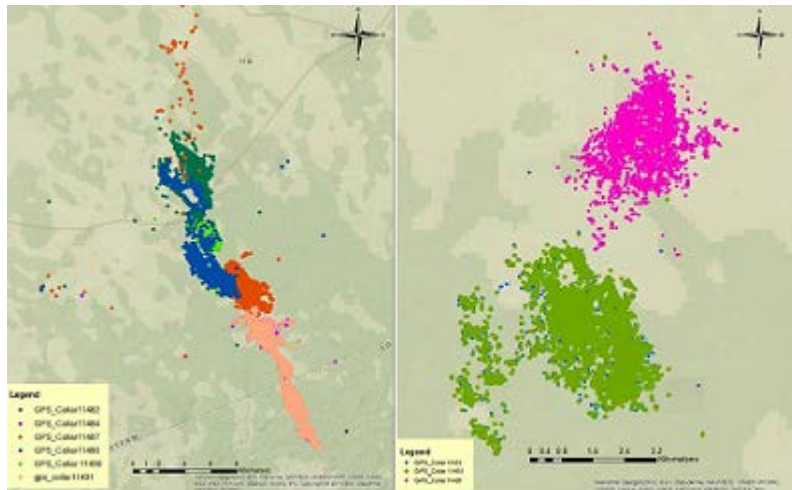
**Plate 3: Map of our study sites in the Ijara District of eastern Kenya, depicting capture sites for GPS-collared hirola, Ishaqbini Conservancy, the predator-proof sanctuary within Ishaqbini, and Arawale National Reserve**

Once per month, we are relocating animals visually from the ground to record survival, recruitment, and age structure; we are comparing these data to those from herds occupying 1) a predator-proof sanctuary in Ishaqbini Community Conservancy; and 2) areas with higher-quality range than Arawale and Burathagoin. For the radio-collared individuals, we will construct resource selection function to quantify the extent to which particular habitat features (distance to water, distance to settlement, percent grass cover, percent forb cover, and percent tree cover) are selected for or avoided by hirola. Our RSF will be used to inform future reintroduction efforts of sanctuary-bred animals. This effort will enable us to better understand the relative influence of predation and range quality in driving hirola population dynamics, and will provide insight into historic declines and contemporary lack of recovery. Additionally, the data we generate on habitat selection and movements can be used to identify sites suitable for any future reintroduction efforts.

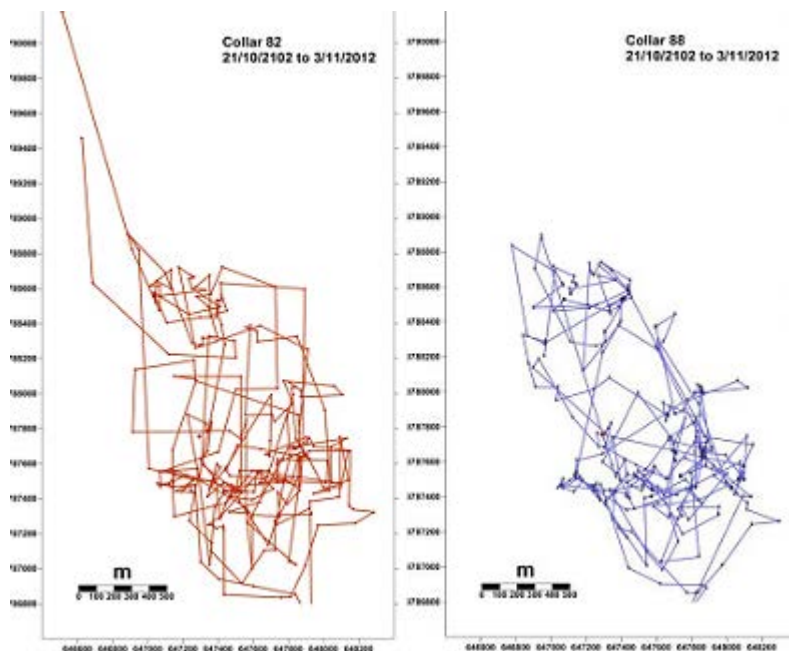
In both the predator-proof sanctuary and conservancy, we are measuring habitat availability at the population level (2<sup>nd</sup> order analysis) but will be doing home range level analysis (3<sup>rd</sup> order analysis) for radio collared animals in community grazing areas. Here, cattle and goats are grazed relatively frequently and hirola are often forced to co-mingle with domestic livestock. Using high resolution satellite imagery, we are classifying the habitat bi-modally as grassland or forest to determine habitat selection.

For each of these areas, we have sampled feeding sites of both hirola and livestock to estimate the how hirola adjust resources as function of livestock abundance, tree cover, and predation threats. We have considered feeding sites as *used habitats* and we associated each of these sites with an adjacent, randomly selected site, considered as *available habitat* (Hall ET al.1997). We are doing analysis for this at the fourth order level since it involves identification of individual plant species selected inside individual home ranges or microhabitat. We used a 10-point pin frame to assess understory composition of grasses, bare ground and the herbaceous layer within each subplot (Figure 2). Frames are placed in the middle of each subplot and the number of individual species hitting the pins counted and identified.

We are using logistic regression to estimate model of the probability of use and available areas for both hirola and livestock. In addition we are using hirola and livestock locations to perform a kernel density analysis. We are interpreting areas of high use with higher survival and recruitments rates as critical hirola habitat and priority sites for future reintroduction efforts. Preliminary results from our work suggest that hirola herds have non-overlapping home ranges (plate 4), but occasionally may share the same resource using different time. We documented such an example between collar 11482 and 1188 which have shown an overlap but further analysis of the data shows that individual 11482 moves a lot and encroached on 11488 whose seem resident in the area (see plate 5).



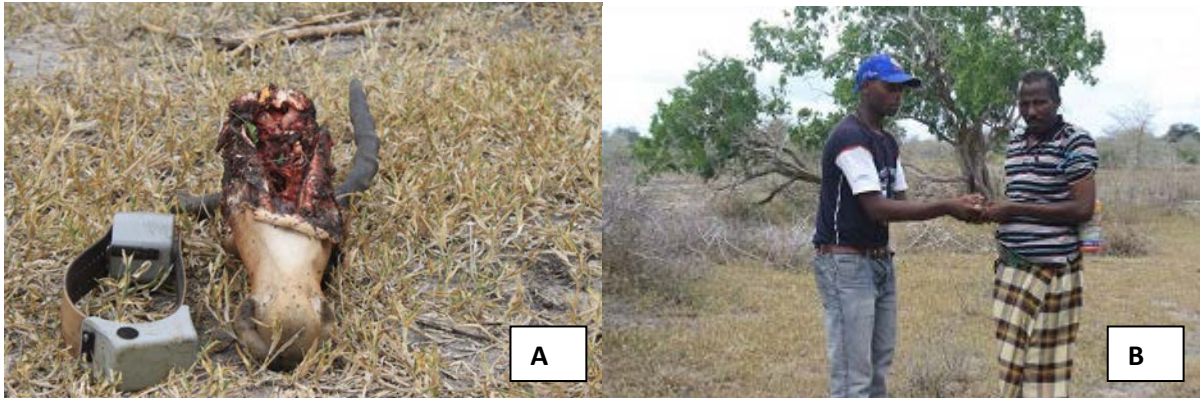
**Plate 4: movement trajectories of 7 hirola herds in Burathagoin and Arawale area**



**Plate 5: movement tracterioes of female 11482 and 11488**

Out of the nine animals we collared, two have been killed by a lion recently and in collaboration with community members we identify these carcasses within 24hours.





**Plate 6: One of the collared females killed and community member receiving a token for reporting this to us.**

**c) Made management recommendation to government and communities over long-term co-existence of hirola and livestock in the area.**

We continuously made recommendation to local communities and government official over the long-term co-existence of hirola and wildlife in the area. While we continuously shared data from the project, we also involved both the locals and government officials in some of our main activities including capture and collaring of hirola and monitoring of translocated herds. We have continued to engage local communities through public meetings and dissemination of educational materials across the range while we celebrated success together. Finally, we recently finalised project website to allow further interaction with stakeholders.

**4. Briefly describe the involvement of local communities and how they have benefitted from the project (if relevant).**

We employ 12 scouts across the hirola range and we continue to engage community members in a variety of conservation activities spearheaded by our project. For the first time in the history of hirola conservation, we are involving local communities in tracking hirola using traditional ecological knowledge mixed with modern methods. This is the only research project in the area, engaging traditional local people, with no previous formal education, in hirola tracking, animal census and vegetation surveys.





**Plate 7: A: Community member tracking hirola, B: Community members meeting with project team leader C: Community scouts learning how to use video camera D: One of the collared females being released.**

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

We started this project as small grass root project but grew bigger over the years (see [www.hirolaconservation.org](http://www.hirolaconservation.org)). In the coming years, we will be in touch with the rest of the world using the project website dedicated just for hirola conservation. Since then we got into a lot partnership with reputable organizations. We applied for Non- profit status in Kenya recently and we are hoping to have the papers ready soon. We therefore would like to apply for additional support from organisations such Whitley Fund (Recommended by Rufford in the past) to spearhead the project into the next phase which will cover the revival of Arawale National Reserve, habitat restoration effort across the range, community capacity building, training and employment of more local scouts and conservation groups and most importantly scientific publications of our past work.

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

Our work continues to be major backbone of hirola conservation and research in Ijara, Kenya. Since we started this project, we have been engaging communities through itinerant meetings, schools visits and the production of educational materials. We finalised the first manuscript of this work and four others are underway in the next two years. These papers will be the first major publications on hirola and will target high impact factor journals such as *Conservation Biology*, *Ecological application*, *Biological conservation and journal of applied Ecology*. One of us (Mr Ali) is am a member of the hirola management committee and we contribute our finding through regular meetings progress reports. The project produces one progress annually and we also share monthly report. In addition, one of us (Mr Ali) recently presented this work at the Zoological Society of London to staff, partner organisation and donors. Mr Ali is also slated to present the same work at the next meeting of American Society of Mammalogists, June 2014 in Oklahoma, USA.

Press coverage of my work can be found here:

The Wildlife Extra

<http://www.wildlifeextra.com/go/news/hirola-kenya.html#cr>

The Standard (Kenya's newspaper of record):

<http://www.standardmedia.co.ke/?articleID=2000035100&pageNo=1>

Zoological Society of London Press Release (picked up by many international outlets):

<http://www.edgeofexistence.org/edgeblog/?p=6502>

The Metro UK newspaper

<http://metro.co.uk/2013/01/28/endangered-antelope-fitted-with-gps-collars-3369213/>

University of Wyoming News article:

<http://www.uwyo.edu/uw/news/2013/01/uw-doctoral-student-partners-with-zoological-society-of-london-to-research-rare-hirola-antelope.html>

Through your generous support, the project is having a global impact and making headlines across the globe. In 2013, Mr. Ali was appointed to the IUCN's Antelope Specialist Group and more recently was recognized as one of the world's emerging conservation leaders by consortiums of conservation organisations in the US, including International Fund for Animal Welfare, Defenders of Wildlife, Wildlife Conservation Society, World Wildlife Fund, and the US Fish & Wildlife Service <http://wildlifeleaders.org/about/participants/class-5-2013-2014/>

Also in 2013 Mr. Ali was recognized by the American Society of Mammalogists and was awarded the William T. Hornaday award (for excellence in conservation research by a graduate student), <http://www.mammalsociety.org/2013-hornaday-award-abdullahi-hussein-ali>. All these forums are allowing us to interact and share the plight of the endangered hirola antelope across the globe.

**7. Timescale: Over what period was The Rufford Foundation grant used? How does this compare to the anticipated or actual length of the project?**

We spent the Rufford Foundation grant in 2012-2013 and covered the second phase of the project. We anticipated using the Rufford grant in 2012 but the translocation effort was postponed from May 2012 to August 2012. This was a multi-stakeholder initiative and created a delay that we could do nothing about. The translocation process was contingent on factors such as availability of helicopters, veterinary crew and weather conditions of the area. However, in collaboration with Kenya Wildlife Service and Northern Rangeland's Trust, we successfully translocated 48 individuals into the sanctuary and collared nine individuals at the periphery of species geographic range by December 2012.

**8. Budget: Please provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used.**

Item	Budgeted Amount	Actual Amount	Difference	Comments
Purchase of large 60 ear-tags @ 25	1500	1000	+500	We ear tagged 30 animals in the sanctuary and nine in the field.
Fuel for monitoring vehicle	1000	1500	-500	We saved 500 from the ear tags and used as additional money for the Fuel.
Maintenance, insurance for monitoring vehicle	400	400	nil	
Educational materials (Brochures, generator for the project)	1000	1000	nil	We produced 50 copies of simple brochure and shown one video to locals in Ijara and Fafi
Principal investigator stipend for 1 year	1000	1000	nil	

Five Community meetings @100	200	200	nil	We held five community meetings to share and disseminate results
Allowance for seven hirola monitoring scouts	700	800	100	We employ 12 scouts of whom seven were paid from the Rufford grant. One of our scouts was injured in the field and we used additional 100 pound to treat him in the hospital
Final Report productions and circulations	200	100	nil	
Total	6000	6000	00	

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

### 1) Range and habitat restoration for the species: We will Restore Arawale National Reserve!

Arawale National Reserve was gazetted in 1973 to conserve the Critically Endangered hirola antelope (*Beatragus hunteri*). The reserve falls under the Garissa County Council and covers an area of 533 km<sup>2</sup>. Since its gazettement in the 1970s, the Garissa County Council had been responsible for managing the reserve while Kenya Wildlife Service (KWS) was charged with the responsibility of enforcement through anti-poaching patrols.

The operation of the reserve was short lived due to financial constraints, the lack of local community involvement, the remoteness of the area, and political turmoil that characterized the vast northern frontier of Kenya in the 1970s and 1980s. Consequently, the ability of the Garissa County Council and the Kenya Wildlife Service to oversee Arawale collapsed by the late 1980s. In response to this, an anti-poaching unit was established by KWS in 1983 solely to protect hirola. This also proved futile as it was based in Nairobi, and it eventually failed due to lack of sustained funding and lack of local involvement.

Following the withdrawal of the Garissa County Council and KWS, the region (and the world) lost the only formally-protected area dedicated to the conservation of the hirola. Subsequently, the hirola has experienced a 95% population decline and was listed as a Critically Endangered species in 1996. Until recently, little attention has been devoted to conservation efforts

In 2012, we initiated discussions on the restoration and re-establishment of Arawale with the local stakeholders and the Garissa County Council. As Arawale already is gazetted as a conservation area within the natural range of the hirola, it plays a pivotal role in the long-term conservation of this iconic species. The Garissa County Council is again attracting interest from the national government and investors as a result of a favorable political climate, the need to expand the country's tourist circuits, and the need to reduce poverty as outlined in Kenya's vision 2030 strategy. Our ultimate conservation objective is to save the hirola from extinction. We will tackle this objective through a series of goals that build on success. Our long-term goal is to re-establish Arawale National Reserve and thus longer term protection of hirola in its natural range.

### **GOAL #1. IMPROVEMENT OF SECURITY IN THE HIROLA NATURAL RANGE FOR BOTH PEOPLE AND WILDLIFE. Initiated by September 2014.**

- Appoint and train community rangers.
- Establish a patrol base for local community rangers at Bura, Gababa and Galma Gala communities.

- Establish a radio communication system through 2-way radios (Motorola RDV 2020) and base station.
- Operationalize patrols including communication links with communities within the range of hirola.
- Link patrols with provincial administration in Masalani and Garissa.
- Encourage community participation through the formation of management committees.

**GOAL #2: ESTABLISH A COMMUNITY-BASED ECOLOGICAL MONITORING SYSTEM IN ARAWALE AS PART OF A WIDER PROGRAMME ACROSS THE HIROLA'S RANGE. Initiated by September 2015**

The national plan for hirola conservation recently identified hirola research needs, some of which currently are being addressed. Areas that would benefit from community involvement include:

- Establishment of area wide hirola demographic and distributional data.
- Impact of livestock on hirola and other wildlife species.
- Impact of poaching on hirola numbers.
- Habitat improvement.

**GOAL#3: IMPROVE COMMUNITY LIVELIHOODS THROUGH THE ESTABLISHMENT OF ALTERNATIVE INCOMES AND CAPACITY BUILDING. Initiated by September 2016.**

- Diversify food production systems in the area by introducing improved livestock management (through trained livestock health workers) and marketing systems, bee keeping activities, and the introduction of planned grazing and controlled pasture management regimes.
- Provision of water supplies to communities through promotion of rain water harvesting technologies.
- Promote both local and international tourism.

**GOAL #4: RE- ESTABLISHMENT OF ARAWALE NATIONAL RESERVE AND ADJACENT BUFFER ZONES. Initiated by September 2017.**

- Develop integrated management plan for Arawale and adjacent buffer zones.
- Improve road and airstrip infrastructure within Arawale to facilitate communication and security.
- Establish MoU between KWS and Garissa County Council.
- Conduct habitat restoration activities such as water provision, controlled burns, and manual removal of trees, reseeding programs, and potentially elephant reintroduction.

**2) Identify future re-introduction sites for sanctuary bred animals and collar all individuals being released:**

In the coming years, sanctuary bred animals will have to be released back into their natural geographic range. We are monitoring survival and recruitment across the hirola range and we are continuously characterizing habitats where survival and recruitment is the highest. We are basing habitat quality on demographic performance of herds and will delineate these areas as optimal areas for future re-introduction. We hope to collar all individuals being released into the natural range. In close consideration with locals we are considering the establishment of community conservancy at Galmagalla area and provide technical long-term assistance to Ishaqbini Community Conservancy. In overall there is an urgent need to improve the level of management and protection of remnant herds, particularly in the Arawale National Reserve and in the Galma Galla region area.

**3) Provide adequate protection and security for remaining herds through improved levels of management across the range.**

Active hirola groups (including Ishaqbini, Arawale wildlife Trust and Galmagalla conservation group) will be trained on techniques of wildlife surveillance and patrol. These training will include basic security drills, discipline, radio communications, and first aid and field survival techniques. Groups will have monitoring protocols in which they will be responsible for collating and summarizing all security information and liaising with KWS District Warden. Through this project we are hoping to establish the foundation for long-term community conservation and anti-poaching activities across the range and improve security and facilities for conservation workers in this area. It is hoped that this collaborative approach to security will have a targeted response to security incidents in the area concerning human-livestock-wildlife interactions.

**4) Continue with community and stakeholder engagements**

We will continue with our outreach program entailing lectures, video shows, and public discussion. We will engage organise groups identified in 3 above to create county level forum to exchange views and discuss common issues facing hirola. In collaboration with Kenya Wildlife Service we hope to strengthen the hirola management committee by actively contributing to it is activities. We will start publishing all major outputs of the projects in the coming months and we hope to reach wilder audience across the globe.

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

Since 2012 when we got this grant, we presented in the following forums:

- 2013: Brownbag seminar series, Department of Zoology, University of Wyoming, USA
- 2013: Zoological Society of London, EDGE fellows and donors meeting, London
- 2013 University of Wyoming, Program In Ecology student symposium, Laramie, WY.
- 2013: Progress report to Hirola Management Committee and the Kenya Wildlife Service
- 2012: Antelope Conservation in the Horn of Africa symposium, Association of Zoos and Aquariums meeting, Phoenix, AZ.
- 2012: First Hirola related conservation brochure, produced by our project and distributed to local and national stakeholders.
- 2012: National Museums of Kenya—Department of mammalogy meeting

**11. Any other comments?**

Thank you for supporting me and hirola research—your contribution has made a long way in saving in one of the most endangered species of mammal's worldwide.