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. 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

Grant Recipient Details	
Your name	Dalia Carolina Barragán Barrera
Project title	The effect of dolphin watching on different bottlenose dolphin ecotypes in Bocas del Toro (Panama): Studying behavior responses combined with genetic structure
RSG reference	11748-1
Reporting period	
Amount of grant	£6000
Your email address	daliac.barraganbarrera@gmail.com
Date of this report	October 10th 2013

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
Create a workshop for the local communities			x	Several talks and workshops were conducted successfully with local communities.
Determine the genetic structure of the bottlenose dolphin population in Bocas del Toro.		x		We collected 23 samples of a population of approximately 150 individuals. Samples were collected at different localities and mtDNA data suggest that this population is genetically isolated from other Caribbean populations. Preliminary microsatellite data suggest there is a low genetic variability in this population. The remaining microsatellite data will soon be analysed.
Determine the behavioural responses of bottlenose dolphins to dolphin watching vessels.		x		We conducted 36 surveys in which behavioural states of bottlenose dolphins were recorded in situations of control (no boats) and in the presence of dolphin watching boats. We are looking into new statistical analysis to overcome the possible pseudo-replication of the data due to overrepresentation of the same pod of dolphins. Nonetheless, preliminary results suggest that dolphins tend to travel more often and engage in feeding less often in the presence of dolphin watching boats.
Determine the acoustic responses of bottlenose dolphins to dolphin watching vessels.			x	We recorded acoustic activity of bottlenose dolphins in presence and absence of dolphin watching boats. We measured the whistle rate and several parameters of whistle structure to determine if there was an acoustic response to boat presence. The results will be submitted for publication in a scientific peer-reviewed journal at the end of the year.

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

During the field trip of 2012 we had a goal to sample at least 30 individuals of the population. Due to weather conditions and repeated sightings of the same pod of dolphins, we were only able to collect

13 skin samples. Therefore, we had to plan a second field trip for the next year in which 10 more skin samples were collected. Another problem encountered was that we did not have enough randomisation in our data as we sighted the same group in our "control" settings, and another group in our "treatment". This issue hindered the comparison between the two. For this, we combined the acoustic data from other years and compared whistle parameters as our independent variables against different treatments of boat presence.

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

a. Our preliminary results highlighted the conservation status for the population of bottlenose dolphins in Bocas del Toro. Our genetic structure analysis gave us insight about the isolation of this population and how it should be considered as a separate conservation unit for future management. We hope that further analysis confirms this in order to be able to make sound recommendations to the regarding the conservations of this dolphin population.

b. We assessed the effect of multiple boats and type of boat manoeuvring on the surface behaviour and communication of dolphins. Our results show that dolphins travelled more often and engaged more in evasive behaviour in presence of multiple boats and 'aggressive' boat manoeuvring. In addition, whistle rate increased as a response to boat presence, particularly when calves were present in a group. These results indicate that dolphin watching is negatively affecting these dolphins. We hope that with divulgation of these results, local authorities ensure adherence to conduct guidelines, promoting less aggressive dolphin watching and thus help protecting this dolphin population.

c. The community of Bocas del Toro showed support and engagement in every outreach activity that was made during our stay. In addition, we got the legal status as a non-governmental organisation (NGO) in the USA under the name of Panacetacea and we are working on the subscription of the NGO in Panama. Four local students and members of the Panamanian Maritime Association (ARAP in Spanish) participated in the data collection. Such participations built a bridge between the Panamanian Government, the university and our organisation.

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

The local communities of Bocas del Toro are an integral part of our project. The local communities greatly depend on tourism as their source of income, and at the same time, dolphin watching is one of the main tourism activities in the island. One of our goals was to increase awareness of conservation issues in the local community by visiting schools and sharing our knowledge about dolphins with the rest of the locals. We were successful in visiting nine different communities of Bocas del Toro in which we had conversations regarding possible management solutions. We also had an "open house" activity at the park of the main town and we gave school materials related to dolphin conservation to five of the schools.

5. Are there any plans to continue this work?

Our future plan includes the establishment of a long-term monitoring programme that will also serve as a training ground for future marine mammal biologists and enthusiasts. Long-term monitoring

programmes require a great effort in the field with numerous visits at different times of the year. To minimise the costs of fieldwork, we want to engage the community in data collection. The idea is to have a group of dedicated and responsible locals who can upload the data directly from Bocas del Toro.

We also wish to continue our involvement with schools and we want to work together with the teachers in the incorporation of dolphin conservation and marine biology in their curriculum.
For the other hand, due the gap of information about genetic structure of bottlenose dolphin in neighbourhood areas, we hope to conduct field trips to get more samples in areas close to Bocas del Toro such as Costa Rica and Panama in order to determine if this population is really isolated or share haplotypes with neighbour population. This information is the key to establish an adequate management plan for this species in this Caribbean area.

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

Our research will result in three manuscripts to be published in peer reviews scientific journals. In addition, we made a press release in the local newspaper, and several posts on our social media accounts (Facebook and Twitter) and webpage (http://www.bocasdolphins.com/). For the other hand, we made a report for consideration of the scientific committee of the International Whaling Commission in Korea during 2013.

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

The funds from RSG were expected to be used during one field collection in a period of a year (during 36 days in 2012). Because of the difficulties encountered in the field and in order to obtain a good sample size, we used the funds for a second field collection a year after the first one (during 10 days in 2013).

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.
(*) Items with * were paid totally or partially with RSG funds.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Flight from Colombia-Panamá (roundtrip)	396	803	407	This value describes airplane tickets for one researcher in her two visits to the study area. The differences in the values are due to the second field trip.
Flight from Puerto Rico-Panamá (roundtrip)	454	454	0	This value describes airplane tickets for one researcher in her one visit to the study area.
Transportation Ciudad de Panamá-Bocas del Toro*	**200**	**439,76***	239,76	This value describes airplane tickets for three visits to the study area. **RSG spent = £ 143,85**

Registration (two people) and permits*	**75**	74,47 + 152,87 = **227,34***	152,34	This value describes the Smithsonian (STRI) registration fee. We included in this item the two research permits fee for the two collection seasons. **RSG spent = £ 227,34**
Food for 60 days*	**1872**	**606,70***	1265,3	This value describes food expenses for the researchers. The differences in the values are due to the extended field collection and the second field collection. **RSG spent = £ 426**
Lodging at Bocas del Toro*	**899**	**811,39***	87,61	This value describes accommodation for the researchers. The differences in the values are due to differences in expected and actual days in the field. **RSG spent = £ 464,74**
Gasoline and Boat captain*	2117 + 983 = **3100**	**2403,21***	696,79	In this item we include boat rental, gasoline and hiring a boat captain because we did one payment to STRI for all. The differences in the values are due to the changes in boat fees by the STRI. **RSG spent = £ 2403,21**
Field equipment	321	321	0	This value describes the equipment we used during fieldtrips.
DNA extraction*	**273**	**252***	21	This value describes DNA extraction kit and tubes. **RSG spent = £ 252**
PCR*	**156**	**213,25***	57,25	This value describes laboratory material such as gloves, PCR tubes and tips used to prepare PCR mix. In addition, we include sequencing expenses, and for this reason, the costs were increased. **RSG spent = £ 213,25**
Microsatellites*	**1372**	**1660,58***	288,58	This value describes the cost of each microsatellite marking and the material required to read them. **RSG spent = £ 1660,58**
Incidentals*	**285**	**209,71***	75,29	We include in this item the costs of local transportation and extra-baggage expenses. **RSG spent = £ 209,71**
Total	**9403**	**8401,94**	***1001,06**	**RSG spent = £ 6000,68**

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

Due to the intense non-regulated dolphin watching activities in Bocas del Toro, it is our next step to establish a long-term monitoring programme that will include the participation of members of the community in data collection. There are still questions to be answered about the biology and natural history of the dolphin population, as well as the biological significance of the human disturbances. One of our main priorities, once the genetic structure of the population is established, is to increase our efforts in the field to accurately estimate the size of the population. To accomplish our goal, we will train local students from the Universidad Marítima Internacional de Panamá to conduct cetacean surveys. Additionally, we would like to maintain a stronger presence in the community by regularly visiting schools and offering talks and workshops to tour operators. We believe that, with the support of the community and the government agencies (ARAP and ANAM), we can contribute to create a self-regulated dolphin watching industry which will benefit the people from Bocas del Toro and the population of bottlenose dolphins.

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 was displayed in several posters and brochures that were distributed in the community of Bocas del Toro in Isla Colón. In addition, it was posted in our webpage, Facebook, and Twitter accounts. The logo was also displayed in poster presentations in two scientific meetings: American Cetacean Society Meeting (San Diego, California) and the 15th Working Meeting of Experts on Marine Mammals from South America - SOLAMAC 9th Congress (Puerto Madryn, Argentina). The RSGF will be displayed in poster presentation in the 20th Biennial Conference on The Biology of Marine Mammals (Dunedin, New Zealand), and it will be mentioned in the acknowledgement sections of all the scientific literature produced by this project.

11. Any other comments?

We would like to thank the board committee of the Rufford Small Grants for providing us with the required funding to fulfill the first stages of our dolphin conservation project. With your support, you are not only helping with the conservation of a possibly endangered population, but you are also empowering young Latin Americans to pursue their careers in science, and engage in conservation issues in their countries. Thank you.