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. 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	Kamal Kandel
Project title	Distribution and Occupancy modelling of globally threatened cheer pheasant *Catreus wallichhi* in Western Nepal: Implications for strategic conservation planning
RSG reference	10850-1
Reporting period	February 2012-April2013
Amount of grant	£5950
Your email address	Kandel.kamal82@gmail.com
Date of this report	28 May 2013

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
Occupancy of cheer pheasant			√	Occupancy of the cheer pheasant with detection probabilities has been achieved for the study area successfully.
Countrywide Species distribution map			√	Species distribution map has been prepared
Variables influencing the distribution			√	I have incorporated some site specific variables in occupancy models
Site specific cheer pheasant density		√		I was not able to get sufficient calling data (>40) to run DISTANCE Sampling to calculate the density of the calling birds. Instead we were able to calculate the occupancy of the birds in the study site.

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

Due to the vast complex landscape of the western Nepal, I could not cover the entire western Himalayan region spatially. So, the field study was concentrated in the Baglung and Myagdi districts of western Nepal including Dhorpatan Hunting Reserve. Still our spatial coverage was large enough to meet the assumption of independent observations.

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

<u>Countrywide species distribution mapping</u>
Cheer pheasant presence locations were collected via field study and literature review. All the data complied were generated via call count surveys. I collected bioclimatic data (www.worldclim.org) and masked them with the boundary of Nepal. Similarly, I downloaded a Digital Elevation Model (DEM) with a 30 m resolution and masked it with the study area boundary. I used DEM to prepare an aspect map and slope map in ArcGIS 10. Then I built distribution model using RandomForest algorithm in Salford Systems Ltd.

<u>Direct sighting of cheer pheasant</u>
During the field survey, eight individual birds were sighted in four sighting incidents. Six birds were sighted inside Dhorpatan Hunting Reserve in three sighting events and two individuals were seen in Masuri area of Bobang Village Development Committee, Baglung.

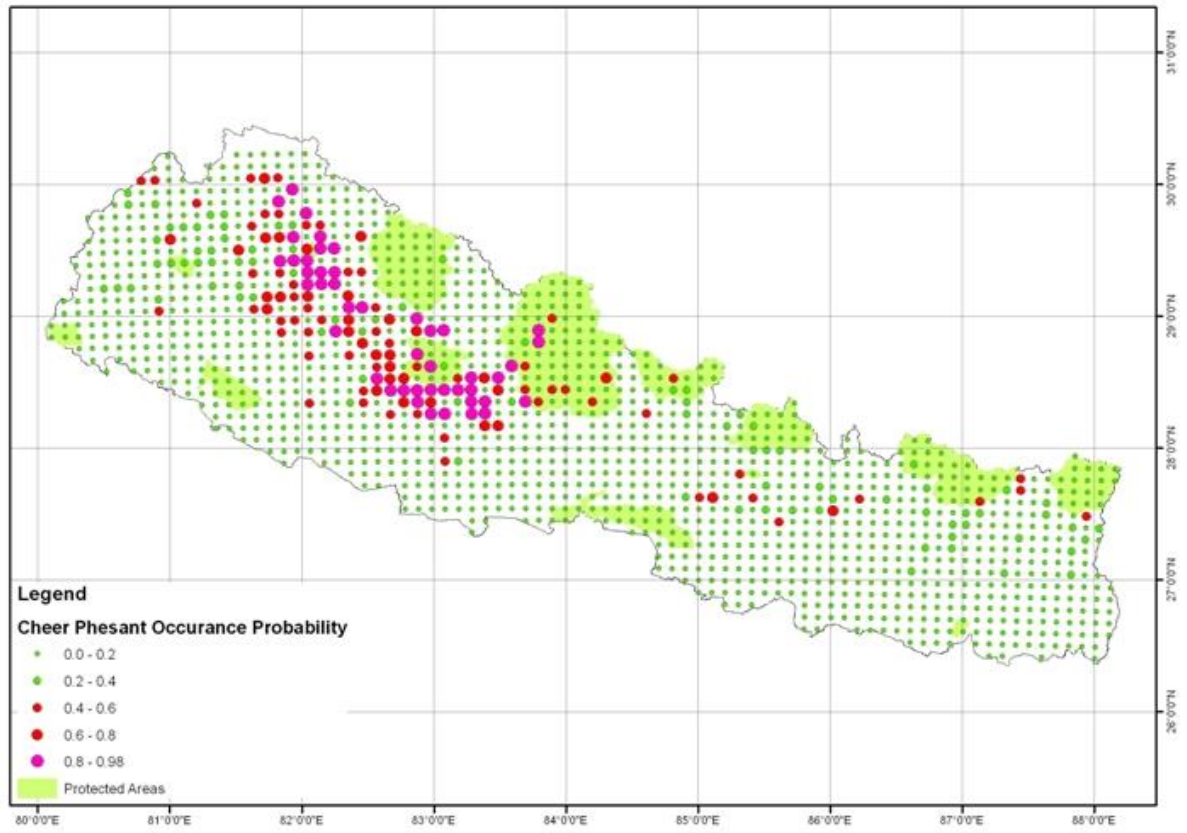

Fig 1: Potential distribution of cheer pheasant in Nepal based on the RF algorithm. Different colour indices in the map denote the (Cheer Pheasant Occurrence Probability = Relative Index of Occurrence). The predicted map shows that higher the ROI (Relative Index of Occurrence) value, more suitable is the habitat of cheer pheasant. The map clearly shows that western Nepal is the potential habitat of cheer pheasant.

Modelling Occupancy of cheer pheasant

I used single species-single season occupancy model to estimate occupancy (Mackenzie *et al.*, 2002, 2006) using method of maximum likelihood. Multiple models were run and the models were ranked and model weights calculated using Akaike's Information Criterion (AIC, Burnham and Anderson, 2002). In a model set, the AIC weights sum to one for all members, and the weights represent measure of the appropriateness of a given model relative to other models in the model set.

The naïve estimate of occupancy was found to be 0.57. It is considerably changed when detection probability was taken in to account. The model Ψ(Grassland),p(.) had the highest level of support with highest model weight (wi) which suggests that it was the best model in the set with occupancy estimation of 0.63. A difference of only 1.86 AIC units between these two highly ranked models indicates that the second model Ψ (Grassland), p (t) still has a reasonable level of support and there is further evidences of this with the second model having a substantial amount of AIC weight. Thus, while most of the evidence point towards the probability of detection being constant, the evidence is not overwhelming and there is some indication that the probability of detection varies between surveys. Looking at the output of the best fit model, β-parameter (a2) = 4.06 which, as it is >0, indicated that **the probability of occupancy higher at grassland areas**.

Table 1: Summary of probability of occupancy (ψ) and detection (p) model selection results for cheer pheasant

Model	AIC	deltaAIC	AIC wgt	Model Likelihood	No.par.	-2*Log Likelihood
Ψ(Grassland),p(.)	**51.23**	**0**	**0.4528**	**1**	**3**	**45.23**
Ψ(Grassland),p(t)	53.09	1.86	0.1787	0.3946	5	43.09
ΨGrassland+Disturbed),p(.)	53.2	1.97	0.1691	0.3734	4	45.2
Ψ(.),p(.)	54.24	3.01	0.1005	0.222	2	50.24
Ψ(Disturbed),p(.)	55.3	4.07	0.0592	0.1307	3	49.3
Ψ(.),p(t)	56.1	4.87	0.0397	0.0876	4	48.1

The occurrence of cheer pheasant was best described by the model Ψ(Grassland),p(.), which implies that its occurrence is dependent on the habitat type and the probability of detection for each survey occasion is almost constant but still there was reasonable amount of support that detection probability varies between surveys. Cheer pheasant is a grassland bird which is supported by our model.

There was also the reasonable amount of support for 2nd candidate model Ψ(Grassland + Disturbed),p(.) that included level of disturbance as a site specific covariate. This model supported that occupancy is dependent on the low level of disturbance (here we considered disturbance level in terms of human impacts and grazing intensity) which had also been supported by Kaul 1989 and Birdlife International, 2011. But Jolli *et al.*, 2012 indicated that cheer pheasant respond negatively with the human disturbance. This could be the difference in scale of measurement of the disturbance factor in these two studies and probably the site were surveyed is more community managed area outside the protected area system where cheer pheasants might have adapted to survive with certain level of disturbance factor (mainly grazing). In most of our call count stations, goats and sheep grazing was predominant.

Hunting and high level of disturbance are the main threats for cheer pheasant in the part of Baglung and Myagdi districts of Nepal. General assessment of local perception indicated that local people are not aware of the species and its vulnerability and global conservation importance. Therefore, conservation awareness in addition of fine level of multi season species occupancy estimate is crucial for making any effective conservation decisions. Multi-season and multi-year occupancy surveys will allow monitoring the population trend, patch colonisation and local patch extinction.

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

During the field study, local people were used as the assistants for locating the call stations and carrying out call count study. In the mean time, we used semi structured questionnaire survey for assessing the local perceptions and understanding about the cheer pheasant in the study site.

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

We are still analysing the questionnaire survey data and also looking for some high resolution landscape and demographic GIS layers so that the distribution and occupancy models could be more refined.

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

Compilation and publication of cheer pheasant 'presence only' data

We collected all the presence locations available for the cheer pheasant (from the literature) and combined and published in the form of ISO compliant METADATA. The data collected in the field during this study are also arranged systematically in Microsoft excel sheet and will soon be available through USGS website for global sharing.
http://mercuryops2.ornl.gov/clearinghouse/send/xsltText2?fileURL=/data/Mercury_instances/usgs/uaf/harvested/mercury.bio.uaf.edu_~falk_huettmann_nbii_cheerpheasant_MetadataFH6.xml&full_datasource=University%20of%20Alaska%20Fairbanks&full_queryString=%20Cheer%20Pheasant&ds_id=

Final Technical Report

Final technical report will be soon shared via Rufford small grant's website and Global Primate Network-Nepal site. The project report will also be shared with the relevant stakeholders, conservation NGOs and government officials and wildlife managers.

Expected Publication

We expect to publish this work on one of the international peer reviewed journals.

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

The RSG was used from March 2012 to December 2012. Mainly the grant was used during the field survey as field logistics, accommodation and travel and some of the fund was used for consumables during 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.**

Item	Budgeted Amount	Actual Amount	Difference	Comments
Field Accommodation	£5000	£4950	£50	
Travel Cost	£550	£600	-£50	Change in the travel fare
Consumables	£400	£425	-£25	
Total	£5950	£**5925**	-£25	

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

During the local perception assessment towards cheer pheasant, the local people were found unaware of the species and its global vulnerability. Therefore along with detection-non-detection survey for multiple seasons and multiple year, conservation awareness programs is critical to

safeguard this species from local extinction in this area. In the mean time, science based adaptive management strategies should also be developed and implemented.

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, I used RSGF logo in each of the data sheet produced during field data collection and also during the DISTANCE SAMPLING training we organized in coordination with another RSG recipient Ganga Ram Regmi/Global primate Network-Nepal and -EWHALE lab-, University of Alaska-Fairbanks.

11. **Any other comments?**

I would like to thank RSGF for this support to carry out this interesting project in remote hills of western Nepal. Thanks also go to Department of National Parks and Wildlife Conservation, District Forest Office Baglung and Myagdi for granting permission to carry out the field survey. And finally all my colleagues and field biologists Mr. Ganga Ram Regmi, Mr. Dikpal Krishna Karmacharya, and Madan Krishna Suwal, my assistants and staffs of Dhorpatan Hunting Reserve. Many thanks to my referees for their recommendations and support.