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. 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. 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	Sze-Wing Yiu
Project title	Conservation ecology of wildlife reintroduction: Managing species and habitats in a newly established reserve in South Africa
RSG reference	13035-1
Reporting period	January 2014-January 2015
Amount of grant	£5464
Your email address	cwingyiu@hku.hk
Date of this report	05/03/2015

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
Monitor post-release survival of reintroduced lions and elephants			✓	Three of the 11 reintroduced lions were killed by the dominant male group within the first season of release. These interactions were critical in our understanding of behavioural and home range dynamics of the newly introduced lion. This however did reduce our initial sample size. But new dynamics were introduced with the introduction of three females later in the study.
Identify home ranges of reintroduced lions and elephants and factors affecting their home range establishment			✓	Satellite collars were provided by the Dinokeng management association and we were able to extract and use four locations per day for each animal, which were adequate for home range analyses.
Identify environmental variables that best predict occurrence of reintroduced lions and elephants and are important for habitat management			✓	The objective was fully achieved. Both lions and elephants were found to have a higher probability of occurrence in areas close to water sources and away from human settlement. Lions were also found to prefer riverine vegetation and floodplains while elephants prefer areas with greener vegetation.
Quantify predation risk in different areas in the reserve			✓	We have identified areas that covered the home ranges of lions as high predation risk zone while areas not used by lions as low predation risk zone. Vigilance behaviour of prey was then compared between the two defined zones.
Quantify and compare vigilance behaviour and movement of wildebeest and zebra under different predation risk		✓		We have completed data collection and analyses on vigilance behaviour. However, the study on wildebeest and zebra movements has not been completed due to unexpected technical difficulties (see section 2).
Quantify effects of elephant's reintroduction on vegetation and bats community			✓	We have quantified elephant impacts on vegetation and found a positive correlation between elephants and bats activity. However, the impacts of vegetation changes on bats will need further investigation for a solid conclusion.
Presentation of results to local communities, management association and scientific communities		✓		Presentations have been given to landowners and study results were presented to the management association. Results on the carnivore reintroduction will also be presented in a scientific conference in March 2015 and we are currently preparing an article for submission to peer-reviewed scientific journal.

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

As mentioned above, we encountered technical difficulties in collecting GPS locations of the wildebeests. We have ear-tagged five wildebeests with GPS-UHF loggers manufactured by Ecotone Telemetry in order to assess the impacts of predator reintroduction on prey movements. But we were unable to establish the download link between the loggers and the base-station that is used for downloading the GPS location data stored in the loggers. Several strategies were used in our attempts to download the data including approach on foot, from vehicle and deploying the base station in field for several days, with no success. Other research teams using this logger have also encountered the same problems. We have been consulting the country representatives for Ecotone and they are currently examining one logger that was retrieved from a wildebeest. Therefore, this part of the project cannot yet be completed before the data is retrieved.

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

i) We found that reintroduced lions and elephants took more than a year to establish a stable home range after released and human disturbances and intra-specific interactions were the main factors affecting their home range establishment process and space use. It has provided a new angle in spatial ecology of reintroduced animals as the process of establishing a stable home range by reintroduced animals was rarely addressed in previous studies. A stable home range is critical for fitness and survival because it is closely related to the quality and quantity of resources an animal can acquire.

ii) We confirmed that reintroduction of lions have resulted in a 'landscape of fear' that altered prey behaviour. Zebra and wildebeest both have higher vigilance behaviour in high than low predation risk area. An increase in vigilance behaviour represents a trade-off in foraging time, which could affect long term fitness and survival of the prey. The quantification of predation risk and prey response in our project thus has provided insights on potential implications on the effects of large predator reintroductions.

iii) We found that increase in elephant activities was associated with an increase in breakage of trees and bark stripping. This has been related to an increase in bat activities of particular foraging guilds. Although the direct cascading effect of elephants on bats will need further investigation, vegetation structure were closely linked to overall bat activities and vegetation structure might be increasingly homogenised by elephant activity over time.

Summarizing our findings, we did not find extensive adverse effect of lions and elephants' reintroductions on species and communities, but results suggested that long-term post-release monitoring is critical for reintroduction success.

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

Our study site is comprised of lands owned by more than 250 landowners, of which the majority of them reside in the reserve. To introduce our project to the communities, we have given presentations during a landowner meeting and in the local school at the township outside the reserve. Participation in the community programs organized by the one landowner at a ecotourism lodge has allowed us an opportunity to communicate with the local people and promote conservation. A news article, introducing the research team and the project was also printed in the regional Dinokeng Newsletter.

Over the year, we have established links with the major landowners who were actively involved in the conservation group and the management association of the reserve and they have helped with our data collection by reporting sightings of the reintroduced lions and elephants. Home range maps of the reintroduced animals were sent to the management association every three months so that they were informed of any changes in space use pattern of the reintroduced lion and elephant, which facilitated management decisions.

5. Are there any plans to continue this work?

Yes. Our work is still on going at this moment. Based on the results we have to date; we are now collecting data on the foraging behaviour of zebra and wildebeest and have sent their dung samples for faecal nitrogen analyses. Faecal nitrogen percentage is often used as an indication of diet quality, with higher percentage indicating better quality, while a better diet quality leads to an increase in individual fitness. Together with the results of an increase in vigilance behaviour of wildebeest and zebra in high predation risk zone, we are planning to quantify the trade-off between vigilance and foraging and its effect on prey fitness. By doing so, we will be able to draw a solid conclusion on the effects of lion reintroductions on predator-prey dynamics.

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

Preliminary results have already been shared with the management association. A detailed report will be written and sent to the association upon completion of the project and summary will be sent to the newsletter of the reserve to share with all landowners.

We will present our work in the annual savannah science network meeting held in Kruger National Park in March 2015. Both scientists and wildlife managers from various institutions and NGOs will attend the meeting, therefore a good opportunity to share our results and get valuable comments on the project.

We are also in preparation of two articles to be submitted to peer-reviewed scientific journal. We aim to publish at least three articles when all our work is finished.

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

The grant was used from March 2014 to January 2015 which stayed the same as the planned and actual length of the project.

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
Nikon Coolshot 10-550m Range Finder	140	175	35	Cost had increased between proposal submission and receiving the grant
Garmin GPSmap 60CSx	200	225	25	
9 m mist-nets	74	74	-	-

Wildebeest and zebra GPS ear tags	2500	2500	-	-
Petrol for field work	2000	2095	95	Due to unexpectedly high sensitivity of wildebeests and zebras to our vehicles their excessive fleeing behaviour, extra fieldwork days were needed for data collection
Hiring of armed ranger for fieldwork on foot	550	550	-	-
TOTAL	5464	5619	155	

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

We have learnt from our interactions with the landowners that, it is important to strike a balance between conservation and tourism. Tourism is usually the major purpose of privately owned reserve and reintroduction of iconic species in these reserves in South Africa, including our study site. However the involving parties are often lack of an understanding that uninformed management decisions without consideration of the ecology of the reintroduced animals and the whole ecosystem are destined to reintroduction failure, which would eventually reduce the benefits they could get from tourism. Therefore, it is important that we maintain communication with the management association so as to incorporate scientific background in their management decisions such that both conservation and tourism can be facilitated. Publication of our results is also important so that experiences can be applied to other small reserves with similar setting.

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?

The RSGF logo has been used and the foundation has been acknowledged in all presentations to the local and scientific communities. We are still in the process of preparation but the RSGF will be acknowledged in all articles we plan to publish and the student thesis of the project.

11. Any other comments?

We would like to express our sincere gratitude to the Rufford Small Grants Foundation for supporting our project, without which we would not be able to complete our work. Your support has not only enabled an advance in knowledge in reintroduction ecology but has also provided us an opportunity to build bridges to the local communities and wildlife managers that has facilitated the promotion of conservation in the area. Thank you very much again for your contribution to the project.