The Rufford Foundation
Final Report

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.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details	
Your name	Deu Bahadur Rana
Project title	Distribution occupancy, potential suitable habitat and conservation of recolonized wolf in Annapurna Conservation Areas, Nepal
RSG reference	24454-1
Reporting period	March 2018- March 2019
Amount of grant	£ 4,917
Your email address	deurana045@gmail.com
Date of this report	2019-03-10

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 study occupancy distribution of recolonized Himalayan wolf in Annapurna Conservation Area, Nepal.				The occupancy of Himalayan wolf was calculated as naïve occupancy based on single season survey. The Relative Abundance Index (RAI) i.e. number of occurrence based on the total distance travelled was also calculated.
To map the potential habitat of recolonized Himalayan wolf in Annapurna Conservation Area, Nepal				I found that 50% of the total grids were potential for the wolf habitat. Different parameters such as distance to river, settlements, and built-up areas (road construction), bioclimatic variables: roughness, aspect, slope, elevation, land use and land cover were used to determine the potential suitable habitat using ArcGIS and freely available Maxent.
Conduct an awareness campaign in two key conflict areas				Wildlife conservation and habitat management awareness workshops were conducted in two key conflict areas. In total 47 local people were participated.

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

The Annapurna Conservation Area covers 7,629 sq. km. Due to the large areas, remote and difficult terrain, I focused my survey in Upper Mustang region, though the plan was to cover entire conservation area. Herders and general public are more important to be educated, who are directly suffering losses of their livestock from wolves. Although, the original plan was to educate students in the study areas.

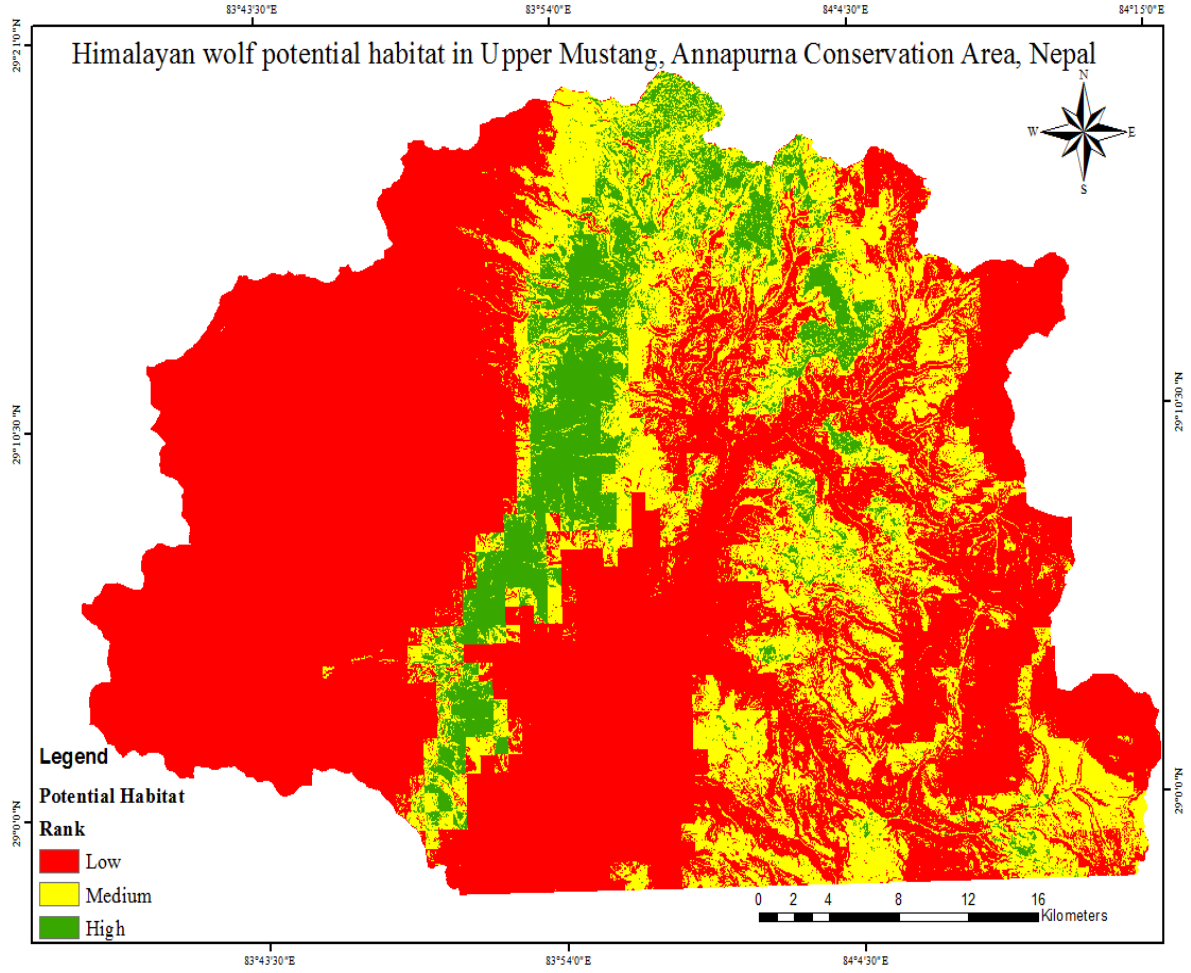
3. Briefly describe the three most important outcomes of your project.

I. Distribution occupancy

During the survey, different high mountain carnivores and their prey species were sighted. The naïve occupancy of wolf was estimated almost 72%. Also, the Relative Abundance Index (RAI) was calculated based on the recorded occurrence locations proportional to total distance travelled. The RAI of the wolf was estimated with an average two signs per km.

II. Potential habitat

Different environmental parameters i.e. land use land cover change, bioclimatic data, elevation, roughness, slope, aspect, topographic data (distance to river, distance to village and distance to build-up area) were used to calculate the wolf potential habitat. All the data were worked under ArcGIS and Maxent.



The Maxent model of suitability mapping resulted 52% of the total areas are highly suitable with an area of 1089.90 km^2 within the study areas. The output of the model qualified with maximum entropy value 7.927. The study also resulted that the nearer the river higher the potential habitat for wolf rather than that of nearer to the village and built-up areas. Among the different environmental variables, the precipitation of coldest quarter (Bio19) gains the major role in predicting the potential habitat of wolf in the high Himalayas followed by annual precipitation (Bio12) and precipitation of warmest quarter (Bio18). Furthermore, the model explored the land use land cover type has major contribution in the habitat suitability of the wolves.

III. Conservation awareness campaign

Local herdsmen, conservation officials, political leaders, local youth club, local women group and the local community are the key stakeholder for conservation in the areas. All total of 47 participants were attended the conservation awareness program in two different villages which was recognised as the key conflict areas

based on the results of the survey. Besides, the awareness workshop, key person discussion was carried throughout the year via meeting and communication on the importance of species and its habitat.

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

Local communities were the main guide throughout the research period. They were involved as local as well as field guides. During the reconnaissance survey, local people were the key informants. Local individuals were provided with cash incentives since they were involved in data collection fieldwork as well as field guide. Their involvement was worthy because there was sharing of the knowledge, experiences and the information on importance of the wildlife conservation.

5. Are there any plans to continue this work?

Yes. Understanding the potential habitat and its distribution was one important aspect to be included in conservation initiation which was assessed in this study. Likewise, research should be carried out based on the seasonal occurrence to estimate the actual potential habitat of the wolf in the Nepalese Himalaya. Further research on prey based study and the habitat corridor for understanding the movement of wolf should be carried out intensively. Efforts to minimise the human

influence in its core habitat would increase the harmony and co-existence between human and wildlife.

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

In the course of this project the information and results was shared in my MSc in Natural Resource Management and Rural Development thesis. The research result will be submitted to donors and published in reputable peer reviewed scientific journal to reach wider audiences with profound acknowledgement of RSG. Additionally, the final result will be shared with the Department of National Parks and Wildlife Conservation (DNPWC), National Trust for Nature Conservation (NTNC), Annapurna Conservation Area Project (ACAP) and other concerned officials.

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 project started in March 2018 although the original plan was estimated from February 2018 because of the grant approval on March 2018. The project was implemented in four different phases including reconnaissance survey, field data collection, awareness campaign and reporting. Activities for the reconnaissance survey was conducted in April 2018. Fieldwork for the data collection ran from late May to August 2018, September to November 2018 for data analysis and December 2018 to February 2019 for report write up. In between the report write up the awareness campaign was also carried in February 2019. Therefore, the project was accomplished within the anticipated timeframe.

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
DSA for research assistant 14/days*90 days*2 person	£ 2520	£ 2520		
Local leaders 9/days*30 days*1 person	£ 270	£ 270		
Investigator accommodation	£ 250	£ 250		
Transportation	£ 450	£ 350	+ £ 100	Cost of transportation increased due to the hiring of horses
Stationers	£ 125	£ 125		
Binocular and GPS	£ 230	£ 230		
Field gears	£ 160	£ 130	+ £ 30	Adjusted in field gears

Printing	£ 275	£ 275		
Notebooks and pens	£ 50	£ 50		
Tea and breakfast for the participants in awareness campaign	£ 90	£ 70	+ £20	Adjusted in snacks for participants which was higher than estimated
Education materials	£ 200	£ 200		
Miscellaneous	£ 297	£ 447	- £150	Adjusted in transportation, field gears and snacks for the participants

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

This project was well accomplished in identifying the wolf distribution and its potential habitat that guides for preparation of plan on conservation and research. In addition, the population status of wolf and its density needs to be determined to understand the intensity of conflict over livestock losses.

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

Yes, the logos of RSG was used during the poster presentation in awareness campaign, power-point presentation was used during my MSc in Natural Resource Management proposal defence, thesis defence and conservation awareness campaign. In future, the logos of RSG will be used while sharing any materials and reports which are related to this project.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Deu Bahadur Rana: Principle investigator
Since Mr. Rana is a team leader of the project he was responsible to plan all the field work activities, manage all the field gears and awareness materials, conduct awareness campaign, data collection, data analysis and prepare a final report. Mr. Rana is also involved to explore awareness about the species including other wildlife species in and around the areas throughout the field visit to herdsmen and villagers. He also involved in result dissemination of the project.

Prabal Birjung Rana
Prabal Birjung Rana assisted as a researcher and worked in the field for collecting various data during survey. Additionally, he was assigned for fill up data sheets and retrieve them in the Upper Mustang as well as contributed in the awareness campaign. He had completed his Bachelors of Science in Forestry from Dolphin (P.G) Institute of Bio-medical and & Natural Science, Dehradun, India. During his tenure as a researcher/ research assistant hard work came naturally to him which

was often in remote and virtually inaccessible regions. His sense of humor is exceptional and often converts difficult situation into more approachable one.

Shujan B.K
Mr. Shujan B.K was one of my team member during the project. His was responsible as preparation of the field plan, data collection and helped to explore field based awareness to the herdsmen and the villagers. He also supported in coordination and management of the field trip with the locals.

Tashi Gurung
Mr. Tashi Gurung was one of the key person. He was involved in management and coordinating with the local people, field work. Since he was the local inhabitant his role was to facilitating in the field work, guiding the field routes, arrangement of the field trip and make contact with different concerned stakeholders in the study sites. His valuable contribution during the field visit and arrangement for the awareness campaign was appreciative and I am thankful to him for his guidance about the local situation and condition we could make this project successful.

Furthermore, **Mr. Buddhi Bahadur Gurung, Pema Tsering & Dindhu Pun Magar** were also involved during the project. Their contribution and suggestions was very appreciative to accomplish the project successfully.

12. Any other comments?

The study would not have been possible without funds. I am very grateful to Rufford Foundation for necessary financial support to accomplish the study successfully. This study plays very important role to conserve such a critically endangered species from extinction from the Nepalese Himalayas incorporating its results in national wildlife conservation strategies. Your contribution to conserve and explore towards the species would be very appreciative and hoping the continuous cooperation from Rufford Foundation in future if needed.