

# 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	Anjali Chandraraj Watson
<b>5</b>	Determining occupancy, abundance and population
Project title	structure of an endangered apex predator, the Sri
	Lankan leopard (Panthera pardus kotiya).
RSG reference	17979-1
Reporting period	October 2015-October 2016
Amount of grant	£4635
Your email address	aalanka@sltnet.lk / info@wwct.org
Date of this report	October 14 <sup>th</sup> 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	Partially	Fully	Comments
	achieved	achieved	achieved	
I. Leopard			Fully	Project work at this study
abundance			achieved	site has been completed
/density estimates				successfully with field work
and occupancy				and spatially explicit mark/
from closed				recapture analysis
population remote				completed to achieve
camera surveys.				leopard density estimates.
Study site 1.				Detailed results from this
Wilpattu National				study site are attached in
Park				a separate report.
Study site 2. Peak			Fully	This study has been
Wilderness area			achieved	divided into three phases
			by end	so as to cover the large
			November	extent of land to be
				surveyed. The first phase is
				successfully completed
				with the second ongoing,
				to be completed on the
				21st October 2016. The
				final phase will run from
				October 22nd for a further
				4 1/2 weeks. Specific
				details of the success of
				this study site survey is
				attached.
				Two reasons caused the
				delay in starting the
				remote camera survey: 1.
				Unseasonal weather
				conditions; and 2.
				Leopard mortality
				incidents that occurred in
				this area specifically to
				which we had to respond.
				Please see below for more
				details on this.



Non-invasive	Partially	Ongoing	Laboratory methods,
genetic analysis for	achieved		preparation of protocol
population			and storage vials for use in
structure			the field when collecting
assessment			fresh samples are
			complete. The first round
			of optimisation of old scat
			samples (n=108) for usable
			DNA is successfully
			ongoing; more recent scat
			samples have also been
			separated for analysis
			(n=18). Fresh samples
			from the field,
			opportunistically obtained
			are now being stored
			according to the study
			protocol in-field and
			analysis will commence
			shortly.
Wildcat and other		Fully	The confirmation of
species		achieved	presence and use of our
documentation		and	study areas by the other
		ongoing	wildcats – rusty-spotted
			cat, fishing cat and jungle
			cat as well as other
			species of importance
			such as golden palm civet
			and pangolin has been
			successful. Other than for
			jungle cat (one detection)
			other wildcat species
			have been repeatedly
			recorded.
Prey availability		Fully	Prey availability via
		achieved	transects and remote
		for	cameras for the Wilpattu
		wipattu	study have been
		and	calculated (see attached
		ongoing	report for results).
		tor Peak.	



Awarapass		Eully/	Polativo prov available in
Awareness			
		achieved	the mixed landscape of
		and	Peak Wilderness area is
		ongoing	ongoing and will be
			completed with the final
			remote camera phase by
			end November 2016.
			We have been successful
			in reaching the estate
			sector within our Peak
			study area: there is much
			interest and support for
			our work and the
			understanding of the
			importance of such
			research has surpassed
			euripitiel expectations All
			our initial expectations. All
			17 estates within which we
			are currently working
			continue to be extremely
			cooperative, sending out
			dedicated field staff to
			assist our teams when
			needed. No theft of
			cameras has occurred as
			yet although hundreds of
			workers have moved
			through the remote
			cameras and even called
			us on occasion to inform
			us of their movement. We
			have conducted a total
			of 11 workshops including
			to local police estate
			management and estate
			workers and school
			children reaching a total
			of 475 people Mara are
			or 475 people. More are
			nave included a
			component on living in
			coexistence with wildcats



		and a	are using o	bur m	aterial
		and	support	for	their
		mobil	e clinic	CS.	These
		mobil	e clin	ics	are
		cond	ucted so a	as to	reach
		remot	te villager	s to s	service
		them	for matte	ers su	ich as
		identi	ity card iss	uanc	e etc.

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

The primary unforeseen difficulty was the unseasonal weather conditions affecting Sri Lanka which caused: a) flooding in Wilpattu National Park which delayed the start of the camera survey there and limited the access, however we have successfully completed the project; and b). a delayed start of the Peak Wilderness survey; this is however successfully ongoing and will be completed by end of November 2016.

A secondary unforeseen delay were eight leopard mortality incidents that occurred in the general Peak Wilderness area during the first 5 months of 2016. This resulted in us having to immediately deal with this issue - i.e. visit the many locations, have multiple meetings with all stakeholders, launch a special Leopard Human Coexistence Initiative that included preparation of a snare removal programme and incident map for the Department of Wildlife Conservation, creation of a dedicated Protocol Manual for Leopard Incident Management as well as conduct targeted awareness programmes.

Thirdly, an unforeseen delay occurred in the order process and delay in delivery from out of country of necessary consumables for the genetics project. This is a constant difficulty in Sri Lanka as most equipment has to be imported, which can result in extensive delays. An additional short unexpected delay resulted from when a new research article was published (Maroju et al. BMC Genetics (2016) 17:37) that dealt directly with new issues surrounding DNA analysis from scat sampling; as such we needed to re-evaluate our protocol methods for amplification and sequencing.



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

I. Documenting the actual presence and residency of leopards in the nonprotected mixed landscape of the areas adjacent to Peak Wilderness Sanctuary. The multiple and repeated image captures of leopards here via this project revealing their continued presence and movement patterns in this heavily fragmented landscape of tea and patch forest is vital. We hope this information will lead to better targeted conservation of these specific areas so as to reduce leopard mortality which has recently been experienced here.

II. The launch of a Leopard Human Co-existence Initiative in the Central Hills Peak Wilderness area and the willingness of estate management and estate workers to have such an initiative together with the monitoring project within their estate lands. The consequent understanding and cooperation shown of the importance of such a project for targeted conservation and thus preservation of ecosystem services, which is key here as this area is the water shed for most of the country's major rivers and three of its largest reservoirs.

III. The successful completion of the Wilptattu leopard density survey, making it the first scientific study of leopards within Sri Lanka's largest national park since some baseline work conducted by a Smithsonian Institute team as part of a general wildlife project in the 1960s. It is also the first such research post war, in an area that was effected by the civil conflict in Sri Lanka.

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

Our work has directly helped to improve the profile of the estates we are working within and will be able to provide a better understanding of the land use pattern by wildlife within this mixed landscape. Many of these tea estates are under Rainforest Alliance certification and our work could help them to improve their conservation efforts thereby improving the value of tea. Our work here is also helping to reduce fears of the local community especially the tea pluckers/workers who are out in the fields. The perception that leopards are dangerous animals that will attack is also being addressed and their understanding that this is not so is much improved. Our work here also shows that something is being done to address the human leopard incidents that have occurred and help in future mitigation and land use planning.

Wildlife department staff as well as estate watchers often form part of our teamutilising their local knowledge of the area helps us to ensure project success and also gives them direct training and understanding of our research and conservation



work. They often receive improved status within the community and are seen as a communication point for future issues and are able to translate the knowledge gained by being a part of our team. Tourism is increasing in this region and the knowledge gained from our project could increase their options of finding jobs in this sector rather than only in the traditional tea plucking sector. Using local safari jeeps in the Wilpattu study directly contributed economically to the local industry as well as enabled them insight into our work, information that could now be shared with other visiting tourists and the community. It gave them ownership of the work being carried out within the national park and a greater appreciation of research and conservation and how that translates to better tourism options and a better livelihood for them.

At the grassroots community level due to the improved awareness given by our work, fear reduction and understanding of wildlife movements and the importance of this habitat, people's involvement with our project has been positive. They have been supportive often lending their local knowledge and informing us of any leopard information they may have. Our awareness programmes involve local school teachers and or estate personal who often conduct our presentations together with our team, giving them a direct connection with the project and overall this increases the empowerment and awareness of the community. As we often include a Wildlife Department officer as part of our team the community is also able to get answers to any related questions and issues they may have. In the long term our goal is to increase forest restoration and protection which will directly benefit the local community that depend on the land.

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

Yes. As this project is part of a long term ongoing research project on the Sri Lankan leopard this work will be continued. The Peak Wilderness project will need to be extended further including the core of the sanctuary which has difficult and limited access (we have just received a renewed permit for this). As well, long term monitoring across seasons would be beneficial to establish annual movement patterns. Wilpattu work will also be continued as more scat samples are needed for diet analysis (once again a permit for this has already been issued to us). We would also like to conduct similar closed population remote camera surveys in other habitats across the island i.e. Gal Oya National Park where no such research has ever been conducted; a re assessment of Yala NP and eventually the Sinharaja Rain forest area. For the DNA section of this project, samples across the island within national parks as well as outside will continue to be collected and sequencing will need to be done in order to reveal relatedness between populations and possible dispersal routes across the island.



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

Sharing of our results has already been done and will continue. We have submitted reports to the Department of Wildlife Conservation, we have presented at Parliament to the relevant Wildlife Minister and we have conducted public lectures on our Wilpattu work. A Peak Wilderness talk is also planned. Numerous articles have been written in local and international media about our ongoing work:

leopard and landmines-post war carnivore research <u>https://news.mongabay.com/wildtech/2016/09/leopards-and-landmines/</u>;

spot spotting-taking the lead on Lankan leopard learning <u>http://echelon.lk/home/spot-spotting/;</u>

Ceylon Today | Conflict betwixt man and leopard<u>www.ceylontoday.lk/90-118942-</u> <u>news-detail-conflict-betwixt-man-and-I...Feb 23, 2016</u>).

Once more refined analysis is completed we will be publishing in international peer reviewed journals. I will also be presenting our work at a local Rufford's Small Grantee Conference scheduled for November 14<sup>th</sup>, 2016.

# 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 RF grant was used over a 12 month period. However we retroactively purchased some of the equipment for the Wilpattu study as that was begun prior to the grant coming through. Actual field length of the total project will be a few months extra with complete analysis ongoing till mid-2017. The long term out comes such as targeted conservation and/or establishment of protection will take much longer, possibly from six months to some years.

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	Actual	Difference	Comments
	Amount	Amount*	for RSG	
	(RSG	(RSG		
	amount)	amount)*		
SD Cards (x16)	113	194.91	81.91	We did not use the
	(113)	(194.91)		Trailmaster cameras, instead
				we used additional
				Scoutguard (21 total).
				Twenty-eight SD cards



				purchased.
AA Batteries (x256)	406 (406)	226.85 (226.85)	-179.16	452 AA batteries were purchased because we did
				not use Trailmaster cameras, but only a cheaper brand (Panasonic) was available and used
Locks and Chains (x16)	30 (30)	43.55 (43.55)	13.55	We did not use Trailmaster cameras, so used additional Scoutguard. Twenty-one chains and 23 padlocks were therefore purchased.
Field phone (x1)	118 (118)	102.83 (102.83)	-15.17	We purchased a Dialog Tablet at an introductory price.
Film	90 (90)	0.0 (0.0)	-90.00	We did not use Trailmaster cameras so this was not needed.
CR2 batteries (x12)	237 (237)	0.0( 0.0)	-237.00	We did not use Trailmaster cameras so this was not needed.
Film development	93 (93)	0.0 (0.0)	-93.00	We did not use Trailmaster cameras so this was not needed.
C-cell batteries (x48)	90 (90)	0.0 (0.0)	-90.00	We did not use Trailmaster cameras so this was not needed.
DNA extraction equipment	1824 (1824)	2092.12 (2092.12)	268.12	Slight cost variations account for difference from 2015 estimate, fallen GBP account for difference from 2016 estimate
Diesel	827 (827)	1024.81 (1024.81)	197.81	Although less diesel was used in Wilpattu due to use of jeep hires (see below), more diesel has been used in Peak survey due to the very poor tea road conditions.
Jeep Hire (Wilpattu)	0 (0)	1061.73 (1061.73)	1061.73	Due to flooded conditions in Wilpattu we were required to hire jeeps (SLR 8000/day).
Vehicle maintenance	564 (0)	1268.51 (0.00)	0.00	Poor alignment and heavy tire wear due to harsh road conditions forced us to



			replace all 4 tires, which was
			not expected (607.57 (2015)
			or 723.91 (2016))
2444	2035.08	0.00	We were provided a
(807)	(807)		Research Station for the
			Peak work so have not had
			to spend on
			accommodation and food
			as much as anticipated.
1128	1235.00	0.00	The discrepancy is due to
(0)	(0.00)		fallen GBP.
7964	8050 37	010 70	The mein discremenes was
,,,,,,	0000.07	918.78	the main discrepancy was
(4635)	( <b>5553.78</b> )	918.78	due to the unforeseen need
(4635)	(5553.78)	918.78	due to the unforeseen need to use hired jeeps for the
(4635)	(5553.78)	918.78	to use hired jeeps for the Wilpattu work. This is
(4635)	(5553.78)	918.78	to use hired jeeps for the Wilpattu work. This is compounded by the fallen
	2444 (807) 1128 (0) 7964	2444 2035.08   (807) (807)   1128 1235.00   (0) (0.00)	2444     2035.08     0.00       (807)     (807)     0.00       1128     1235.00     0.00       (0)     (0.00)     0.00

\* Since the GBP to SLR exchange varied from 0.0047 GBP per SLR as reflected in the initial budget request (2015) (first column above) to 0.0058 GBP per SLR as of October 2016 we calculated the exchange rate for actual expenditures (this column) as an average of these extremes (0.00525).

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

# Peak Wilderness Study:

On completion of this study leopard and wildlife land use maps including temporal use maps will be created. Using these, the next important step is to discuss with the relevant estates, government and stakeholders how best to proceed with targeted conservation of these areas. Our ongoing and future leopard work in Peak Wilderness (we have just received a further permit renewal for work within the protected sanctuary) will contribute towards lobbying for upscaling the protection level of Peak Wilderness from its current Sanctuary status to National Park status. For the forest areas outside the strict sanctuary boundaries and where this current work was focused, we will need to assess if increased Department of Wildlife Conservation (DWC) protection or whether a mixed land- mixed ownership concession be formed. Lobbying for this protection will be an essential next step. Long term monitoring and active protection and patrolling of these identified areas will be needed. As the DWC is already stretched for personal and resources and most likely unable to provide adequate protection alone, a combined effort between public private partnerships maybe the solution. It will be our role to coordinate and spearhead this.



### Wilpattu Study:

In Wilpattu National Park a larger study including a greater portion of the national park and peripheral buffer zone areas, to understand dispersal and recruitment of the leopard population here, would be beneficial. As well, repeated monitoring of the completed study area to establish population trends every 2-4 years would enable us to understand any threats facing this protected area leopard population. During this study we documented injuries to  $\neg 20\%$  of the detected leopards; we would like to assess if these injuries are a result of intra-specific competition. As the national park gets increasingly hemmed in due to degraded and porous park boundaries, a direct result of post-war development, leopards may be forced to vacate compromised peripheral areas and confine their range within the core area of the national park thus increasing competition.

### New Study Areas:

We would like to replicate the closed population remote camera leopard abundance surveys in locations across the country so as to refine overall leopard density and population numbers for the whole subspecies. As mentioned above areas such as Gal Oya National Park in the east of the Island where no work has yet been done, Yala National Park complex (where we conducted work in 2000-2002 and base line work in 2009-11) would be some of the targeted locations.

Non Invasive DNA analysis for population structure establishment:

Increasing the number and locations of fresh scat for DNA extraction would be beneficial. Once the extraction process has been successfully established specific sequencing of *Panthera pardus kotiya* will need to be done in order to answer questions on level of relatedness of populations. As this sub species is already genetically impoverished, being an off shoot of mainland India's *Panthera pardus fusca* subspecies and given the new issues identified in the Indian studies we will need to specifically sequence for *P. p. kotiya*. This cannot be done cost effectively in Sri Lanka and may well have to be sent to Korea for sequencing if local results are unsuccessful. We feel although this may be a time consuming (due to possible need for permits) route, it may be the only viable option, given the lack of genetic resources at our Universities.

# Awareness and Targeted Conservation Intervention:

Of extreme importance is the continuation of the awareness programmes to ensure that human leopard co-existence is fostered. Going hand in hand with this, we feel that targeted conservation action such as snare removal and reduction, increase in habitat available to leopards and protection of movement corridors are vital next steps to this work. We aim to work in conjunction with Wildlife Department, Estate Management and community level actors to achieve this.



# 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?

The RF logo was used in all of our reports submitted to the relevant government institutions as well as to other funders. It is displayed on our website as well (<u>http://www.wwct.org/support.aspx</u>). A large poster depicting our research results in Wilpattu National Park which is to be placed at the park entrance office carries the RF logo. We have given publicity to RSGF via numerous public talks and media articles both local and international that all mention RSGF as a funder of this ongoing work (e.g. <u>https://news.mongabay.com/wildtech/2016/09/leopards-and-landmines/</u>). Visitors who are guests at Resplendent Ceylon's luxury TeaTrails boutique bungalows visit the Research and Conservation Station based at Dunkeld Estate which is where our Peak Wilderness area project is housed. They are given a short talk on our ongoing work and mention of our funders are made. Future publications stemming from this work will acknowledge RSG funding explicitly.

# 11. Any other comments?

In many instances once projects get completed, follow up can be difficult and long term sustained action is rare, due often to lack of funds, long term goals and presence of project personal. As this RSG supported a particular project component that was a part of a long term ongoing research and conservation initiative of The Wilderness & Wildlife Conservation Trust I feel that we can aim to ensure that long term goals be achieved. I am confident that the work successfully undertaken here will translate into long term conservation for the Sri Lankan leopard and the habitats within which it resides.

Thanks to Rufford for enabling this important work to be initiated and conducted.