

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

Your name	Kathryn Scobie
Project title	The sleeping site ecology and habitat use of the southern woolly lemur (<i>Avahi meridionalis</i>): effects of habitat disturbance and implications for conservation
RSG reference	13747-1
Reporting period	12 months
Amount of grant	£2000
Your email address	kascobie@gmail.com
Date of this report	June 2015

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
<i>H. meridionalis</i> habitat requirements and population density.	X			A number of forest fragments originally targeted for use in the study were considerably more degraded than available records had indicated and were uninhabited by lemurs. As such these fragments were not included in the study. Of the eight fragments which were included, <i>H. meridionalis</i> were present in only two. Such a small sample size would provide insufficient data for meaningful statistical analysis and so this species was excluded from our investigations.
<i>A. meridionalis</i> habitat requirements and population density.			X	We successfully collected structural and vegetational data on the species' daytime resting sites and on areas of the forest used at night when individuals are active. We also performed nocturnal line transects, recording sightings of groups and individuals, allowing us to then calculate population densities.
Factors affecting avahi population density.			X	We successfully collected data on a number of ecological variables within different forest fragments, together with population densities of Avahi in the same fragments, from which we are able to see which variables influence Avahi population density.
Scale of logging in the area.			X	Collected both qualitative and quantitative data on logging and habitat disturbance in eight forest fragments in the area.
Effect of logging on forest structure.			X	Forest fragments were characterised according to a number of structural and vegetational variables. We were then able to identify any correlation between forest structure and logging pressure.
Interviewing local	X			Following preliminary discussions with local

<p>people to record perceptions of lemurs and attitudes towards hunting.</p>			<p>people we felt that a significant proportion of responses were inconsistent and/or unreliable. Other researchers have commented on the difficulty of getting reliable responses during such interviews, particularly when interviewers are not Malagasy. Unfortunately, owing to a limited time frame we were unable to train local people to conduct interviews. As a result we chose to exclude interviews from the study.</p>
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2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

The proposed focus for this project was to identify the influence of habitat degradation on populations of both Avahi and Hapalemur, by comparing the ecology of these species living in fragments of varying quality. However, once work began in Sainte Luce and Mandena it became apparent that there are far fewer viable forest fragments remaining than anticipated; to continue to try to categorise fragments in this way would give too small a sample sizes to allow for accurate statistical analysis. With fewer fragments to work in, I decided with my supervisors to focus on the correlation between Avahi density and other metric variables within the remaining fragments. Unfortunately Hapalemur are only found in two of these fragments and so the focus of the project has shifted towards the Avahi with additional emphasis on quantification of logging pressure.

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

We have calculated the population density Avahi within the study fragments. Comparing our results with data collected by researchers in previous years, we can see that the population density is decreasing in all fragments. We have also been able to quantify the negative effect that selective logging and timber exploitation has on their population density, concluding that such fragments are of limited value to the species. This highlights the urgent need to further investigate the behaviour and ecology of this species, to allow us to establish more effective and targeted conservation measures in these forests.

We have been able to identify a number of habitat features which appear to be important for the survival of the species, including canopy cover, tree density and the crown diameter of sleeping trees. In addition, we have made the first recorded observations of *A. meridionalis* using man-made forest and eucalyptus plantations. This information will be used by Rio Tinto/QMM in their rehabilitation projects in Mandena and Sainte Luce, to ensure that the restored habitat will be of value to the species.

We have been able to quantify logging pressure in the region by individual fragment and identified that the current logging restrictions are ineffective. Furthermore, we have confirmed that illegal logging persists in even the protected fragments; more worryingly, we received a number of reports that illegally obtained timber is being exported to Fort Dauphin and perhaps even further afield; this was reported to and discussed with local protected area managers (Rio Tinto/QMM and Missouri Botanical Gardens). Plans are now in place to amend the local DINA and enforce stricter penalties for illegal cutting and exporting of timber.

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

Guides and camp staff (cook, day guard, and night guard) were employed from communities local to the various project sites. We were always accompanied in the forest by local guides, and recently-trained ecotourism guides from the community in Sainte Luce benefitted from additional training in basic research methods. Furthermore, guides who were not yet qualified were able to shadow our work, which contributed to their formal training.

Local communities also provided valuable information relating to past and present use of the forest, as well as their concerns and predictions for the future. The perspective of the community must be taken into consideration when developing any *in situ* conservation measures and so their involvement in this project was invaluable. The involvement of local communities was therefore invaluable to this project.

5. Are there any plans to continue this work?

Results from this study have been shared with ONG Azafady (working in Sainte Luce) and with Rio Tinto/QMM. Rio Tinto/QMM have identified the Avahi as one of their priority species for conservation, and the results of this study will be used in the ongoing conservation and post-mine rehabilitation efforts of their biodiversity team.

ONG Azafady's conservation team will continue to monitor the population density of *A. meridionalis* within a number of fragments in Sainte Luce. In addition, following our discovery of a pair of Avahi within the unprotected fragment S6, ONG Azafady have begun developing plans to extend their current research to include this fragment.

I will be continuing research on the response of Avahi to habitat disturbance, this time studying the population of eastern woolly lemur (*Avahi laniger*) at Ambatovy. Here, an open pit nickel and copper mine is set to remove approximately 1,366 ha of eastern mid-altitude forest. We will be comparing the home range and habitat use of *A. laniger* in the fragmented and disturbed forest at Ambatovy with that of populations living with the intact forest of neighbouring Mantadia National Park. Individuals will be tagged using GPS collars, allowing us to record their ranging behaviour as well as perform detailed behavioural observations. In

particular, we plan to build on the observations of the current project by recording the use of man-made and restored habitat by *A. laniger*.

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

Results have so far been disseminated to all relevant in-country stake holders (Rio Tinto/QMM, ONG Azafady, Missouri Botanical Gardens, and the University of Antananarivo). Results will also be submitted to a number of relevant peer-reviewed journals for publication (e.g. Lemur Review, Ecology, Primates, American Journal of Primatology).

7. Timescale: Over what period was The Rufford Foundation grant used? How does this compare to the anticipated or actual length of the project?

Field work took place over three months, between April and July 2014, as anticipated.

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
Food for research team	1000	1080.00	+80.00	Food for three members of research team, guides, and other camp staff; £2pp/day for 90 days
Malagasy student salary	200	487.80	+287.80	20 000 MGA per day for 90 days
Salary for guides, guard and cook	700	860.25	+160.25	Local salaries were 5 000 MGA for day work, 10 000 MGA for night work
Roundtrip London-Antananarivo	800	730.59	-69.41	
Roundtrip Antananarivo-Fort Dauphin for principal and local researcher	300	543.98	+243.98	My flight cost 300.00; the flight for Mirana, our local researcher, cost 234.98 due to a residential discount; additional luggage cost 9.00
In country travel	500	357.50	-142.5	Six 4x4 journeys to/from field site

				required at 50.00 per journey; taxis in town and camion journey to study site 57.50
Canoe hire	150	47.50	-102.50	Canoe rental with boatman
Accommodation in Antananarivo	100	42.50	-57.50	
Camp site in Tolagnaro	50	173	+123	Unable to stay at camp site so had to use local hotel
GPS	150	264.84	+114.84	x2 required as work was carried out in two teams; Garmin eTrex 20 model
Internet and printing	150	32.50	-117.5	Printing (internet costs included with 'Mobile phone and credit')
Research material inc. camera, laptop, binoculars	500	653.53	+153.53	Recorder (113.77); MP3 players x2 (90.00); binoculars x2 (105.24); USB cable (1.99); cameras x2, speakers x2, SD cards x2 (149.90); delivery (6.65 + 10.98); laptop (175.00)
Expedition kit inc. tents, head torches, batteries	500	442.89	-57.11	
Research permit	500	0	-500	Handled by contacts at University of Antananarivo
Visa	45	45	0	
National Park entrance fees	30	31.25	+1.25	
Use of field stations	500	56.50	-443.5	Contribution to staff costs
Medical equipment and insurance	330	341.77	+11.77	First aid, vaccines, malaria prophylaxis (328.77); insurance (13.00)
Mobile phone and credit	150	207.30	+57.3	Mobile phone (10.00); credit/calls inc. internet

				(197.30)
Total	6655	6398.70	-256.30	Exchange rate GBP 1.00 = MGA 3690.00

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

I think it is important to fully investigate the use of man-made forest by this species. In some deforested areas, plantations have been used as a source of wood for local communities and studies have found that, when correctly managed, plantations can extend the habitat available to lemurs. Where plantations connect small isolated forest fragments, they can serve as corridors thus reducing the danger of extinction for isolated primate populations. During the fieldwork phase of the previous project, *A. meridionalis* were observed using secondary forest within the Mandena Conservation Zone, and particularly surprising were repeated observations of pairs using *Eucalyptus* sp. Although these sightings were recorded and the microhabitat surveyed, observations within these habitats were spontaneous and unfortunately provide insufficient data for meaningful statistical analysis. Understanding Avahi's use of man-made forest would enable us to manage corridors and plantations in such a way as to extend the range of habitat available to this species.

I also feel it would be of huge benefit to collar a number of individuals using GPS collars. This would allow for a much more detailed behavioural study and also would enable us to examine the species' ranging behaviour.

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 Rufford Foundation logo was used in a number of presentations made to organisations including the University of Bristol, the University of Antananarivo, and Rio Tinto/QMM. The Rufford Foundation will receive acknowledgement in any scientific publications resulting from the current study.

11. Any other comments?

A grant from the Rufford Foundation was vital in allowing us to carry out this project, which has provided much-needed insight into the ecology of an understudied and endangered species. Due the rapid and extensive habitat loss currently taking place within the species' already-limited range, the need to better understand the habitat requirements *A. meridionalis* is an urgent one. The results of the present study will be used to influence reforestation and rehabilitation initiatives in the region, ensuring that *A. meridionalis* benefit from these measures.

This project also gave the entire research team an opportunity to improve and develop our skills in conservation research, and share our experience and passion with others. Since



completing fieldwork, Mirantsoa Andriamandrosonotahinjanahary, who joined me as a postgraduate research assistant from the University of Antananarivo, has since completed her Masters studies with a thesis on habitat degradation in the south-eastern littoral forests. Laurie O'Neil, a second research assistant, has since gone on to begin a PhD with Max Planck Institute of Ornithology.