

## The Rufford Foundation

### Final Report

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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](mailto:jane@rufford.org).

Thank you for your help.

**Josh Cole, Grants Director**

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Grant Recipient Details	
<b>Your name</b>	Ana Rita Caldas Patrício
<b>Project title</b>	Impacts of Climate Change on West African Green Turtles
<b>RSG reference</b>	12317-1
<b>Reporting period</b>	15 July 2013 to 15 June 2014
<b>Amount of grant</b>	£5438
<b>Your email address</b>	<a href="mailto:R.Patricio@exeter.ac.uk">R.Patricio@exeter.ac.uk</a> , <a href="mailto:anaritapatricio@hotmail.com">anaritapatricio@hotmail.com</a>
<b>Date of this report</b>	9 July 2014

**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
Train IBAP staff on specific field activities			X	Park wardens and technicians collaborated in all field activities, used all field equipment purchased for this project and worked in separate teams when autonomy was achieved
Involvement of local community			X	14 young men from the Bijagós actively participated in the project during 3 months and were paid a stipend for the time of collaboration
Investigate nesting distribution and consistency on nest site selection		X		Nest characteristics were recorded in 539 nesting occasions and a map of nesting distribution was created. Also, 200 nesting females were tagged and 69 of these were later re-sighted nesting. However, more observations are needed to fully understand the consistency of nest site choice and the effects of some variables in nest site selection, previously unstudied, e.g. tidal effect, sand type, moist of sand.
Evaluate consequences of nest site to hatchling sex-ratio and fitness			X	We deployed temperature data loggers inside 54 nests and found that: 1) nest elevation was determinant for clutch survival; and 2) Poilão has a high potential for producing male hatchlings which will become even more important in the advent of predicted increasing temperatures
Model nesting environments under future global warming scenarios		X		Important data were collected on nest temperatures, sand temperature and air temperature to be use in models of global warming impact. However we need more data to increase model robustness and quality of estimates.
Estimate impacts of predicted sea-level-rise (SLR)		X		Same as above, plus in the coming season we will try a different method to measure nesting habitat elevation above mean sea level for more accurate estimates of SLR impacts.

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

I could only start field work in September 2013, due to logistical constraints in Guinea-Bissau, therefore important data were not collected during August 2013, one of the peak nesting activity months in Poilão. I will therefore collect these data during the 2014 nesting season.

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

- 1) The involvement of local community was undoubtedly one of the highlights of this project; the feedback from the young people after they collaborated with us, their families, friends and neighbours, was overwhelming. They are truly proud of their biodiversity and interested in halting any illegal activities against it, and keen to report these. In particular the younger generations are truly interested in collaborating with the IBAP in the management of the protected areas.
- 2) The dissemination of this project, acknowledging the importance of Poilão Island for the conservation of the green turtle at an international level: oral communication at the International Symposium for Sea Turtle Conservation and Biology, held at New Orleans, April 2014.
- 3) Some very important and novel results of our research already evident are: i) the balanced hatchlings' sex ratios being produced at Poilão, making it a very unique and important area for the Atlantic region; and ii) the connectivity between the green turtle rookery in Poilão and Brazilian and Argentinian juvenile aggregations, found through genetic analyses

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

During the stay in Poilão Island we worked with 14 young men from the village of Ambeno, located in the Island of Canhabaque, Bijagós Archipelago. Traditionally the villagers of Ambeno own the island of Poilão and consider it as sacred soil, only to visit during important social ceremonies. Each of these young men collaborated in the research and conservation work at the Island of Poilão for a period of 2 weeks and was given a stipend for that period. They were trained in all the fieldwork and sampling techniques and in the evenings we had gatherings to discuss conservation issues, sustainability, biology of sea turtles, problems of illegal fishing in the park, and whichever subject was of concern for them and their way of living. These young men will be the future decision makers of their communities. Although the National Marine Park of João Vieira and Poilão is managed by the governmental Institute of Biodiversity and Protected Areas (IBAP) of Guinea-Bissau, the traditional law is very respected, and taken into consideration at the time of rule-making. With the young generations becoming active in the biodiversity conservation work the management of this important protected area will be made in agreement between government and the local communities. (Photo sent in attachment)

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

Yes. Our goal is to go back this year, 2014, for the green turtle nesting season, i.e. August to November, to: 1) collect further data to get better models of climate change impacts on this

population; 2) evaluate the available/potential nesting habitat in the other islands of the National Marine Park of João Vieira and Poilão; 3) access the nesting distribution in these other islands of the Park; and 4) have more local people involved in the project.

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

- 1) I gave an oral communication showing the work conducted, results obtained and the conservation implications and future work at the *International Symposium on Sea Turtle Biology and Conservation*, in April 2014 in New Orleans. <http://iconferences.seaturtle.org/>
- 2) I have prepared a technical report for the Institute of Biodiversity and Protected Areas of Guinea-Bissau (IBAP – GB), so they can compile the achievements intrinsic of this project with their ongoing motorization and present these at regional meetings.
- 3) I am currently working on a manuscript on the sex ratio of hatchlings being produced at this major green turtle rookery at Poilão and expect to submit by the coming Fall.
- 4) A poster presentation has been submitted to the *XIII Iberian Congress of Herpetology*, to be held in Aveiro, Portugal, on 30th September to 4th October 2014: <http://herpe2014.biologiaatua.net/index.php> the first author will be a master student from the Faculty of Sciences of the University of Lisbon, Ana Marques, whom participated in the project in November of 2013.
- 5) I will publish further scientific work on the climate change impacts on West African green turtles; however, I will need further data, to be collected the upcoming field season.

**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 actual length proposed for the project was 5 months, which included 1 month of preparation for field work and 4 months in the field work. I extended the use of the Rufford Foundation grant to obtain materials and reagents for important genetic analyses undertaken between January and April 2014. This was possible as I was able to obtain some of the budgeted items through other source (i.e. MAVA foundation). So the grant was used during a period of 10 months.

**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
Temperature data loggers (30)	2322	2490.72	-168.72	I needed to buy service kits (batteries) for 13 data loggers that I managed to
GPS receiver Garmin (#1)	160	359.96	-199.96	I acquired four units so that guards and volunteers could have hands on use during all field season, each at
Monel tags (#2000) & applicator (#4)	905	405	500	I managed to obtain funding from other source to cover partly this expense (MAVA foundation).
ink spray (#10)	60	60	0	n.a.
Batteries AAA and AA	50	44.8	5.2	n.a.

Abney level (#2)	215	330	-115	I acquired three units instead of two, so that guards and volunteers could use them at different sites after training (each at £110).
Flagging tape (#10)	34	34	0	n.a.
Conductivity probe, Moisture sensor, flash lights, metal detector	272	0	272	These materials were discarded from the project and replaced with other methods.
Measuring tapes	46	42	4	n.a.
Diverse field work supplies	150	302.6	-152.6	Ropes and cords to secure data loggers, wire for hatchlings' collection, sharpies, tapes, writing boards, rain cape, etc.
2 ml screw cap tubes (bag ca. 1000)	75	75	0	n.a.
Head lamps (#4)	60	65	-5	n.a.
Airfare Lis – Biss	1089	0	1089	I managed to obtain funding from other source to fully cover this expense (MAVA foundation).
ASUS vivo tab	0	508.82	-508.82	Since money was save from other equipment I got this essential long life battery tablet to record field data collected, save photos, activate data loggers and download GPS data, during stay in remote island.
PCR reagents	0	340.94	-340.94	Since I saved money that meant to be used in other equipment I applied it in materials for genetic analyses, after confirming by email that I could apply the Rufford budget in this manner.
Sequencing	0	375	-375	Same as above.
<b>Total</b>	5438	5433.84	<b>4.16</b>	

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

- 1) Collect more data in order to create good robust models on the impact of global warming and sea level rise on this population and further available habitat in the neighbouring islands.
- 2) Access the nesting distribution and available/potential nesting habitat in the neighbouring islands.
- 3) Further enhance the capacity of the IBAP park wardens to take measures of beach elevation, and record important nesting site characteristics, so they can include these important parameters in their long term monitoring.
- 4) The impact of hatchlings sex ratio on the viability of sea turtle populations is understudied and not understood. We aim to estimate the sex ratio of reproducing adults from the green

turtle population of Poilão, using genetic analyses, to enter this important population parameter in our models.

**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 has been presented twice in oral communications, one at the Centre for Ecology and Conservation of the University of Exeter, and another at the International Symposium on Sea Turtle Biology and Conservation, in April 2014, in New Orleans. We will further present a poster at the XIII Iberian Congress of Herpetology, in Portugal, and have the Rufford Foundation logo in the poster.

**11. Any other comments?**

I believe that this project can be fully accomplished if I manage to obtain funding in similar amount to this grant. I will submit an application in July 2014 for a Second Rufford Small Grant, hoping to gather the necessary funding to complete this work.

