

## 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>	Dr. Kathryn Shutt
<b>Project title</b>	Wildlife Tourism and Conservation: an interdisciplinary evaluation of gorilla tourism in the Central African Republic
<b>RSG reference</b>	8985-1
<b>Reporting period</b>	01/01/2011- 23/01/2014
<b>Amount of grant</b>	£6,000
<b>Your email address</b>	k.a.shutt@durham.ac.uk
<b>Date of this report</b>	08/05/2014

**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
Investigate the motivations, perceptions and attitudes concerning gorillas, their conservation and the understanding of risk amongst people engaged in gorilla ecotourism			X	I was able to fully address this objective using planned research methodology. I gathered a large amount of data which has now been fully analysed and has contributed to the management recommendations coming out of the full study.
Identify predictors of human-gorilla disease transmission risk based on human socio-cultural, health and epidemiological profiles, and examine how these relate to human behaviour towards gorillas and anthropological data derived from objective 1.		X		This objective was approximately 80% met as planned. The specific data that was originally thought to be available was actually limited (regarding complete staff health profiles) as the project employee health programme faced many funding/logistical issues. As such, this objective was addressed as much as possible using available data and other research means were adapted to collect data (qualitative interviews and historical data).
To assess the nature and impact of habituation /research /tourism /film crew-related exposure to humans on gorilla behaviour, stress levels and health, and investigate the relationship between stress and health.			X	This objective has been 100% fully met and two publications have derived from this work – contributing to gorilla and wider wildlife health/stress monitoring methodology and advising specific wildlife tourism management interventions.
Assess the level of protection that is afforded to gorillas by the presence of the ecotourism project in relation to the occurrence of other human forest activities.	X			I was not able to address this objective in a qualitative manor as planned as the GIS data that would have informed this objective/question was not available/accessible. Instead, I addressed the underlying question via qualitative

				analysis of ethnographic discourse and observation.
Produce theoretical and practical recommendations for direct benefit-maximization and risk mitigation across gorilla ecotourism and conservation programmes.			X	This objective was fully met – please see attached publications.

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

There were a number of unforeseen difficulties arising during the project. The table below identifies the difficulties, the impact, and action taken to overcome the problems or the repercussions.

Difficulty	Impact	Action/Repercussion
Study gorilla groups going missing for days/weeks.	Gaps in biological and socio-cultural data collection as faecal samples could not be collected and tourists could not be interviewed.	Extension of fieldwork data collection period required.
Elephants causing physical damage to field-based living accommodation and eating physical data records (3 months data!)	Gaps in data during a specific period – alternative data sourced.	Extension of fieldwork data collection period required.
Tropical illness – myself as PI and field work assistants.	Risk to long-term personal health.	Return to UK for specific medical attention – disruption to data collection schedule.
Staff strikes and/or shortages	Forest data collection disruption.	Extension of data collection period – negotiation with staff re specific work activities and obligations.
Political unrest / intermittent rebel groups threats.	Threat to personal safety, restriction on travel/communications.	Avoided travel/exiting the remote forest –based camp and travel to the capital during times of unrest and put in place an evacuation plan in case of attack.

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

In summary the three major findings of this research are;

1. I found that two (very close to all three) of the human-contacted gorilla groups had significantly higher levels of FGCMs (stress hormones) than unhabituated gorillas, and a group undergoing habituation had the highest FGCMs, suggesting that the process of

habituation is perceived as a threat by gorillas, and that habituation reduces this response over time. Moreover, FGCMs in habituated groups were significantly associated with increasing frequency of violation of the 7 m distance rule by observers and with a medical intervention but not with other measures of human pressure, suggesting that some elements of human-gorilla contact still elicits a GC response in habituated gorillas, and that management interventions are necessary to mitigate against this physiological impact.

2. I also demonstrated that there was a positive association between FGCMs and parasite infection that may reflect hormonal suppression of the immune system in gorillas with higher FGCM levels, or, stimulation of the HPA axis as a result of increased parasite infection.
3. Finally, I investigated socio-cultural, epidemiological and management aspects of human interactions with gorillas in order to identify how and why visitors break regulations and the subsequent risk of human-gorilla disease transmission. Key findings revealed that socio-cultural and emotive factors motivate people to get too close to gorillas (breaking health/safety rules). Epidemiological factors interact with socio-cultural and emotive drivers to create a variable profile of disease risk presented by each person during their interactions with gorillas. A surprising, but key final finding was that tourists have little to no comprehension of the process of gorilla habituation, and this may be a key driver of rule/regulation violation and misunderstanding.

Please see Figure 1 for a summary of the three major/key findings, their relationships and interactions.

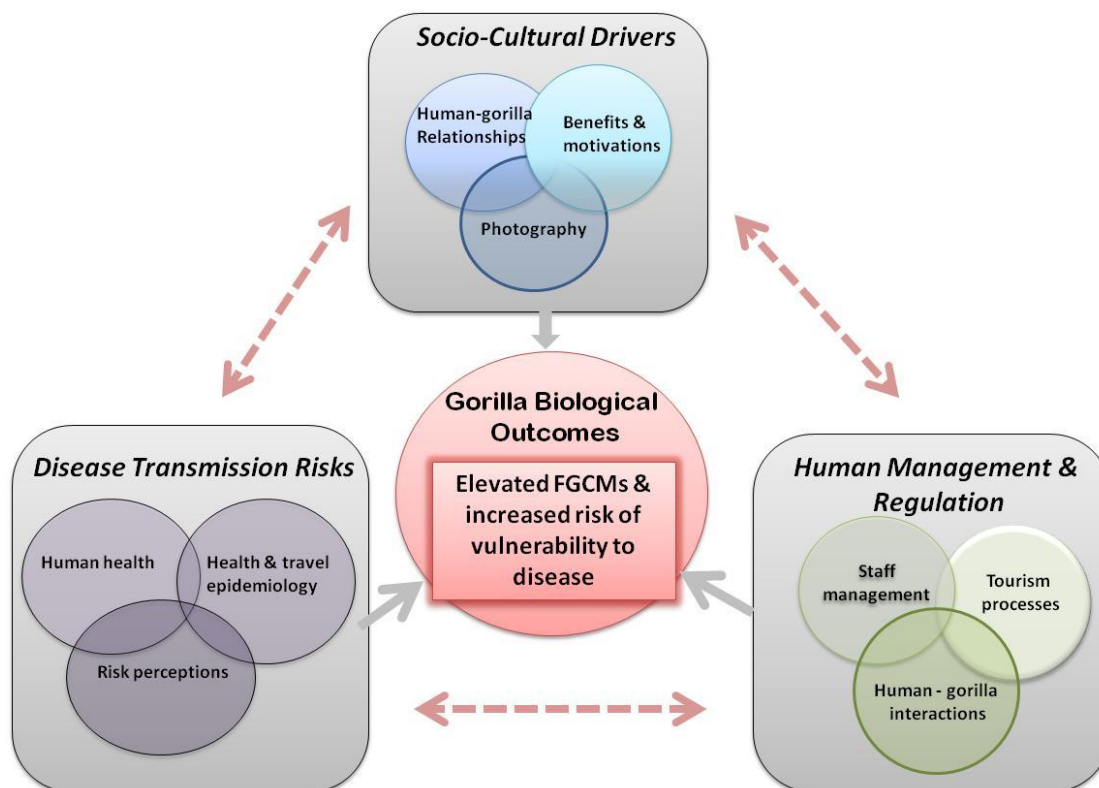


Figure 1. Relationships between factors influencing human-gorilla interactions and subsequent biological outcomes for gorillas involved in ecotourism activities. (Dashed arrows demonstrate the

indirect influence of each human-data theme on each other and solid arrows represent their influence on gorillas).

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

In order to conduct this research I collaborated with WWF's in-country gorilla habituation and ecotourism programme. Although this project is fully staffed and funded by WWF and partners, my research project contributed to the salary of staff from local communities to be employed, and trained. I recruited and trained local research assistants, in technical aspects of the study such as GIS data collection, behavioural data collection, non-invasive faecal sample collection and sample set management, excel data entry and analysis and qualitative research methodologies. Those research assistants have since been recruited on subsequent research projects with international students/institutions or have continued to receive further training. As such, this project has directly contributed to the capacity building of local conservation staff.

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

Although findings of this study had been fed back to the research site and had started to be implemented, the ecotourism project is sadly affected now by the outbreak of civil war (hence also delay to final field work activities and data analysis). The habituated gorillas continue to be followed and protected by a skeleton body of local staff that are remote from the ongoing turbulence and violence in the main cities and towns. This has, however, meant that ecotourism activities are currently on hold until further notice, when political stability may return to the country. Published results of the study (including methods developed and intervention recommendations) have however since been applied to other gorilla research and habituation sites in Africa (e.g. in Gabon). In essence, therefore, elements of this research are being continued and expanded, and the key findings are informing ongoing research in conservation contexts.

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

The results of this work have been and continue to be widely disseminated. During the course of this project two manuscripts have been submitted, accepted and published in peer reviewed journals, the most recent in a well-esteemed journal informing conservation practice (biological conservation) – please see attached manuscripts. A third manuscript is being prepared and will soon be submitted for publication which details further results regarding gorilla stress hormones and gastrointestinal parasites. I have also presented the key findings (developed methods and impacts of human-gorilla interactions on gorilla stress hormones) at an international primatological conference (IPS Mexico), at a primate- health workshop in the Czech Republic, and at a university lead conference on primate research in the UK (Roehampton University, UK).

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

The actual support period covered by the Rufford Grant was a great deal longer than originally anticipated. The field work was extended due to data collection difficulties, political insecurity in the country, and a long data analysis and interpretation period. As such, the project, which was originally planned to complete in March 2013, actually finally ended in January 2014.

**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
Research Permit Admin Fee	£347.27	£405	+57.73	Additional amount due to required permit extension for prolonged fieldwork.
Salary and living expenses for one year of national homologue (local research assistant)	£1000	£1500	+500	Additional amount due to required permit extension for prolonged fieldwork.
Initial VISA for 1 month upon arrival in CAR = \$50, and extension to 'Carte de Sejour" (1 year stay) = \$80	\$130 (£79)	\$180 (£109)	+50	Additional amount required to extend past one year's sejour due to prolonged field work requirement.
Cost of faecal sample analyses per sample (provided by the German Primate Center - Gottingen), and derived costs for estimated maximum 1000 samples.	£2200	£4,855.08	+2655.08	Final cost of analysis per sample was 4 euros (collaborative rate agreed – reduced from 7 euros per sample). Number of collected samples exceeded estimated by 50%. Please see box below regarding re-budgeting of costs to cover this expense.
Transportation of samples (courier) to Germany - Frankfurt (Frozen samples with 8-9kg dry ice = \$150 for 50 samples) x 1000 (remaining duplicates kept onsite).	£1786.5	0.00	- 1786.5	The project pilot study demonstrated that freezing faecal samples would not be an option, therefore I developed a new method to extract and store samples onsite (please see publication from 2012). This negated the need to transport samples, and the cost, therefore the extra budget was put towards additional costs of analysis (above).
Transportation of duplicate faecal samples to Czech Republic, Parasitology Institute for gastrointestinal parasite analysis (costs estimated as per weight	£1786.5	0.00	-1786.5	As above – we developed means to store parasite samples in country until they could be shipped with traveling researchers/staff to remove the transportation cost and put the remaining funds towards extra costs (£2655.08) of sample

for hormone faecal samples).				analysis and prolonged field work stay (£1786.5*2 = £3573).
<b>Total</b>	<b>£7199.27</b>	<b>£6869.08</b>	<b>-£330</b>	

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

The most important next steps for this project (given that specific in-country activities cannot proceed for now) is to further disseminate the results of this research so that it is available to inform/advise management and research regarding wildlife tourism for conservation in similar contexts. A third manuscript will be submitted in the next months (by July 2014), and a fourth is planned in 2014 which will focus on the socio-cultural aspects of the research regarding human-wildlife interactions in tourism contexts, and which will also inform management implications for wildlife conservation.

**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?**

Every presentation related to this project concluded with acknowledgements to project funders, including a large Rufford Logo. Each publication also acknowledges project funders (See attached publications) thus Rufford's support to this project is/was widely recognised.

# **Wildlife tourism and conservation: an interdisciplinary evaluation of gorilla ecotourism in Dzanga-Sangha, Central African Republic**

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Dr. Kathryn Shutt – Project Abstract for Work Supported by Rufford Grants for Nature Conservation. 2014.

Wildlife tourism is proliferating worldwide and has the potential to raise revenue for conservation as well as public awareness of conservation issues. However, concerns are growing about the potentially negative influence of such tourism on the wildlife involved. An absence of scientific information means that the potential costs of tourism are unidentified, tourism management strategies are not informed by scientific studies, and the ethics of habituating animals to humans remain relatively unexplored, though much discussed. This combination of ecological and anthropological research questions necessitates a bio-social approach. In this project I adopt an interdisciplinary approach to explore the factors that influence human-animal interactions and incorporate them into conservation biology, using the Dzanga-Sangha Gorilla Habituation and Ecotourism Project in the Central African Republic as a case study. First, I explore the context of wildlife tourism and why people watch gorillas in the wild, their reactions to and behaviours during their gorilla encounters and the effect these encounters have on the visitors. People are drawn to gorillas because gorillas are human-like and tourists seek close encounters which are rare and authentic. Photography is a key motivation for tourists to visit gorillas but also a major cause of disturbance. Next, I detail a series of experiments conducted to validate methods for measuring physiological stress in the western lowland gorilla. Using these methods, I then address the question of whether gorillas incur stress as a result of habituation and ecotourism activities, comparing faecal glucocorticoid metabolite levels (FGCMs) in four gorilla groups at different stages of habituation. Two (and possibly all three) of the human-contacted groups had significantly higher levels of FGCMs than unhabituated gorillas, and the group undergoing habituation had the highest FGCMs, suggesting that the process of habituation is perceived as a threat by gorillas, and that habituation reduces this response over time. FGCMs in habituated groups were significantly associated with increasing frequency of violation of the 7 m distance rule by observers and with a medical intervention but not with other measures of human pressure, suggesting that some elements of human-gorilla contact still elicit a GC response in habituated gorillas. I then demonstrate a positive association between FGCMs and parasite infection that may reflect hormonal suppression of the immune system in gorillas with higher FGCM levels, or, stimulation of the HPA axis as a result of increased parasite infection. Finally, I explore socio-cultural, epidemiological and management aspects of human interactions with gorillas in order to identify how and why visitors break regulations and the subsequent risk of human-gorilla disease transmission. Socio-cultural and emotive factors motivate people to get close to gorillas. Epidemiological factors interact with socio-cultural and emotive drivers to create a variable profile of disease risk presented by each person during their interactions with gorillas. The outcomes of this interdisciplinary risk assessment will inform policy makers as to how they may better protect gorillas, and other animals, from the potential negative effects of human disturbance resulting from habituation, tourism and research activities. The implications of this study will help to maximize the potential for such projects to be beneficial, low-impact and sustainable conservation solutions.