

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

Thank you for your help.

**Josh Cole, Grants Director**

<b>Your name</b>	Swati Sidhu
<b>Project title</b>	A study of leopard diet and habitat-use in the fragmented rainforests of Anamalai Hills, the southern Western Ghats
<b>RSG reference</b>	38.03.09
<b>Reporting period</b>	20 months
<b>Amount of grant</b>	£5950
<b>Your email address</b>	<a href="mailto:swati@ncf-india.org">swati@ncf-india.org</a>
<b>Date of this report</b>	14/04/11

**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
<p>Aim 1: Understanding leopard diet and habitat use in a fragmented landscape of plantations and surrounding protected area.</p> <p>Key objectives:</p> <p>a) To examine large carnivore and leopard diet in a modified region of commercial plantations.</p> <p>b) To compare diet of leopards between modified and protected area.</p> <p>c) To understand habitat-use of leopards and other large carnivores in available habitat types within the modified region.</p> <p>d) To understand prey community composition in the different habitat types in the modified region.</p>		√		<p>147 large carnivore scats (leopard, dhole, and tiger) were analysed for diet. 102 scats were analysed for DNA-based identification with successful identification obtained for 57 scats between leopard and canid. This was essential to understand leopard diet. This low success rate in identification was due to inclusion of many old scats with disintegrating boli in DNA-based predator identification.</p> <p>Comparisons with protected area were not possible due to very low sample size of scats from PA.</p> <p>Habitat use of different land uses by large carnivores was measured in terms of encounter rate of scats on transects. Habitat use by leopard in different land uses could not be estimated due to low number of identified scat samples from transects.</p> <p>Line/belt transects were walked for prey community composition: 15 in tea plantations, 13 in coffee plantations, eight in forest fragments, and six in protected areas. All these transects were repeated twice. Direct sightings of mammal species were very low to obtain density estimates. Relative abundance of different mammal species from indirect signs were obtained and compared between land uses.</p>
<p>Aim 2: Examine patterns of human-leopard conflict to develop science-based strategies for conflict mitigation.</p> <p>Key objectives:</p> <p>a) Compilation of conflict records between humans and leopards to understand temporal</p>			√	<p>Data on livestock loss between 1999 and 2010, as well as number of people attacked by leopards and number of leopard mortalities under anthropogenic circumstances from 1990 onwards, were gathered from Tamil Nadu Forest Department records and present study. Interview surveys with local communities were conducted in 36 colonies in Valparai plateau and surrounding protected area.</p> <p>Interview surveys conducted with 161 household's yielded information on number of depredation events from year 2000 onwards, in Valparai</p>

<p>patterns in conflict.</p> <p>b) Understanding spatial patterns in conflict involving livestock losses at colony level.</p> <p>c) Understanding attitudes of local communities towards leopards and the factors influencing these attitudes.</p>				<p>plateau and in tribal settlements inside protected area. Number of livestock and people in a colony, and distance to protected area were used to evaluate spatial patterns in conflict at colony level. We examined if depredation of livestock, attacks on humans, and direct sightings of leopards influenced attitudes towards leopards. This is important to plan management strategies which will be socially acceptable.</p>
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**2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).**

Low success rate in identifying predator species using DNA-based identification of scats was one of the difficulties. Initially, the scats used for the analyses were old and many with a disintegrating boli. As outer layer of the boli has most DNA, the result was a lower success in predator identification. Later field work included additional effort in finding more fresh scats, mostly opportunistically, which lead to higher success in identifications as the DNA-based predator identification progressed. One of the other difficulties faced during the study was the delay in obtaining research permits to work inside the protected area. The research permits were obtained after seven months of submission of a study proposal to the Tamil Nadu Forest Department which delayed the field work inside the protected area. Field work was started soon after obtaining the permissions. However, sampling was carried out for just over a month because of monsoon rains. During this time we were unable to find large carnivore scat samples on transects from the protected area.

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

The 3 most important outcomes of the project were:

a) Large carnivore predominantly consumed wild prey species (98.1%) and domestic prey species contributed <2% to overall prey biomass. For leopards four wild prey species (Indian muntjac, Indian spotted chevrotain, sambar, and Indian porcupine) contributed 95.1% of prey biomass, with the rest being minor wild prey species (no livestock in identified scats).

b) Based on indirect signs for mammal species, significant differences in relative abundances among land-uses were recorded for several of these species. For Indian spotted chevrotain, an important prey species for large carnivores in Valparai region, use of protected forest was found to be higher than tea and coffee plantations, and forest fragments. Similarly, sambar, another important prey species, was found to be using tea plantations significantly less when compared to coffee plantations, forest fragments, and protected forests. For Indian muntjac, use of coffee plantations was significantly higher than tea plantations, whereas Indian porcupine, an important prey for leopards, used tea plantations more than other land-use types. Black-naped hare, a small herbivore species, was found to be using only tea plantations and avoided coffee plantations, forest fragments, and protected forests. Asian elephant was found to be using protected, more contiguous forests significantly more than any other form of land use surveyed during this study. This confirms the

presence of wild prey community in the modified landscape with differences in species abundances between different land uses.

c) Livestock depredation at a colony level was significantly and positively related to livestock numbers, and also interacted positively with distance to protected area, but negatively with number of people. Attitudes of people towards leopards were found to be influenced only by presence of attacks on people by leopards in a colony and not by loss of livestock or previous direct encounter with the species.

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

NA

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

Communicating the results from this study to local stakeholders is an important work which will be carried out over the coming months. In the meanwhile, as the above is being achieved, we will be deciding further course of action and will get in touch with RSGF if we plan to expand the work.

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

A technical report is being submitted to the Tamil Nadu Forest Department. A report will be submitted to the RSGF and will also be available on our website ([www.ncf-india.org](http://www.ncf-india.org)) for free download. A non-technical report will be shared with estate managements in the region. Also, popular articles will bring up the issues and the results from this study for local communities. Nature Conservation Foundation has been carrying out conservation education programmes with the local communities in Valparai. General awareness and precautionary measures to avoid conflict with leopards were discussed in local schools in the last year. Results from the study will continue to be shared with the local communities through future programmes.

**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 starting September 2009, as was planned. The anticipated time taken for project activities was 12 months. However, RSG was used over 16 months (between September 2009 – March 2011). The initial work plan did not include interview surveys with local communities which were incorporated later. This work was carried out using questionnaires with local communities and took 3 months. This added important information to the data gathered during this study and is essential in understanding attitudes of local communities towards leopards, enumerating losses to large predators, and potential factors influencing livestock depredation. Also, there was a three-month period (June 2009 – September 2010), when I took leave for attending a course work at my institute and RSG was not being used during that time.

**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
Consumables	285.71	285.39	0.32	
Laboratory costs	1228.57	715.56	513.01	This money was underspent due to fewer samples for DNA-based analyses.
Travel (vehicle maintenance, fuel costs, surface travel by bus, rail)	1157.14	1157.14	0	
Maintenance costs including field station rental	428.57	428.58	0.01	
Utilities and communication	257.14	257.14	0	
Per diem for investigator	1714.29	2227.31	513.02	This money was overspent due to an extra 4 months in project completion. During this time interview surveys were carried out with local communities to understand spatio-temporal patterns in conflict incidents between humans and leopards.
Per diem for field assistants	450	450	0	
Per diem for research assistant	428.57	428.58	0.01	
<b>Total</b>	<b>5949.99</b>	<b>5949.69</b>		

Local exchange rate: 1 £ = 77.97 INR. All figures are in pound sterling.

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

Over coming months, the most important step is to share the results of this study with local stakeholders: Tamil Nadu Forest Department, estate management, and local communities. These will include discussing use of better husbandry practices for reducing economic losses to predators, such as corralling livestock at night in closed pens. Also, measures that reduce the existing interface between people and predators and having a potential for reducing attacks on people will be recommended.

**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. RSGF logo was used in a poster based on our study which was presented during the SCCS-2010 held at Bangalore. Also, we are extremely thankful to the RSGF for providing us with the funds to carry out this work, and this will be acknowledged in all our technical/non-technical reports and peer-reviewed publications.

## **11. Any other comments?**

Valparai is a human-modified landscape with rainforest fragments within the dominant commercial plantations and is surrounded by protected areas. Valparai underwent habitat alteration from tropical evergreen to commercial plantations which was carried out in the early to mid twentieth century and fragmented the tropical forests. This ecologically important landscape is home to several endemic and endangered species and is also a source of livelihood to migrants who have been living here for many years now. This also means that there are encounters between humans and wild animals. Our study shows that there is a great potential to reduce existing conflict between humans and leopards. Leopard diet in this region consists mostly of wild prey species which were found to be persisting in the modified landscape. General awareness measures to reduce encounters between humans and leopards, such as better husbandry practices and insurance schemes will be suggested to the local management, Forest Department, and local communities.