

The Rufford Foundation

Final Report

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.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details	
Your name	Gabriel Melo Alves dos Santos
Project title	Unravelling the biology and conservation needs of the newly described river dolphin, <i>Inia araguaiaensis</i>
RSG reference	
Reporting period	September 2016 – November 2017
Amount of grant	£5,000
Your email address	botogabriel@gmail.com
Date of this report	

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
Determine the movement patterns and home range limits of botos after they leave the market.				
Use acoustic data and surfacing information determine habitat use by associating these variables to behavioural activity.				
Determine whether boto feeding activities are a conservation issue or not. By estimating the proportion of daily food intake from the market and the wild.				
Develop a field programme and interactive material that promotes the involvement of the community on data collection and research.				
Use spatial and acoustic data to make recommendations to the local officials.				

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

A main goal of the project was to learn about the movements and foraging behaviour of Amazon River dolphins when they are not attending market towns. This is important to assess their home range and the degree to which they depend on the market. To do this, we had planned to use suction cup attached sound and movement tags (DTAGs) which have been used successfully on more than 20 species of cetaceans. We were readily able to attach tags to river dolphins when they attended the market. Our difficulty was that dolphins did not allow the DTAGS to remain attached for long periods. Despite attachment attempt over 13 days with five different animals and a range of attachment locations on the body, our longest deployment was 6 minutes on an adult male. The dolphins removed the tags shortly after deployment by rubbing against the river bed or, by one dolphin taking the tag off the dorsum of another. We hypothesise that these reactions to the tags are due to the ectoparasitism of a species of silverfish (a catfish locally known as candiru, *Megalocentor echthrus*), so that botos have a natural reflex of removing the tags. The dolphins did not seem unduly discomforted by the tags and immediately returned to the market after removing one. However, there does not currently appear to be much prospect for longer term deployments using this attachment method.

Due to these unforeseen circumstances we invested our efforts in taking underwater sound recordings with Soundtraps (an autonomous recording system) to characterise the repertoire and echolocation clicks of the Araguaian river dolphin.

This is a critical step to enable acoustic surveys of the river to assess the population and habitat preferences of this new species. We also initialised a photo catalogue of dolphins attending the market in Mocajuba, in which we have identified so far nine individuals using their natural marks comprising four adult females, two young females, a female calf and one each adult male and male calf. We were also able to develop protocols to collect blow samples (for hormones and pollutants) and mouth swabs for molecular identification of individual botos and their associated microbiota, these samples are now being processed. More recently we started trials with a Doppler ultrasound to monitor internal health of these animals and to detect pregnancies. We also are creating a dental photo-identification catalogue which will be useful to identify age classes and possible malformations of the teeth in these new described species, as well as providing an independent check on the persistence of external marks used for photo-identification. In addition, we conducted boat surveys to collect information on botos away from the market, as well as the sympatric tucuxi (*Sotalia* sp.), in these surveys we collected data on underwater sounds, behaviour, group size and composition, geographical location, habitat, tide, and presence of fisheries. These data along with data collected previously are being analysed to build a habitat use model of river dolphins in the Tocantins River.

Even though we could not fulfil our original objectives we were able to side-step the obstacles, taking advantage of the international specialists participating in the fieldwork to create new innovative methods for studying this new species of river dolphins. For example, after processing, the swab and blow samples will provide us with a general picture of the microbiota inhabiting these animals and which of these organisms may be transmitted to or by humans. The recordings obtained with the Soundtraps will allow us to design a larger acoustic survey, allowing us to unravel the habitat use of botos and tucuxis in greater detail and to estimate population numbers using sound.

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

(i) Characterisation of social and echolocation repertoire of botos at the market and in the greater area, (ii) strong media exposure of the issues associated with river dolphin conservation, and (iii) development of lasting partnerships with Mocajuba community leaders.

With the resources provided by the Rufford Foundation we were able to collect important biological information for the Araguaian boto, for example we described the repertoire of social sounds of the animals that visit the Mocajuba Market. Hitherto we identified 79 types of social sounds produced by these individuals, finding that such sounds are not used evenly: only a few types of sound are used often, and these calls might be used to maintain contact between calf and mother. Apart from having a diverse vocal repertoire, the sounds produced by these animals are also complex in structure making them similar to sounds used by orcas and pilot whales. Another defining feature of *I. araguaiensis* sounds is that they are short, this might be related to the complex environments that these animals inhabit; long sounds are more likely to be lost or hampered by obstacles such as sand banks,

vegetation or rocks. We also obtained the first recordings of echolocation clicks from Araguensis river dolphin and found that they have distinctive spectral features that allow us to distinguish them from Tucuxi. This will allow us to conduct larger-scale acoustic surveys to better describe habitat use, potential overlap with human activities and to improve population estimates.

Our project caught the attention of the media giving us an opportunity for exposure on the main TV networks throughout Brazil as well as magazines and newspapers. We were therefore able to reach a very broad audience and create awareness for the conservation issues faced by the river dolphins. We were also contacted by international TV networks, BBC and NHK that will feature botos in documentaries, with the former showing the research conducted in Mocajuba and the unique interaction between botos and humans that occur in the area. See the list of URLs of the interviews on item 10.

The media attention that Mocajuba received on account of the project has enabled us to forge a strong relationship with the local authorities and community leaders. Thus, now Mocajuba City Hall has committed to support some logistics costs for our team when we are in Mocajuba. We are also now asked to participate in issues that relate to river dolphins, For example, in December 2016 we were asked to assist a boto that was injured by locals and in July 2017 we were called to do a necropsy on a boto found dead in the river, all with the support of local authorities. This closer relationship has led to the creation of a bill, in which we acted as guides, to turn botos and tucuxis into natural and touristic patrimonies of Mocajuba, granting these species more protection to ensure their welfare while improving the prospects for a careful local industry in ecotourism. Our efforts with support from Rufford therefore created more awareness in the city for the river dolphins, making the market space cleaner and strengthening the emotional and hopefully economic bond of the city towards river dolphins.

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

The local community and authorities have been involved since the beginning of our study in the area. The support of Rufford Foundation helped our team to strengthen this relationship. Local residents are part of two studies being conducted by our team, one to understand the perception of children about river dolphins and the interrelationship of river dolphins and fisheries, and how these interactions with humans may affect conservation. During our visit to Mocajuba in September 2016 we invited local people using a radio station to join our team in the campaign of International Coastal Clean Up, and with strong participation from local people, we made a clean-up of the Mocajuba river front while also creating awareness of the substantial problem of plastic rubbish pollution in the river. These actions along with the attention of media and support of local authorities transformed the market space, which now is cleaner. Moreover our actions led to a law project that turns river dolphins into natural and touristic patrimony of Mocajuba. Now we are working with local authorities to create programmes that will help to generate income to the local community, for example selling artisanal boto souvenirs for tourists.

5. Are there any plans to continue this work?

Our work in Mocajuba is still ongoing and we plan to continue it in long-term. We are applying for more funding and adding more colleagues to collaborate with new research lines to obtain even more data that are key for the species conservation, for example the study of stable isotopes to access these dolphins diet. We are also working together with local authorities to improve boto's and people welfare in the area. Monitoring this group of boto's in the market and river dolphins along the course of the Tocantins is fundamental to create better conservation strategies.

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

Part of the results of this project were shared to the scientific public in three international conferences: The RT/SOLAMAC (Meeting of Experts in Aquatic Mammals of South America) held in Valparaiso, Chile in November 2016; the Symposium of Animal Communication in Nebraska, USA, July 2017 and the 22nd Biennial Conference on the Biology of Marine Mammals in Halifax, Canada, October 2017. In addition, we are working on papers to be published in peer reviewed journals. Results of our project as well as images taken during the fieldwork were also shared with general public through interviews on TV and in magazines. Moreover, together with local authorities in Mocajuba we are planning to build a small river dolphin museum, close to the area where people interact with boto's, the plans are that this space will feature a complete mounted skeleton of an animal found dead in the Tocantins River (in July 2017), photos of river dolphins from the Tocantins, and videos and sounds with information on the biology of river dolphins and their importance, all in accessible language.

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 grant amount was used from September 2016 to March 2017, mainly supporting the expedition in September and my visit to St Andrews, where I received training to conduct the analysis of the Soundtrap and tag data. Additional funding from our own resources together with the support of Mocajuba City Hall and the Brazilian environmental organ ICMBio and BBC allowed us to make additional visits to Mocajuba in December 2016, January, April, July and November 2017.

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
Hotel (Mocajuba)	1701	1000	701	As we stayed in the field in September for two weeks

				we had some leftover resources that were relocated to support my visit to St Andrews.
Boat (Mocajuba)	924	600	324	
Car fuel (Mocajuba)	132	150	18	
Food (Mocajuba)	1247	750		
Bus tickets, ferries (Mocajuba)	624	300	324	
Belem-St Andrews (plane tickets -round trip)	990	1000	110	
Housing (St Andrews)	-	400		
Daily Costs (St Andrews)	-	1200		

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

With Rufford support we have made a great initial step in Mocajuba and it is now critical to maintain and expand scientific, political and community attention on this and other key sites for river dolphins in the region. Mocajuba represents an excellent opportunity to build a sustainable river dolphin's conservation programme and a showcase to inspire other communities. We can show that these dolphins shrouded in myths are actually docile and intelligent and not evil as some local communities perceive them. Also, this area gives us a great opportunity to learn more about the biology and conservation threats of such an unknown species. Therefore, we aim to add more research lines to our study including the study of diet, population numbers, and health assessments and to create strong stake-holder linkages for effective conservation actions.

10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did The Rufford Foundation receive any publicity during the course of your work?

During the project we produced two t-shirts layouts containing the Rufford Foundation logo in a prominent position. These were used by the team in every action conducted in Mocajuba since September 2016 and in all interviews given by the team. Below is a list of URL's to the interviews videos, articles in websites and magazines:

<http://g1.globo.com/hora1/videos/t/edicoes/v/especie-de-boto-recem-descoberta-e-estudada-por-pesquisadores-da-ufpa/5282172/>

<http://g1.globo.com/pa/para/noticia/2016/09/expedicao-de-pesquisadores-grava-conversas-entre-botos-no-para.html>

<http://g1.globo.com/pa/para/e-do-para/noticia/2016/09/pesquisa-analisa-comportamento-e-comunicacao-de-botos.html>

<http://amazonia.org.br/2016/09/expedicao-de-pesquisadores-grava-conversas-entre-botos-no-para/>

<https://ww2.ufpa.br/imprensa/noticia.php?cod=12044>

<https://www.organicsnewsbrasil.com.br/meio-ambiente/ecologia-biodiversidade/pesquisadores-gravam-conversas-entre-botos-no-para/>

<http://www.portalcultura.com.br/node/47880>

<http://www.beiradorio.ufpa.br/index.php/2016/79-134-dezembro-e-janeiro/124-eles-os-botos-de-mocajuba>

<https://ww2.ufpa.br/imprensa/noticia.php?cod=12090>

<http://www.ormnews.com.br/noticia/mocajuba-quer-salvar-botos>

<http://www.diarioonline.com.br/colunas/maurobonna/noticia-379871-confira-os-destaques-da-coluna-de-mauro-bonna.html>

https://issuu.com/amazoniaviva/docs/66_av_fev_2017_web/36

<https://www.youtube.com/watch?v=3R-ktMeelRw>

<https://www.youtube.com/watch?v=Rj7fVvj-8hc&t=1022s>

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Gabriel Melo-Santos: PI, organization of the fieldwork, acoustic and behavior analysis, study design

Mark Johnson: Co-PI, fieldwork, acoustic analysis, provided equipment

Miriam Marmontel: Co-PI, fieldwork, study design

Natacha Aguilar: Fieldwork, acoustic analysis, study design

Angélica Rodrigues: Fieldwork, outreach activities

Iara Ramos: Fieldwork, outreach

Doracele Tuma: Veterinary, fieldwork, necropsy, assistance to injured animal

Rodrigo Tardin: Fieldwork, habitat use analysis

Tayná Miranda: Fieldwork

Luiza Pereira: Fieldwork, veterinary, necropsy, assistance to injured animal

Layane Maia: Fieldwork

Ricardo Calazans: Fieldwork

Rafael Barata: Fieldwork, molecular analysis

12. Any other comments?

Botos are Amazonian symbols, they awake a variety of feelings and different communities have different perceptions of those animals, though through most of their range these animals are feared or perceived as evil making it difficult to sensitise people on their conservation. The region of Mocajuba provides us with an

opportunity to turn the tables and show that these animals are docile and can coexist with humans. The support from the Rufford Foundation was fundamental in this first step towards the better understanding of Araguaian botos biology, creating awareness for their conservation and establishing deeper bonds with the local communities and leaderships. Still, more work is needed and we intend to continue our efforts in the region expanding our ongoing studies as well as implementing new methods.

