

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

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details	
Your name	Leki
Project title	Winter Population Structure, Abundance and Habitat Use of Blue Sheep in Central Part of Jigme Dorji National Park, Bhutan
RSG reference	17122-1
Reporting period	March 2015 to March 2016
Amount of grant	£5000
Your email address	<a href="mailto:lekipunap@gmail.com">lekipunap@gmail.com</a>
Date of this report	29 <sup>th</sup> March, 2016

**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
Distributional map of blue sheep will be produced for the central part of JDNP			+	The blue sheep distributional map for the central part of JDNP was produced based on the herds observed in different types of habitat. The map will help the park management in planning the routine monitoring and identification of prime habitat, thus helping to narrow the area of focus in JDNP. In addition, it would help in devising effective management strategy for conservation of endangered snow leopard in the park.
The population size, structure and density of blue sheep will be determined for the central part of JDNP			+	The total number of blue sheep in Lingzhi Park Range was estimated at 1,762 in winter and 2,097 in summer. In winter, 1,524 blue sheep were categorized into various sexes and age groups of which 478 were adult females, 266 were lambs, 305 were yearlings, 117 were young males, 109 were medium males, and 249 were adult males. In summer, 1996 blue sheep were categorised, of which 627 were adult females, 289 were lambs, 314 were yearlings, 219 were young males, 230 were medium males, and 317 were adult males. The density of blue sheep was estimated at 2.96 individuals per km <sup>2</sup> and 3.52 individuals per km <sup>2</sup> in winter and summer seasons, respectively.
The habitat use of blue sheep will be assessed			+	Although there was no significant difference in the habitat utilisations ( $H [3] = 2.505$ , $p=0.286$ ), slightly higher sightings were recorded in alpine grassland of 41.86% (n=18) followed by

				barren land 32.56% (n=14); and shrubs 25.58% (n= 11; Table 8). This finding was validated by evidences collected from the same site (Table 6), with grass land containing significantly more pellet groups (38.36 %) than barren sites (33.96%); shrub land (25.79%); and others (1.89%).
The number of snow leopard that can be sustained in central part of JDNP			+	Using the snow leopard to blue sheep ratio of 1:98 - 143 by Jackson (1996), 11 - 17 snow leopards could be sustained in the study area. This estimate is closer to the estimated snow leopard abundance of 13 - 17 determined by Thinley et al. (2015)

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

Although the project was successfully executed, few unforeseen difficulties and bottlenecks were encountered. The inclement weather conditions of high altitude was the major difficulties faced together with unavailability of adequate manpower and having to engage horses and yaks as means of transportations.

The first round of data collection was carried out in extreme winter, where, thick snow covered mountains hampered the survey team in travel from one survey point to another. The thick snow cover made it impossible to travel on foot. Hence, we had to resort to yaks as a means of transportation rather than horses.

In summer, the foggy weather posed hindrance in surveyors classifying the blue sheep especially during rainy season, which took longer time to complete the survey. All these factors contributed to the escalation of survey cost.

The classification of blue sheep was further hindered by natural barriers such as inaccessible and rugged terrain and big and torrential streams during summer, which forced us to use high powerful binoculars, high resolution cameras and projection system in GPS to mark the location of herds. Unavailability of water source for drinking and cooking was another challenge we faced. For that, we had to totally depend on ice or snow for drinking and cooking which were used by melting.

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

- I. The first outcome of the project was that the study provided important baseline information for blue sheep in Jigme Dorji National Park, in terms of population abundance, density, and population structure of blue sheep. Using the abundance estimation method for double-observer regime, the total number of blue sheep in the study area was estimated at 1,762 individuals in winter and 2,097 individuals in summer.

- II. The second outcome was that the study found out that the Lingzhi Park Range alone can sustain 11 - 17 snow leopards in central part of Jigme Dorji National Park. This figure sounds promising in the face of mounting threats to both blue sheep and snow leopard conservation, elsewhere.
- III. The study also found out that most of the blue sheep were using alpine meadows closer to escape cover and were distributed mostly between 4000 to 4500 m asl. Besides specialisation in south facing slopes and gradual to moderately steep slope during winter.

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

At the outset, all possible areas of blue sheep occurrence in the study area were identified and listed through consultation with local yak herders. During such consultation, about 45 local people were provided with working lunch and daily subsistence allowances.

About 12 local community members from different localities were also directly involved in the whole project period. These local people were engaged in providing porter pony services and local guides during the entire survey period and were paid daily subsistence allowances and service charges in full as per entitlements under the government laws. In addition, some local people were indirectly benefited by selling their dairy products and vegetables which the surveyors bought to feed ourselves.

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

Yes, especially after the study provided exciting findings which were very reliable and useful for several government agencies and non-governmental organizations which are engaged in conservation of flora and fauna particularly elusive snow leopard. Hence, the project will continue.

Blue sheep is believed to be competing with domestic animals in the study area, thus, to properly understand the nature and extent of grazing competition between blue sheep and domestic animals such as yaks and horses, it is imperative to conduct a study on seasonal diet selection of blue sheep and domestic livestock.

Since blue sheep is known to be preyed by numerous predators, assessment of following aspects of spatial and population ecology is particularly needed to obtain further insights into the interspecific interactions among Tibetan red fox, wild dog and snow leopard. For these, the funding is being explored:

- Population structure and dynamics.
- Food and space requirement/availability/preference of snow leopard, Fox and wild dogs.
- Predator-prey relationships.
- Potential for competition and/or resource partitioning.

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

The results of the study were presented to the group of researchers from various agencies, lecturers and students of College of Natural Resources and park officials from Jigme Dorji National Park, in several different occasions. The presentation was followed by interaction basically through question

answer session which created a platform for both researcher and audience to engage in providing constructive critics and suggestions.

Further, a copy of thesis was submitted to College of Natural Resources, Lobesa; Wildlife Conservation Division, Department of Forest and Park Services; Jigme Dorji National Park, Gasa; Research Development Centre, Yusipang as reference.

A scientific paper has been submitted to the “Journal of Wildlife Research” for wider publicity. The materials will also be available for seminar presentation, as and when required.

**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 fund was judiciously used from March 2015 to March 2016, for about 12 months.

**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
Transportation and mobility	2152	2510	+358	Although, initially planned only for winter season, cost escalation was experienced since we did for summer season also.
Daily subsistence Allowances paid	2478	2663	+185	Although, initially planned only for winter season, cost escalation was experienced since we did for summer season also.
Equipment	160	320	+160	Same set of equipment were bought for summer season also.
Induction Course to Research Assistants and local community	45	91	+46	More local people were involved from different localities
Stationary	0	100	+100	Unforeseen expenditure
Printing cost	131	262	+131	Double printing cost for two season
Bank transfer charges	0	75	+75	Unforeseen expenditure
<b>Total</b>		<b>5890</b>	<b>+924</b>	Budget short by £924 ( Met from research funding provided by Royal Society for Protection of Nature and Wildlife Conservation Division, Bhutan)

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

Sensitisation activities through publication of scientific paper in journals and other scientific forum, developing monitoring guidelines, book, public gathering and seminars about the importance of having blue sheep in the Himalayan ecosystem and how it plays a critical role in maintaining the

population of endangered snow leopard and dhole. Media may be engaged at some point of time, especially discussion in national newspaper and TV programmes. The next scope of research could be to study the nature and extent of grazing competition between blue sheep and yak, especially on seasonal diet selection between them.

**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?**

Yes, the RSGF logo was used in all presentations, posters and journal publication. Thus, most of the park officials, researchers from various agencies, lecturers and students from College of Natural Resources, officials from Department of Forest and Park Services, Ministry of Agriculture and Forests, Bhutan and several other relevant stakeholders were made aware about existence of RSGF, its logo and fund support RSGF provides. As a result, most of the research enthusiasts were inspired and encouraged to apply for RSGF in future.

**11. Any other comments?**

Generally, the study was very successful in creating baseline information such as total population, herd size, social structure, distribution and density for two seasons (winter and summer). These data will definitely help in devising effective conservation strategy for this species and its predators, and their trends over the years.

The blue sheep density in this study area is comparatively lower than elsewhere. There is highly likely that the increasing grazing competition from the domestic animals in the area is expected to exacerbate in the days ahead thereby adversely affecting already precarious snow leopard survival in the region. Therefore, in order to properly understand the nature and extent of grazing competitions between blue sheep and domestic animals, it is imperative to conduct a study on seasonal diet selection of blue sheep and domestic livestock. Further fund support will be explored, also from RSG in future to successfully conduct the aforementioned study.

Finally I on behalf of grant recipients would like to thank Rufford Foundation for your kind contribution towards nature conservation projects around the globe in general and in Bhutan particularly.

