

## 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](mailto:jane@rufford.org).

Thank you for your help.

Josh Cole  
Grants Director

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#### Grant Recipient Details

<b>Your name</b>	Lydia Natalie Tiller
<b>Project title</b>	Understanding how land use change in the Trans-Mara District, Kenya, is driving human-elephant conflict
<b>RSG reference</b>	15360-1
<b>Reporting period</b>	17 <sup>th</sup> April 2014 – 17 <sup>th</sup> April 2015
<b>Amount of grant</b>	£6,000
<b>Your email address</b>	Lnt3@kent.ac.uk
<b>Date of this report</b>	May 2015

**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
1: Understand human-elephant conflict patterns in the Transmara District			X	Since June 1 <sup>st</sup> 2014, 10 field scouts from strategic locations across the Transmara have been responding to reports of human-elephant conflict (crop raiding, property damage, human injury etc.) by visiting the location of these incidents and recording data on what happened. Data has been collected using a standardised procedure (Hoare, 1999) including information on the location of the incident, the amount of crop damage and the number of elephants involved. Currently, this data is still being collected as the project has been extended until December 1st 2015. This will provide 18 months of data and will enable a better analysis of human-elephant conflict (HEC) data. The results will enable us to determine seasonal, spatial and temporal patterns of HEC which will help identify HEC hotspots. This will then enable prioritisation of conflict management and land-use planning. Data will be fully analysed once all data has been collected.
2: Evaluate current HEC methods	X			This component of the project has not been carried out. There is another PhD student from Cambridge University conducting his research in the Transmara looking at the social issues surrounding HEC. It was decided that we would collaborate and I would investigate more ecological questions of HEC and he would investigate the social side of HEC. Thus, after having spent a few months in the Transmara and determining what other research was needed, I formulated a new objective (see row below).
**2. (New Objective) Understand pathway and habitat usage of different elephant groups in the Transmara			X	To be able to understand why elephants are utilising pathways in the Transmara, which elephant groups are using them and the seasonal and temporal patterns of pathway usage, I started conducting camera trap and elephant sign surveys. To carry out these surveys, I first needed to identify the locations of all the elephant pathways. Pathway use was confirmed by: community scouts, rangers, and local farmer's observations of elephants on pathways, and the

				presence of dung, footprints and feeding damage on the pathways themselves. Each pathway was subsequently mapped using a global positioning system (GPS) starting from the edge of the Masai Mara Reserve to the top of the escarpment. The end of each pathway was marked when the pathway opened out. Land-use, elevation, slope, human-disturbance and other species presence have also been recorded for each pathway. I have used ArcGIS to produce a map of all the current elephant pathways. In total, 25 pathways have been identified. Since September 2014, elephant sign surveys have been conducted by the field scouts to determine elephant usage. On an elephant sign survey, which is carried out every 2 weeks, dung piles are counted with and without maize seeds. 40 camera traps have also been installed along 17 of the pathways in order to determine elephant groups using the paths.
3: Determine how land-use change is driving conflict		X		All ground-truthing has been conducted. However, the land-use map will be updated from September 2015 onwards. This mapping work will require a couple of months to complete.
4: Train and develop the skills of at least 10 Kenyan field staff			X	10 Kenya field staff were selected from different regions across the Transmara. Each field scout was a local Masai, born and raised in the Transmara. Initial training with data collection protocol and equipment was conducted in May 2014. This was a 1-day training workshop where scouts were also issued with their equipment. After the training workshop, I attended HEC incidents with the scouts to ensure they understood data protocol. Throughout the year, each scout has been monitored and two more training days were conducted for data collection protocol of elephant sign surveys that are being carried out.

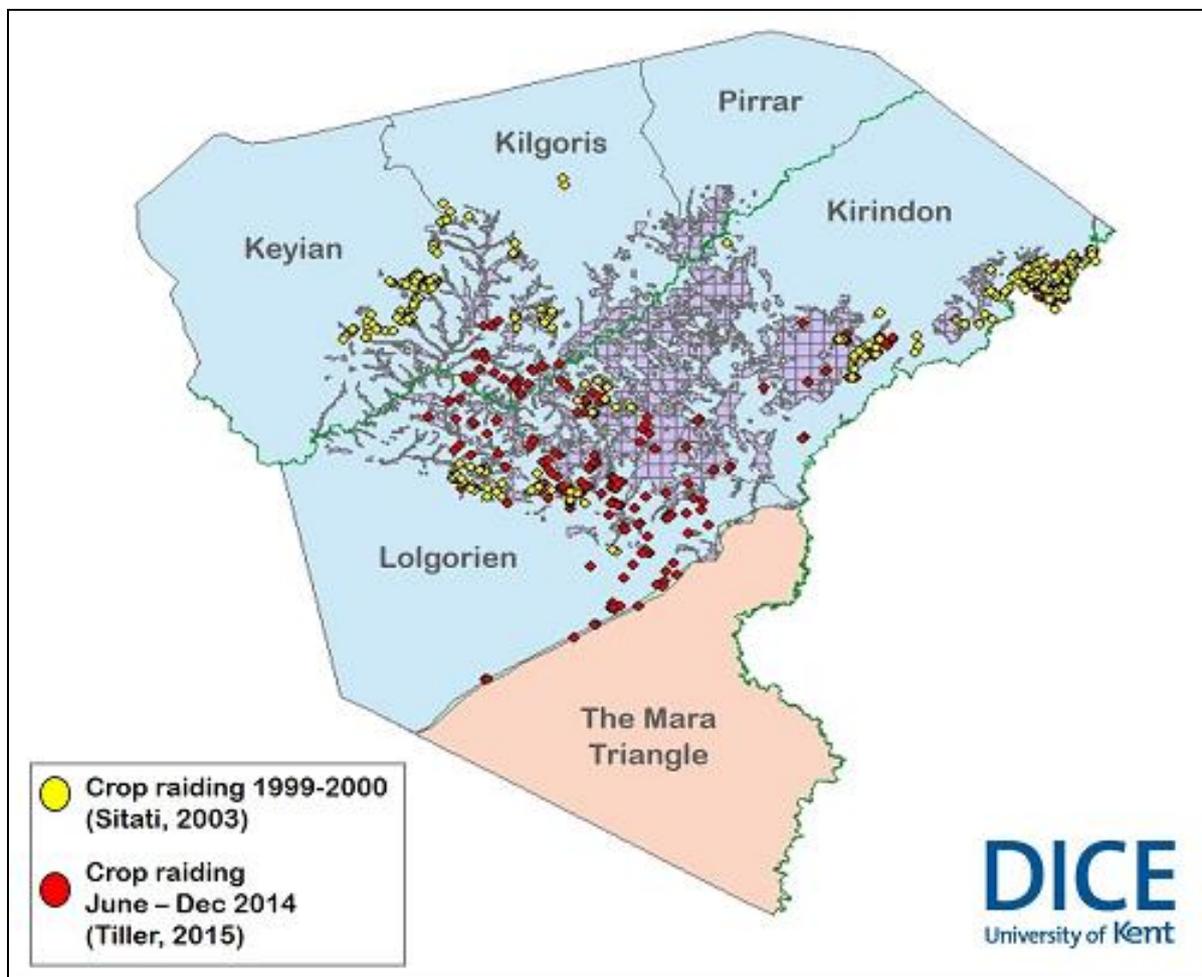
**2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).**

Apart from changing one of the project objectives, I have not faced any major problems during the project. However, I have encountered minor difficulties throughout which one would expect from being in the field. These problems include vehicle issues, heavy rains and very poor road conditions. My research assistant also left mid-season due to other employment opportunities, so I had to find a new assistant and train him in a short amount of time. Living in the Transmara was also quite challenging as it is a fairly remote area with not much to do. Thus, at times, I did feel quite lonely.

Apart from these small difficulties, working in Kenya has been soul-strengthening and a truly great learning experience.

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

1) Although the human-elephant conflict data has not been properly analysed yet, I have been able to determine conflict hotspots and formulate ideas for appropriate mitigation in the area. It appears that since 1999-2000, human-elephant conflict has increased and shifted areas. For example, between June 1<sup>st</sup> - December 31<sup>st</sup> 2014, 616 HEC incidents were recorded (including fence damage, crop damage, damage to boma livestock and human injury/death), of which 234 were crop raiding incidents. Historically, there was considerable conflict in the northern regions of the Transmara (see map) but now conflict is occurring much closer to the elephant pathways and all across certain regions, as opposed to very localised locations.



**Figure 1: Crop-raiding incidents -Trans-Mara District in 2000 and June-December 2014**

An interesting observation from my project so far is that farmers living right on the border of the Mara Triangle, in the West of the Transmara, receive very little crop raiding by elephants, despite having large maize farms. What reduces crop raiding here is that these farmers monitor the movement of elephants in the Mara Triangle from a vantage point up on the escarpment in the Transmara. When they think elephants are about to climb up one of the pathways, they alert the

rest of the village. Farmers will then gather on this vantage point to scare away the elephants using traditional methods such as shouting, banging tins and setting off fireworks. An early warning detection system in this village is, thus, proving very effective. Therefore, this could be an effective mitigation measure if applied throughout the Transmara.

2) The Transmara supports important elephant populations, which is why current levels of habitat loss is so concerning. Elephants seasonally migrate into the Transmara using 25 pathways (see figure 2) which I have identified. The pathways facilitate the movement between the Mara Triangle and the Transmara. This information is important from a spatial planning perspective when land-use plans are being drawn up.



**Figure 1: Map showing the pathways (in red) that connect the Mara Triangle and the Transmara.**

Some initial observations so far (data will be collected until December 2015), from monitoring pathway usage by elephants from conducting sign surveys and camera trapping, is that: (1) pathway usage is seasonal and they appear to be using pathways more during the crop ripening season, (2) elephants are moving up the pathways at night and moving down in the early morning, and (3) specific pathways lead to crop raiding.

3) One of the proposed outcomes of my project is that data should feed into KWS and WWF Kenya strategy reports. Even though I have not finished the project and data has not been fully analysed, so far I have written, edited and contributed data for the 'Nyekweri Forest Biodiversity Technical Report 2015', conducted by WWF-Kenya and National Museums of Kenya. I have also contributed data to 'Save the Elephants' and 'Elephant Voices' for a report about elephant population status, movements and distribution. This report was produced for Narok County Government, which is currently carrying out spatial planning in the county.

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

I have employed 10 local field scouts from different areas across the Trans-Mara. They have benefited from employment, a regular monthly salary and skills training. Each scout has attended a number of training workshops in which they have developed new skills, thus, enhancing their curriculum vitae for future research. The scouts have developed human-elephant conflict monitoring skills, animal monitoring skills, camera trap skills, ground-truthing skills and GPS skills.

I have been engaged with local farmers who have been victims of human-elephant conflict. The farmers have appeared enthusiastic about my presence as it has allowed them to talk about the problems that they are facing, as often their voices are ignored.

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

Yes. After gaining more funds for field research, I am going to continue monitoring HEC until the end of November 2015. This will provide 18 months of data for better understanding of spatial and seasonal trends of HEC. I would also like to trial out different early warning detection systems as a mitigation method for HEC.

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

I plan to share the results of my work in a number of ways. Firstly, I am planning to publish 3-4 journal articles before 2017. One paper will be on land-use change; one on spatial and seasonal trends of human-elephant conflict comparing this with previous data; one on elephant pathway use; and one using systematic conservation planning to look at different conservation scenarios of the Transmara. I am also planning to write articles and blogs for a wider audience and publish these on websites such as Mongabay. So far, I have written, edited and contributed data for the 'Nyekweri Forest Biodiversity Technical Report 2015', conducted by WWF-Kenya and National Museums of Kenya. I have also contributed data to 'Save the Elephants' and 'Elephant Voices' for a report about elephant population status, movements and distribution. This report was produced for Narok County Government, which is currently carrying out spatial planning in the county.

I have also presented my project at different conferences/workshops/talks (see below). The most notable presentation that I have given was at the 'Kenya Wildlife Service National Elephant Conference'. This year I will also be presenting a poster at the International Congress on Conservation Biology in Montpellier (France). In January 2016, I will be presenting my work at the 'Pathways: Conflicts and Co-existence' conference in Kenya.

**Lydia Tiller, Bob Smith, Tatyana Humle, Noah Sitati & Rajan Amin (2014) *Monitoring human-elephant conflict in the Mara***. Talk presented at WWF Kenya, human-elephant conflict workshop, June 2014.

**Lydia Tiller, Bob Smith, Tatyana Humle, Noah Sitati & Rajan Amin (2014) *Understanding how land-use change in the Transmara, District, Kenya is driving human-elephant conflict and elephant movement***. Talk presented at WWF Kenya, stakeholders spatial planning workshop for Narok county government, October 2014.

**Lydia Tiller, Bob Smith, Tatyana Humle, Noah Sitati & Rajan Amin (2015) *Understanding how land-use change in the Transmara, District, Kenya is driving human-elephant conflict and elephant movement.*** Talk presented at Kenya Wildlife service National Elephant Conference, 18-19 February 2015.

**Lydia Tiller, Bob Smith, Tatyana Humle, Noah Sitati & Rajan Amin (2015) *Understanding how land-use change in the Transmara, District, Kenya is driving human-elephant conflict and elephant movement.*** Talk presented at WWF UK as a special talk for staff, May 2015.

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

I have used the Rufford Foundation Grant for the original and stated planned period of my field work (May 2014-May 2015). However, due to gaining additional research funds, I will continue this field work of human-elephant conflict monitoring and elephant sign surveys until November 2015. This will provide me with 18 months of data to analyse, thus enabling a greater understanding of HEC in the Transmara as two main crop raiding seasons will be covered.

**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.**

£1 = 135Ksh (Kenyan Shillings).

Item	Budgeted Amount	Actual Amount	Difference	Comments
10 x field assistant for HEC monitoring conflict data collection (per month = £50). Therefore £50 x 10 field scouts = £500 x 12 months	£6000	£6000		I have provided 10 scouts with a wage of £50 per month for one year.
<b>TOTAL</b>	£6000	<b>£6000</b>		

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

From initial observations, comparing current data with data from 1999-2000, it appears that human-elephant conflict has increased in the Transmara. Thus, six additional months of HEC monitoring is required for a better understanding and analysis of the data. Once data is fully analysed, recommendations can be made as to where conflict management should be targeted.

**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?**

I have used the RSGF logo in the following workshops/talks/conferences:

**Lydia Tiller, Bob Smith, Tatyana Humle, Noah Sitati & Rajan Amin (2014) *Monitoring human-elephant conflict in the Mara.*** Talk presented at WWF Kenya, human-elephant conflict workshop, June 2014.

**Lydia Tiller, Bob Smith, Tatyana Humle, Noah Sitati & Rajan Amin (2014) *Understanding how land-***

*use change in the Transmara, District, Kenya is driving human-elephant conflict and elephant movement.* Talk presented at WWF Kenya, stakeholders spatial planning workshop for Narok county government, October 2014.

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This year I will also be presenting a poster presentation at the International Congress on Conservation Biology in Montpellier (France). In January 2016, I will also be presenting my work at the 'Pathways: Conflicts and Co-existence' conference in Kenya.

#### **11. Any other comments?**

I would like to take this opportunity to thank Rufford Foundation for awarding me this grant. I am extremely grateful as, without this support, I would not have been able to carry out this project. This generous grant has enabled me to work closely with 10 local scouts, providing them with wages for 1 year. The scouts have been essential for collecting human-elephant conflict data. The training of these scouts, and the experience that they have gained, has built scientific and conservation capacity in the area which will enable the project to be continued beyond my presence.

I feel that not only have the local communities benefited from this project, but I have too. This project has been a significant learning experience and has enabled me to grow as a conservation scientist as I have developed invaluable skills in project management, community engagement and analytical skills.

My enduring ambition is to devote my working life to making a practical and positive contribution to wildlife research and conservation. Human-elephant conflict is increasing and worsening in many areas. It is very important to understand the drivers of this conflict in order to properly manage it. I feel that the findings of this project, which Rufford Foundation have made possible, will be of significant practical use in not only advancing the study of human-elephant conflict, but in also helping to better manage the elephants in the study area of the project.