

## 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>	Shailendra Kumar Yadav
<b>Project title</b>	The conservation status of megafauna and management issues in wildlife corridors: A case study of big cat in the Bardia-Katarniyaghat corridor, Nepal
<b>RSG reference</b>	13206-1
<b>Reporting period</b>	July 2013 to July 2014
<b>Amount of grant</b>	£5994
<b>Your email address</b>	Shailendrayadav69@gmail.com
<b>Date of this report</b>	25 <sup>th</sup> July 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
To assess status and distribution of tiger in the corridor and compare tiger density with adjoining area of park			✓	Altogether, 16 individual tigers (12 males, four females) were identified from 168 photographs captured. We deployed 30 camera trap stations (23 in corridor and 17 in park) in 15 effective working nights. Among 16 individuals there were four and 12 exclusively individuals' tigers were photo-captured in the corridor and park respectively ( $\chi^2 = 0.32$ , $df=1$ and $P=0.05$ ). Among four individuals, only one male was photo-captured in both areas. Finally, it was only (exclusively) three were trapped in corridor in 2013. The one-tailed P value equals 0.0181 by using Fishers Exact Test. Using both right and left flank photos, the estimated population sizes of tigers were $4 \pm 0.14$ , $12 \pm 0.41$ under Mo estimator for corridor and park respectively and $4 \pm 0.21$ , $15 \pm 4.36$ under Mh estimator. The estimated MCP polygon for corridor and park of camera trap were respectively $82.98 \text{ km}^2$ and $75.56 \text{ km}^2$ . Estimated density of tiger in corridor and park per $100 \text{ km}^2$ by buffering the camera trap MCP with $\frac{1}{2}$ MMDM using population estimates of Mh was 1.79 and 9.15 respectively for corridor and park.
To know the current status and compare the tiger prey base between park and corridor			✓	There were altogether 55 transects surveyed in which there were 17 transect in park and rest were in corridor. However out of the 10 species that were detected on transects, estimates for the density could be computed only for the two species due to sample size constraints (Buckland <i>et al.</i> 1993). The swamp deer encounter rate could not be compared since it was virtually absent from corridor as well as no sightings of hog deer or sambar in corridor, similarly not any blue bull sightings in park. Major tiger prey species such as chital and hog deer had significantly higher abundance in the park than in the corridor. Wild boar was distinctively most abundant in the corridor than in the park. The results showed that barking deer had higher abundance in the park than in the corridor, but blue bull had higher abundance in the corridor than in the park. The overall detection was 160 and 29 in park and corridor respectively of 57.82 km and 75.85 km

				transect effort. Similarly, the mean number of animal observations was 964 and 198 in park and corridor respectively which indicate park has much better prey base abundance and density than the corridor.
To determine the principal prey species of tigers and to know the proportions of each in tiger diet using microanalysis of scat			✓	<p>The seasonal diet of tigers was estimated from micro-histological analysis of scats. Hair from scats was examined macroscopically and compared with reference slide of hairs and reference guide for features such as colour, length, thickness (Mukherjee <i>et al.</i> 1994). The relative proportions of prey species of different sizes in the diet was estimated according to Ackerman <i>et al.</i> (1984). We determined the diet by analysing the content of 127 tiger scats, collected over a period of 16 months. The analysed scats were distributed almost evenly between winter including spring (dry, October-May; N=98) and monsoon or summer (wet, June-September; N=29) seasons from both areas. Scats were collected opportunistically along forest roads and trails (locations known to be frequently used by tigers). The tiger scats were distinguished from those of leopards based on their size, appearance and other supplementary evidence in the form of associated pugmarks and scraps. Scats of tigers are larger with a lower degree of coiling and relatively larger distance between two successive constrictions within a single piece of scat (Biswas and Sankar 2002). A total 149 prey items (mean per scat <math>1.17 \pm 0.41</math> SD) were identified from of 127 scats of tiger collected. A minimum of eight different prey taxa (seven wild and one domestic such as ox) were consumed by tigers. Nearly 83% of total scats had a single prey item, 13.57% had two and 3.42% had three items; consequently, two measures per faecal sample, the frequency of occurrence and relative occurrence, did not differ considerably. Scat analysis revealed that 93% of tiger diet constitutes wild ungulates, 3% primates, 4% livestock (big cattle). At the species level, chital comprised 61% of the relative frequency of occurrence, but detected in more than 50% of all scats.</p>
To assess the human-predator conflict status and community perception in tiger conservation			✓	<p>The human predator conflict was carried out by questionnaire survey and key person interviews in the villages. It was randomly selected 18 CFUGs which were about 30% sample intensity from most victim CFUGs. The victim household was identified from BNP existing database of human wildlife</p>

				<p>conflict (HWC). It interviewed 61 victim households, 20 chairpersons of Community Forest User Groups, 17 nature guides, five protected area managers and seven elephant care takers from July- September 2013. Altogether, there were seven people killed and seven people injured by tiger attack from 1993 to 2013. There were low human casualties by killing from tiger compare to rhino and elephant in the corridor. The loss percentage for adult cattle, adult buffalo and goat/sheep/boars were 86%, 14%, and 0% (of the stock owned) respectively. In comparative analysis between two predators (tiger and leopard), tiger only killed adult domestic animal (cow/ox and buffalo) on pastureland, whereas leopard killed both on pasture and corral (herd) by 38% and 62% respectively. The trend of livestock depredation by tiger in stagnant whereas it is increasing by leopard. The respondents demonstrated positive thinking in tiger and leopard conservation. More than half of the respondents (56%) were not in agreement with supporting tiger and leopard conservation if they had lost a family member killed or injured in a tiger attack. Similarly, 67% were found to agree in supporting tiger and leopard conservation when their livestock had been killed by a tiger and leopard attack.</p>
<p>To conduct pro-active conservation awareness programme through street drama, video show, school visit and art competition</p>			V	<p>Conservation education program conducted with local schoolchildren, youth groups and community members, to increase the knowledge, understanding and engagement of the local community with the conservation of tiger, its prey base and habitat. It aimed to make participants aware and empower them to take action to reduce tiger human conflict by getting tiger/leopard behaviour and their pressure on corridor and to understand and mitigate the negative effects of human-tiger conflict. Video show, street drama, art completion and pictorial description regarding tiger conservation organised in school and settlements near to corridor and park border. More than 600 villagers and 1000 school students aware through proactive conservation education session. Tiger Conservation Street Drama and Art Competition was performed on World Wetland Day, 2nd February 2014 organizing on illegal trade of tiger and river poisoning with the active involvement of eco club of Nepal Rastriya Secondary School at six locations. This drama was focused on effects of poison in public health and in</p>

				the environment. These street dramas performed by local students are very effective to disseminate conservation messages to in the ground level villagers.
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**2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).**

It was very difficult to conduct systematic camera trapping survey in the corridor due to camera traps being stolen by local people. There is continuous movement of local people in the corridor and high chances of stolen of camera traps. And two camera traps were stolen by local herder. Therefore, we removed the trap early of the morning and placed it again at evening in daily basis up to fifteen functioning night. So that some of traps only operated 12 hours' timeframe whereas other traps placed on 24 hr basis according to Prof Per Wegge's suggestion.

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

- It seems clear that the sex ratio of tiger was male dominated in corridor and female dominated (which is normal) in park which was just opposite to previous year 2012. Hence, the estimated tiger population found four times less in the corridor than Park.
- The tiger prey base density of park was estimated 98.7 animals/km<sup>2</sup> with detection probability and encounter rate of 0.3 and 3.24 respectively. In the corridor the prey base detection probability and encounter rate were 0.46 and 0.38 respectively and density was 44.68/km<sup>2</sup>. Hence corridor perceives less prey density in comparison to park. As the low prey density in corridor, local people declared some part of the respective Community Forest areas as **GRAZING PROHIBITION ZONE** after series of mass meetings and discussions in 15 Community Forest User Groups. **PRO-ACTIVE CONSERVATION AWARENES CAMPAIGNS** was conducted in 15 settlements of Thakurdwara and Suryapatuwa areas to control illegal threat as well as over grazing in the corridor. Traditionally local community used these cattle for most of their agriculture purposes including manure. These cattle generally freed for grazing in the forest areas and creating huge problem for forest regeneration and accelerating deforestation. To reduce this problem in the area we performed the **CORRIDOR COBSERVATION AWARENES CAMPAIGNS** as the declaration.
- The seasonal diet of tigers was compared between two areas based on two different seasons. It was quantified by calculating frequency of occurrence as well as percent occurrence of all items found in tiger scat. Predation of different ungulates by tiger varies from season to season. Chital supported for tiger diet abundantly in compare to other diet in both areas in two seasons which was found as 65% and 55% in park and corridor respectively during dry (winter) season where as it was decreased by 4% and 5% during wet (summer) season respectively in park and corridor. Hog deer was second abundant diet recorded as 13% and 11% in park and corridor respectively during dry (winter) season where as it was decreased by 2% and increased 1% during summer. It is worth mentioning, however, that out of the 149 prey items found in the 127 scats examined in this study only 4% and 2% of Sambars were recolonised during dry season in the corridor and park respectively. However, it was found no Sambar diet in the corridor and slightly increased from 2% to 3% in park during summer season. Adult Livestock (cattle and ox) supported 11%

and 13% of total tiger diet in corridor only during dry (winter) and wet (summer) season respectively. Finally, it was found that there was less prey types occurred in scat during summer in the corridor in comparison to dry season. But it was same in park during both seasons. All prey percentage occurrence is higher during the summer in the corridor comparing to dry period except chital. The results indicate that tiger diet shifted from grassland prey species like chital to other Sal forest depended prey species because of waterlogged the grass land by monsoon flood during summer season.

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

We have conducted our activities in close coordination with Community Based Anti-Poaching Unit (CBAPU) and newly formed corridor management group; four local youths from CBAPU were involved in this project fully for camera trapping and sign survey during the project period. They were paid fully from this project. The community people and school students were able to get more knowledge on tiger conservation and their importance in nature through conservation awareness programs (video show and street drama). This project has supported to CBAPU for their future plan to species conservation in the corridor. They are happy to collaborate with us for long term tiger conservation in the corridor and seeking continuous support. Local residents have been interviewed on various aspects of their interaction with local perception towards tiger conservation and human-predator conflict. We shall use this information in formulating future participatory conservation activities in this area. We also hired local residents to help in field surveys.

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

Our study reveals that the human-predator conflict is major challenge to tackle with for the long-term conservation of tiger and leopard in the corridor. It is important to work out more to address human-predator conflict as proactive community-based tiger conservation. We have very good foundation to continue the project for the sustainable tiger conservation in the corridor. CBAPU is also expecting some more support from us to address the human-predator conflict by supporting predator proof coral, insurance policy, tiger conservation street drama etc. and therefore, we have the plans to continue the works.

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

I got opportunity to present about the result in different trans-boundary meetings, India and with different group of people as well as organisations in Nepal. On the occasion of 19th wildlife week, I have presented the tiger research findings among the university professors and students and I will also present the result on the occasion of 29<sup>th</sup> Global Tiger Day in Bardia National Park. I am working on the paper to be published in the international journal.

**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 RSG was used over the period of 12 months. Although, the anticipated time frame was 13 months. The difference is one month because of data analysis.

**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. Exchange rate: £1= NR 140 (the rate in effect at time of receipt of grant)**

Item	Budgeted Amount	Actual Amount	Difference	Comments
Tiger preliminary sign survey, camera trapping field survey	1517	1527	-10	
Tiger Prey Base survey	1643	1640	3	
Orientation to Field Technicians	104	150	-46	Exceed the budget to cover more than target participants
Scat collection Material purchased	57	51	6	
Tiger diet analysis	554	550	4	
Photo printing, focus group discussion and school programme	407	412	-5	
Community meetings and interview survey	214	245	-31	
Corridor Management Group formation	57	61	-4	
Community engagement program as street drama, slide show	1333	1248	85	
Conservation Awareness Camp	108	110	-2	
<b>Total</b>	<b>5994</b>	<b>5994</b>	<b>0</b>	

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

Based on the experiences of the current project and observing the urgent requirements for long term tiger conservation in the corridor, I feel following works need to be urgently undertaken as a follow up of this project and sustainable impact of the current project:

- Pro-active Community based tiger conservation programme should be implemented focusing tiger conservation street drama in intensively in all communities around the corridor.
- Formation of Community Managed Livestock Insurance Scheme (CMLIS) focusing on tiger and integration of tiger into existing common Leopard CMLIS to address human-predator conflict in the corridor. Support to victim household by predator proof coral.
- Make a short video documentary to communicate tiger conservation message among wider audience.
- Expansion of genetics research activities to cover wider areas.
- Evaluation of historical patterns in land use change and project these for the future.

**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?**

No, I haven't used the logo yet. However, I will be using it in my forthcoming publication. For publicity, I acknowledged the RSGF grant in the publication.

**11. Any other comments?**

I wish to extend my deep thanks to the Rufford Small Grants for Nature Conservation, for the financial support which made possible for this project to achieve its fruitful goals. I am thankful to Central Department of Botany, Tribhuvan University Nepal, Department of National Parks and Wildlife Conservation (DNPWC)-Nepal, Bardia National Park (BNP), Community Based Anti-Poaching Unit, and community based organizations, schools, all students and local people for their support to this project. I owe my sincere gratitude to Prof Dr Per Wegge, Dr Maheshwor Dhakal, Mr Rabin Kadariya, Dr Rodney Jackson, Prof Ole Reidar Vetaas for their cooperation and valuable support. I am very much thankful to all who supported directly or indirectly to accomplish this project. I sincerely acknowledge all of you and anticipate your support in future as well for the conservation endeavours.