

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	David Gary Marneweck
Project title	Ecology of an inverse density dependent canid: a case study of the African wild dog (<i>Lycaon pictus</i>) meta-population in KwaZulu-Natal, South Africa
RSG reference	14409-1
Reporting period	January 2014-January 2015
Amount of grant	£5946
Your email address	davidmarneweck@gmail.com
Date of this report	06/02/2015

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
Investigate variation in demographic patterns of a small stable population compared to its growth			✓	The historic database was successfully cleaned and inserted into a usable format with the most current data. All data were tabulated monthly yet analyses were run per dog year (period from the middle of the year at the start of one breeding season to the next). A population growth function revealed that the wild dog population in Hluhluwe-iMfolozi Park has not increased exponentially but rather has remained relatively stable with a growth rate of 1% per annum on average over the last 34 years.
Compare the historic versus current feeding ecology of a small enclosed meta-population		✓		The kill records for the reserves were received and although there were gaps in this database, the general pattern emerged that nyala and impala were the main prey items killed historically. As for the current kills, not enough scats were collected during the year to make valid inferences nor were enough actual kills observed. The unexpected difficulty was that during the denning season, den sites were located far off tourist and management tracks making 4 months of the year very difficult to locate fresh scat samples and to observe actual kills. Additionally, the difficulty in locating wild dogs daily played a part in not obtaining enough scat samples. With the addition of another year for data collection, that could change and the sample size increased.
Investigate spatial ecology of wild dogs by determining variation in spatio-temporal dynamics in home range size, ranging patterns and habitat selection			✓	Accurate and precise satellite collar locations in addition to opportunistic and tracked sightings allowed ~1200 fixes per pack for the year (more than enough data to make valid inferences. With pseudoreplication (data not temporal separate) removed from consecutive data points, this revealed approximately 600 usable fixes per pack allowing in depth home range size, use and habitat use patterns to be determined for each pack. Preliminary analyses have shown that wild dogs in fenced reserves use similar size areas to one another for both core and outer ranges. Additionally, the fenced off reserve wild dogs

				utilise the same amount of space as those in larger unfenced areas in Africa. Undoubtedly, the fitment of satellite collars on the packs made it substantially easier and quicker to obtain substantial accurate location data that would not have been possible with just standard VHF collars fitted.
Test optimal foraging theory in carnivores using wild dogs as a model		✓		Firstly, seven of the nine packs of wild dogs denned last year, with three packs' collars not working for all or a portion of the denning season. This was due to: (1) a battery pack being kicked off one of the satellite collars during hunting causing it to stop functioning; and (2) malfunctioning collars. Of the five remaining packs that were collared with data transmitting throughout the denning season, one of the packs did not den due to the death of the alpha female immediately preceding the denning season. This meant that denning season spatial data was only available for four packs in the KZN metapopulation. Additionally, the last pack did not have a collar on them during the denning season due to veterinary concerns of the potential negative effects to the pack if another immobilisation event was attempted on them. The decision was made by the park vet to not immobilise just in case. This problem, along with a pack not denning and malfunctioning collars for a portion of the denning season were unforeseen and have resulted in not enough spatial data being collected for this objective. Another denning season worth of data will provide enough information to address this objective fully with a solid and valid sample size.
Address the implications of these results for the conservation and management of an endangered, density dependent and obligate cooperative breeding carnivore using wild dogs as a model in endangered species recovery			✓	Data was used in three Wild Dog Advisory Group of South Africa (WAG-SA) and four KwaZulu-Natal Wild Dog Advisory Group (KZNWAG) meetings to help with both understanding the historical and current drivers and ecology of the KZN wild dog metapopulation. The data was also used to understand that the space use of enclosed wild dogs doesn't differ to free-roaming ones. Most importantly, a rash management decision based on a knee-jerk reaction to a perceived burgeoning wild dog population in Hluhluwe-iMfolozi Park (HiP) was easily and quickly reduced with current and accurate data analysis from the previous

				objectives. This resulted in the park management rescinding their decision to remove three packs of wild dogs from HiP, thus allowing this provincially and nationally fundamental population to persist and thrive with reduced management interventions. This is particularly important when dealing with a species brought dangerously close to extinction by human persecution.
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2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

An unforeseen problem was the malfunctioning of satellite collars. As soon as possible after these collars malfunctioned, they were replaced although during the denning season that proved difficult due to the packs denning in area far away from both tourist and management roads (no off road driving permitted). Additionally, one of the packs did not den which meant objective 4 could not be met for all packs entirely; the reproductive behaviour of African wild dogs was out of my control and I could not rectify the issue of a non-breeding pack of wild dogs. Finally, the difficulty in tracking down wild dogs that are highly mobile and utilise a large area was underestimated resulting in fewer than expected scats collected and kills observed. I tackled this by getting tourists and additional park staff to report sightings and/or kills and to increase my effort in tracking the packs down (spending an unforeseen extra 2 months in the field). However, this did not significantly increase the success of locating wild dogs and I predict that this is due to their naturally elusive nature and existence in low densities.

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

- Given the first in-depth understanding of wild dog space use in the denning season at such a high resolution (albeit for just four packs of wild dogs).
- Allowed the reserves to accurately locate gaps in their historic databases regarding wild dog info and how best to go forward with collecting accurate and relevant data for the future.
- My data was used to inform reserve management that the population is neither saturated nor burgeoning. This helped to mitigate the idea to remove wild dogs from the reserve.

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

The packs of wild dogs often broke out of reserves in their attempts to both increase the area of their ranges and when fleeing competition from surrounding packs or lions. This then resulted in packs utilising communal land adjacent to protected areas, forcing them to come into contact with local communities. These communities benefitted in that we temporarily “employed” young men to help us locate the wild dogs and push them back towards the park with an extended line.

Additionally, the wild dog monitor for the park is from a neighbouring community and he benefitted from the project in that he was paid for helping me to walk in and locate breeding dens after the packs left their breeding dens. This experience has also helped to be able to locate exactly where potential den sites could be in the future for the same packs of wild dogs.

5. Are there any plans to continue this work?

Yes, the plan is to continue this work. As stated in sections 1 & 9, extra data is needed to fully address objectives 2 (prey selection) & 4 (testing optimal foraging theory) with a valid sample size. Additionally, after my reports at the WAG-SA meetings, there is the possibility of extending objective 4 to a comparison between the fenced KZN metapopulation vs. the open Kruger wild dog population. This would add to the objective to see if there are underlying impacts from the fence on foraging during the denning season in KZN that the Kruger population may not experience during the denning season. An extra season of data collection will also give another year for the demographic population projection analysis (objective 1) and for the spatial ecology analyses (objective 3).

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

Firstly, preliminary results were shared at the South African Wildlife Management Association (SAWMA) 2014 conference in Port Elizabeth, South Africa and Ezemvelo KZN Wildlife (EKZNW: provincial environmental organisation) annual symposium in Howick, South Africa. I intend to present final results later in 2015 through both local (SAWMA 2015 & EKZNW annual symposium 2015) and international conferences (Behavior 2015), which is a great way to share my results. Additionally, findings are being reported at the quarterly national and provincial wild dog advisory group meetings (WAG-SA & KZNWAG respectively) and will be reported during 2015 too. Also, the findings will be presented at the Southern African Rufford's Conference in Cape Town, South Africa from 15-17th April 2015.

Finally, the results will be written up as both my PhD thesis and into four or five individual peer reviewed publications.

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

The period of this RSG was from January 2014 – January 2015. However, in hindsight, this period was not enough to accurately count neither the current prey taken nor the space use around den sites. The project will have to continue to increase the sample size of those objectives of the project to make valid inferences on both prey preferences and optimal foraging theory.

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.

Amounts converted from South African Rand (ZAR) to British Pounds Sterling: £1 = 17.13 ZAR

Item	Budgeted Amount	Actual Amount	Difference	Comments
Travel (to sites and field work)	4069	3984.82	+84.18	Slightly less time for tracking using the vehicle when inclement weather is around or if tourist sightings helped to locate wild dogs quickly.
Accommodation	936	1208.41	-272.41	Required to be in the field for the entire year to increase the amount of data collected. Rate was increased after financial

				year (April –December) from the estimated R50 to R60 per night for 345 days (not the initially budgeted 300 days).
GPS unit	224	210.11	+13.89	Fluctuation in exchange rate. Online price different from store price.
Binoculars	343	280.16	+62.84	Fluctuation in exchange rate. Online price different from store price.
Game Guard	374	175.13	+198.87	Only needed 30 days to ground truth den sites (not the budgeted 60 days) accurately.
TOTAL	5946	5858.63	87.37	

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

Undoubtedly, the next important step is to increase the sample size on both the prey selection objective and an additional denning season field period. With collar malfunctioning and a target pack of wild dogs not breeding last year, the sample size is not good enough to make valid scientific inferences yet. Therefore, a continuation of the work to increase the sample size would be relevant and necessary for a stand out scientific study. Additionally, this would benefit objectives already completed too, as another season of data collection would add extra data to the monthly demographic resolution and to the space use by wild dogs.

Finally, more in depth analyses regarding objectives 1, 3 & 5 to make them ready for peer review (not just preliminary analyses) would be good so as to wrap up those objectives so that I can focus on the remaining two uncompleted objectives.

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, the logo was used in two conference presentations: SAWMA 2014 and the annual EKZNW Symposium 2014. No, RSGF did not receive any publicity during the course of the year.

11. Any other comments?

I plan to apply for the 2nd Rufford Small Grant when I am eligible (if this report is deemed satisfactory) to continue this work with regards to completing objectives 2 and 4.

