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	Natália dos Santos Mamede
Project title	Improving conservation of the Guiana dolphin (*Sotalia guianensis*) in a heavily impacted coastal habitat in Brazil.
RSG reference	14000-1
Reporting period	January 2014 to January 2015
Amount of grant	£5,960
Your email address	nataliamamedebio@gmail.com
Date of this report	29 January 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
The investigation of habitat use by Guiana dolphin will show if there are heterogeneous distribution and differential occupation of sites by animals, thus detecting "core habitats" within its range. We plan to identify the existence of these habitats and overlay the expansion of human activities (e.g. building two ports in the region) to promote their conservation.				A total of 86 Guiana dolphins groups were recorded. The observations were performed in all seasons and with calves. The dolphins were more frequently observed during the winter (44.2%), than autumn (23.3%), spring (22.1%) or summer (10.5%). The Minimum Polygon Convex (95%) estimated a total of 37.3 km^2 as the total area used by the dolphins for all seasons and corresponds only 20.9% from the grid. There is less than 1% likelihood that this clustered pattern could be the result of random chance (Observed Mean Distance / Expected Mean Distance = 0.34, Z Score = -11.63 standard deviations). Generalised additive models (GAMs) were implemented in ArcGIS v. 9.3 (using mgcv package in R v. 2.15) for investigating the variables influencing the distribution of dolphins in the study site. The GAM identified 13 variables associated with dolphin presence in the study site (adjusted R-square of 0.29 and 60.7% deviance explained). Guiana dolphins appeared to be strongly associated with bathymetry, turbidity and biogenic areas in most seasons. Encounter rate was higher between 7.5 and 10.7 m, 1.9 on 5.5 m of transparency and reefs. The two ports weren't building in the study area. So didn't overlay the expansion of human activities and "core habitats". Also in the biogenic sediment and biogenic

Organisation of a catalogue of identified individuals				A total of 42 photo-identification surveys were conducted between February and October 2014, totalling 21,159 photographs, of which 540 (2.6%) were graded as excellent for photo-identification of individuals. Guiana dolphins were only found in 20 surveys, and a total of 86 groups were observed. The group size ranged from 1 to 27 individuals (mean = 9.2, SD=6.1). 22 dolphins were recognised through conspicuous long-lasting marks on the dorsal fin. The sighting frequency of these individuals varied between 1 and 6 times (mean= 1.7, SD=1.7).
Estimates of abundance of population				The number of dolphins with long-lasting marks in the population was estimated by Chapman's models using data from 23 individuals, 95% CI = 17 – 29, SD=3.3 and CV=0.10. The proportion of marked animals in the population was estimated (19.3 %) and used to estimate the population size, which totalled 30 dolphins.

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

The project was carried out as planned and no remarkable difficulties were encountered during the study period.

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

The most important outcomes of the project are as follows:

1) The largest documented database for Guiana dolphin sightings along all stations in the study site and in the Espirito Santo state, highlighting the frequent observations of groups in all seasons and accompanied by calves. The use of this area by these individuals is something be emphasised, as it suggests its importance for this population. We can identify the relevance of this area, because they do key activities for survival and maintenance. Not only by the same individuals being seen, as well as the presence of calves and juveniles in all seasons and the feeding behaviour prevailing in this area.

2) The documented high concentration of sightings in the northern region of Benevente Bay. This high concentration suggests a preference for certain areas within the bay by the dolphins. The physiographic characteristics preferred by the dolphins in the Benevente Bay resembles those observed closer to the oceanic features: saltier waters (between 37 to 40 salinity units), lower water temperature (there was little variation in temperature of the surface of the water between the stations, especially considering the minimum and maximum temperatures, 13° to 32°C respectively, preferred by the specie), and less turbidity. The northern portions of the study site seems to be an

important area for the species due to the eco-geographic characteristics (sediment type biogenic and biogenic reefs), and the geographic position which exposes the bay to the discharges of the Anchieta river, and influences on the productivity and species diversity of fish. Studies of habitat selection revealed that Guiana dolphins preferred areas close to shores, and in proximity to fluvial outflows where prey abundance was assumed to be high, which seems to be the case in our study site. Thus, the preference of *Sotalia guianensis* in Benevente Bay for shallow, inshore habitats near river-mouths and reefs could be attributed to the high concentrations of prey items in these areas. The small home-range observed for the species in relation to other coastal dolphins found in this study corroborates previous findings. This fidelity to the "local habitats" along the coast makes it locally sensitive, which might be throughout their distribution. Therefore, the important and preferably the northern part of the bay were evidenced and confirms the occupancy patterns as described for other coastal areas which form small resident communities associated with highly productive rivers mouths, estuaries and bays.

3) The estimation for the total population of Guiana dolphins in the study site. The results suggest that the total population dolphins in Benevente Bay is relatively small compared to other Brazilian populations. For example, the estimated population of Guiana dolphins in Sepetiba Bay (RJ) was 1311 individuals, and 200 to 441 individuals in the Estuary Complex of Paranaguá (PR). So far, we understand this is an area of low density of individuals; however, this population seems to play an important role in the maintenance of the overall population through the whole specie range in the southeast coast of Brazil. Population viability analysis of well known small coastal cetacean species indicates that populations composed of less than 100 individuals have high probability of extinction even when non-natural mortality rates are relatively low. The increase in human activities in the region may pose a further threat to the estuarine dolphin population living in the Benevente Bay.

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

We involve the local communities in our research by hiring community members. During the research it was possible to share about the presence of dolphins (unknown by many locals), concepts of environmental education and cetacean's conservation with these community members. In this first moment, was necessary to know where, when and what the dolphins are. So dedicated all the resources and time to start answer these questions. From that contact has been possible to perceive that there is a strong need for developing future studies involving members of Benevente Bay communities and this help the conservation of this species can be succeed.

5. Are there any plans to continue this work?

Yes, based on the success of the first year of this study, this plan is very realistic. The results about Guiana dolphins in Benevente Bay, are providing the preliminary insights of several important ecological and behavioural aspects, but the information requires a continuity of data collection. The increase of human activities in the region, draw attention to the quality of the bay and the needs of monitoring as well as the rivers that flowing there. The two ports were not building in the study area, yet. Thus, another activity will settle in the region. Chemical and noise pollution have been detected in the bay, thus this population could be under anthropic pressure. Simultaneously the environmental variables collected were done three phenol trials (evaluate contamination by various anthropogenic sources) and the values found between 0.1 to 0.3 mg/l, but the maximum value for total phenols is from 0.003 to 0.06 mg/l, so these values were above the maximum allowed by the law. Further studies are needed to know the consequences of phenol index for aquatic biota,

but it is important to explain the need for such monitoring because is known that phenolic compounds are toxic to the aquatic environment, and can cause the death of fish in 1 mg/l concentrations and lower concentrations, affect other species, and all aquatic ecosystem. As possible that other toxic compounds may be present in Benevente Bay, too.

Continues this work is very important for this population, for all reasons showed, and by the species, which declines in Brazil more than 30% over three generations. So it was categorised as Vulnerable by the lists of Species of Brazilian Fauna Endangered in 2014.

Besides this, along the coastal area of the Espirito Santo state (411 km) this project is the first and only to carry out a monitoring with this effort to study a population of cetaceans.

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

The research result will be published in reputable scientific journals and presented as part of my PhD thesis. The final report will be shared with decision makers such as State Institute of the Environment (IEMA/ Espirito Santo State Brazil). In addition, the coordinator of the National Plan of Action of Small Cetaceans (Institute Chico Mendes de Conservação da Biodiversidade / Ministry Of Environment, Brazil) and IUCN Red List Assessor *Sotalia guianensis* have been informed about the preliminary results of this project.

A lecture showing the preliminary results of the project was presented in University Center São Camilo, Espirito Santo Estate, for biology graduate students.

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

The RSG original plan was to accomplish activities between January 2014 to January 2015. The data collection was carried out between February – October 2014, and the period between November - January was used for data analysis and writing up. The project was accomplished within the proposed time frame.

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.
Local exchange rate 1 £ = 3,91 reais (BRL)

Item	Budgeted Amount	Actual Amount	Difference	Comments
Rent a boat for expeditions (7 rents for season/4 seasons data collection)	5320	5320	0	I rented the boats in the last two seasons more cheap and could double my effort for data collection. I did 42 expeditions in all RSM.
Accommodation rent's (1 rent for season=£160)	640	720	- 80	

TOTAL	5960 (23.329,00 BRL)	6040 (23.641,00 BRL)	-80 (-313,12 BRL)	Additional money has been used in connection with this project from my own funds. The additional money was used to cover other field costs (feeding for all team and transport).

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

The project goal was accomplished very well. The next important steps involve publishing the results in peer-reviewed international journals, and submitting the reports to decision makers.

Further data collection is recommended for increasing the sampling area and further our understanding about the spatial ecology and distribution of the species throughout the southern coast of Espirito Santo State. Under a sampling design adapted to the probably wider distribution of this dolphin in the study area, and the prevailing environmental conditions related with the sightings. The association with photo-id will provide this context estimate the area of life of these individuals. Our aim is to identify areas of critical then importance to support this population the part of an ecosystem based framework Integrates the current level of coastal development. Rooted in behavioural and spatial ecology, but recognising the key aspects of the governmental policies and influence priorities decision making.

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?

Not yet, RSGF logo will be used in all the documents, presentations and publicity material resulting from this study.

11. Any other comments?

I would like to thank Rufford Small Grants for this grant and their contribution to the conservation of Guiana dolphins in supporting the current study; and I want to express my gratitude for having had the opportunity to implement such an important project.