The Rufford Small Grants Foundation
Final Report

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

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. 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. 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.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details	
Your name	Dr. Maurus Msuha
Project title	Conservation of large carnivore biodiversity in the Masai Steppe, northern Tanzania.
RSG reference	22.11.09
Reporting period	April 2011
Amount of grant	£6000
Your email address	Maurus.Msuha@gmail.com
Date of this report	May 2011

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
Training Village Game Scouts and Game Rangers in carnivore identification and monitoring techniques in order to develop capacity for large carnivore monitoring			√	
Determining large carnivore distribution in order to identify priority areas for conservation		√		Camera traps were not set in community areas outside Mkungunero Game Reserve after being advised because of fear of theft.
Assessing attitudes of local people towards large carnivores in order to understand key factors that affect people's tolerance to large carnivores			√	
Carrying out outreach programme to raise awareness on carnivore conservation.			√	

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

Budget constraint
Proposal for this project was submitted in September 2009 with a budget of £6000, which is equivalent to Tanzanian Shillings 12,600,000 at an exchange rate of Tshs. 21,000 per pound. When funds were received in March 2009 inflation rose from 4.5% to 11% and remained at about 8% throughout, affecting prices of imported items like batteries, fuel, films and printing materials. To address this problem, we did not print education materials instead we opted for holding village sensitisation meetings. The saving was then used to meet costs for batteries, fuel and developing and printing camera trap films.

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

i)   Information on large carnivores and other mammal biodiversity in the Mkungunero Game Reserve
Current threats to the world's biodiversity calls for the need to have effective conservation strategies. However, developing effective biodiversity conservation strategies requires knowledge on species richness (the number of species) in the areas that we want to conserve. This is important because species richness is frequently used in the establishment and management of protected areas (Margules and Usher 1981; Baskin 1994) and to assess whether management strategies are successful (Bawa and Menon 1997; Yoccoz *et al.* 2001; Thomas 1996). This project carried out the

first survey of large carnivores and other mammals in the Mkungunero Game Reserve, using a combination of camera traps and questionnaires to reveal species distribution. It should be noted that several methods are available for assessing mammal distribution e.g. the use of track/spoor (Stander 1998) and distance based sampling methods (Buckland *et al.* 1993). However, such methods are extremely difficult to apply for carnivores because most carnivores are shy, nocturnal and for large species they often occur at low densities (Stander 1998). The use of camera traps here enabled us to assess species distribution even in locations that would otherwise not be possible with available conventional methods. This is because the camera trap can work in a variety of environments (Griffiths and van Schaik 1993; Champion 1992; Karanth and Nichols 1998).

Here I report a total of 12 carnivores and 17 herbivore/omnivore species (Table 1) that were identified during a camera trap and questionnaire survey with people living adjacent to the reserve. This information is of fundamental importance for the conservation of large carnivores and other mammal species in the area because wildlife managers need to understand the distribution of these species so that they can identify priority areas for conservation planning. Of the species recorded during the survey it included large carnivores such as lion and spotted hyaena. Such species are often used for conservation planning partly because they require large and intact habitats to survive and therefore it is urged that by conserving such wide ranging species it also benefits other species found within their range (Ray 2005). Mkungunero Game Reserve is an important area for conservation in the Masai Steppe. It provides key habitats for migrating wildlife from Tarangire National Park. Unfortunately this is an area that has received little attention by researchers and consequently only few species such as lesser kudu, elephants and gerenuk have been studied. The later was not found during our survey although it been recorded in the ecosystem (Msoffe et al. 2007). The reason why gerenuk was not in the reserve during our survey is not well understood. While information on species richness is essential for conservation planning, the measure does not provide information on abundance of the species. Information on species abundance is required for a variety of reasons e.g. assessing viability of threatened species (Linkie *et al.* 2006), setting of quota for species that are hunted (Lindsey 2008; Lindsey *et al.* 2007; Baldus and Cauldwell 2005) and monitoring populations of keystone species i.e. species that have impacts on others, often far beyond what might be expected from a consideration of their biomass or abundance (Simberloff 1998). In this case, I calculated trapping rates (photographic rates) as indices of abundance for each species. Trapping rates were calculated as the number of photographs of a given species divided by the total number of camera trap days (Carbone *et al.* 2002). Camera trap days which refers to the number of days that the camera has been functioning. Results showed for most common species trapping rates were relatively higher suggesting that such species were more abundant than others. For instance, trapping rates for banded mongoose was 0.038 while for lion was 0.0215. Similarly trapping rate for elephants was 0.1560 whereas for lesser kudu was 0.0096 (Table 1). Trapping rates were also relatively higher for herbivores/omnivores than for carnivores. This is not surprising as herbivore/omnivores occupy a lower position in food chain (Terborgh *et al.* 1999).

ii) Capacity development for large carnivore conservation

Of the many things that affect large carnivore conservation in developing countries, inadequate trained wildlife manpower is one of them. Trained wildlife professionals are important for providing information that can guide conservation planning. This project sought to develop capacity of local people and wildlife managers in large carnivore conservation. We identified six Village Game Scouts (two from each of the three villages) bordering the reserve. These Scouts and Game Rangers were trained in large carnivore identification skills including identification of spoors/tracks and setting up

of cameras for monitoring species. A simple monitoring tool (sighting sheet) was prepared for Rangers and Scouts to use after the project (Annex II).

iii) Raising community awareness on conservation

Raising stakeholder awareness on large carnivore conservation was central to this project. I held three sensitisation meetings in three villages bordering the reserve prior to which I had meetings with the reserve staff and the management authority who issued a free entry permit to the reserve. In each case I explained why the study was important and how it could help in developing conservation actions. With regard to local community awareness, it is important for them to understand why we advocate for large carnivore conservation given that they are the once who bear the cost of living with wildlife (Browne-Nuñez and Jonker 2008). In addition to sensitisation meetings, an abstract has been submitted for presentation at the 8th TAWIRI Biannual Scientific Conference to be held from 6th – 8th December 2011 where I am the chair of the organising committee for the conference. I am hoping the manuscript will be included in the conference proceedings. Additionally, an article will be submitted to a peer reviewed scientific journal. In both publications i.e. proceedings and the journal RSG will be acknowledged. I am also hoping to apply for second RSG grant which should among other things help me to go back to the villages and provide feedback through meetings and brochures/posters and develop conflict mitigation measures with the communities

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

Involvement of local communities was key to this project. Firstly, the project had to be introduced to village governments. This was an important entry point in that I needed their support including e.g. the villages to appoint Game Scouts to participate in training carnivore identification and monitoring techniques (Annex II). Secondly, local communities were involved in attitudinal survey to assess attitudes toward large carnivores. Thirdly they were involved in sensitization meetings and fourthly Game scouts will continue to monitor carnivores and provide sightings to the project.

5. Are there any plans to continue this work?

Yes. As mentioned above, I am hoping to apply for a second RSG grant which among other things should enable me to work with communities to develop conflict mitigation measures over livestock depredation and to assess potential for developing ecotourism and other environmentally friendly projects. I am also hoping the second grant will facilitate establishment of community based conservation groups in the villages and train them in natural management and governance.

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

As mentioned above, there will be a conference presentation and two publications, one in a conference proceedings and the second in a peer reviewed journal. I am also hoping to go back to the villages to provide feedback. A summary of the report will be submitted to the Wildlife Division in Dar es Salam who have the national mandate for management of all Game Reserves in the country. A copy of the report will also be submitted to the Reserve Manager and posted on the TAWIRI website (www.tawiri.org and on www.tanzaniacarnivores.org). It should be noted that prior to this project, there had been very few studies in the area and consequently little is known on most wildlife species. This data is crucial for developing conservation plan of the reserve.

7. Timescale: Over what period was the RSG used? How does this compare to the anticipated or actual length of the project?

Assessment of large carnivore distribution, training of Village Game Scouts and Rangers, assessment of local community attitudes toward large carnivores and raising awareness on carnivore conservation was conducted as planned from April 2010 to March 2011.

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
Films 200 speed	480	542	-62	High inflation rate
Double "A" batteries	280	344	-64	High inflation rate
9 volt square batteries	560	594	-34	High inflation rate
Developing and printing films	800	871	-71	High inflation rate
Topographic maps	40	40	0	No change in price
Fuel to Mkungunero	20	32	-12	High inflation rate
Fuel for camera trapping	240	286	-46	High inflation rate
Fuel for questionnaire survey	297	333	-36	High inflation rate
Fuel for travel back to Arusha	20	32	-12	High inflation rate
Food for three for camera trapping	900	810	90	Food relatively cheaper
Food for three for questionnaires	600	568	32	Food relatively cheaper
Field accommodation for three	900	823	77	Accommodation relatively cheaper
Printing posters for education	500	0	500	Spent on other budget lines
Sensitization meetings	0	252	-252	Not budgeted for initially
Printing and binding final report	100	0	100	Yet to be spent, report will be printed this May 2011
Vehicle service	213	291	-78	Cost higher than anticipated
Bank charges	50	82	-32	Charges higher than anticipated
TOTAL	**6000**	**5900**	**100**	**1 £ sterling=2100 Tanzanian Shillings**

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

   I. Complete report writing and submit to the Wildlife Division, Game Reserve Manager and posting on the TAWIRI and the Tanzania Carnivore Conservation Program websites.
   II. Present results of the project at the forthcoming TAWIRI Scientific Conference in December 2011 and a manuscript for submission to a peer reviewed journal.
   III. Write a second grant application to the RSG to continue with conservation activities in the area

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

Yes, the logo was used and will be used in all presentation and reports that will be submitted to stakeholders. Datasheet for monitoring large carnivores and species list also bear RSG logo. As explained earlier no education materials were printed during the project owing to increased cost following increase in inflation rate.

11. Any other comments?

The RSG grant provided to be has been extremely useful in fostering conservation in Tanzania and in particular Mkungunero game Reserve. This grant demonstrated a lot can be achieved that a lot can be achieved with a relatively small budget provided that people are determined to work together.

Appendix 1, 2 & 3 below

Appendix 1:

Table 1: List of species in Mkungunero Game Reserve recorded during the survey where 1 and 0 refers to whether the species was recorded during camera trap or interview.

Species common name	Scientific name	Camera	Interview	Trapping rates
Canidae				
Black-backed jackal	*Canis mesomeles*	1	1	0.0192
Felidae				
Leopard*	*Panthera pardus*	1	1	0.0101
Lion*	*Panthera leo*	1	1	0.0215
Serval	*Felis serval*	1	1	0.0126
Wild cat	*Felis silvestris*	1	1	0.0096
Herpestidae				
Banded mongoose	*Mungos mungo*	1	1	0.038
White-tailed mongoose	*Ichneumia albicauda*	1	0	0.0173
Hyaenidae				
Spotted hyaena*	*Crocuta*	1	1	0.0037
Striped hyaena*	*Hyaena*	1	0	0.0010
Mustelidae				
Honey badger	*Mellivora capensis*	1	1	0.0047
Zorilla	*Ictonyx striatus*	1	0	0.0021
Viverridae				
Common genet	*Genetta*	1	0	0.0178
Cercopithecinae				
Olive baboon	*Papio anubis*			0.0008
Vervet monkey	*Cercopithecus pygerthrus*			0.0015
Hystricidae				
Crested porcupine	*Hystix cristata*			0.2089
Orycteropodidae				
Aardvark	*Orycterpus afer*			0.0286
Elephantidae				
African elephant	*Loxodonta africana*			0.1560
Equidae				
Burchell's zebra	*Equus burchelli*			0.3010
Suidae				
Warthog	*Phacochoerus africanus*			0.0630
Giraffidae				

Masai giraffe	Giraffa camelopardalis			0.0419
Bovinae				
African buffalo	Syncerus caffer			0.0275
Bushbuck	Tragelaphus scriptus			0.0141
Lesser kudu	Tragelaphus imberdis			0.0096
Eland	Taurotrogus oryx			0.0015
Antelopinae				
Kirk's dikdik	Madoqua kirkii			0.2053
Waterbuck	Kobus ellipsiprymnus			0.0007
Grants gazelle	Gazelle grantii			0.0101
Aepycerotinae				
Impala	Aepyceros melampus			0.2587
Alcelaphinae				
Hartebeest	Alcelaphus buselaphus			0.0034

* Refers to large carnivore

Annex II. Large Carnivore Monitoring Sheet

Large carnivore biodiversity project
Observer(s)   **Month**

Submit to project after every 3 month

	Seen? tick if yes	**Where seen?**		**How often seen?** Once / 2-10 times / 10+ a month + any other notes
Common name		In the reserve	Outside the reserve	
Wild Dog				
Cheetah				
Lion				
Leopard				
Spotted hyaena				
Striped hyaena				
Aardwolf				

Note: The project has grid square for the reserve and areas outside the reserve making mapping possible.

Appendix III: References

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