Final Evaluation Report

Your Details	
Full Name	Ramón Hernández Andreu
Project Title	Ecosystem Function in Coral Reefs: Implications of Functional Groups on Resilience and Conservation of Communities of Marine Reef Organisms
Application ID	25444-1
Grant Amount	£5000
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1. **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
Evaluate how Functional Groups (FG) or Functional entities (FE) can be influenced by the protection provided by marine protected areas (MPAs), based on measures of functional diversity, inside and outside MPAs			■	The experiment has shown that there are differences between protected and unprotected areas for some of the functional indices.
Understand what the key species of each FG/FE in coral reefs are, as well as establish the relationship between the species that make up each FG			■	The information from the functional traces allowed us to establish which species formed the functional groups or entities that perform similar functions in the ecosystem.
Analyse if there is ecological redundancy among species within FG/FEs			■	Most FG/FE found were multispecies groups and we found ecological redundancy in coral reef fish.

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

The two areas in which the work was carried out have the particularity of being highly influenced by the rivers affecting visibility conditions; thus, climatic conditions are very important to undertake visual census work in tropical coastal areas. Also, we faced a strong El Niño event which contributed to the impoverishment of the water quality. Therefore, we could only obtain data of two from three proposed locations in the Royal Charlotte region. Due to climatic interference we repeated all sampling campaigns in the summer of 2019-2020 (December-March), in order to have more accurate data fulfil all three areas as stated in the original plan.

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

Some of the most revealing results we found with this study were that from a regional point of view, the National Marine Park of Abrolhos showed lower alpha richness and greater similarity of functional traits than in the other unprotected areas, indicating

not all ecosystem functions are being protected in this locality, or at least not key functions.

In contrast, none of the localities revealed high space replacement values or loss or gain of functional space among the communities, but differences were observed for the communities in each locality.

On the other hand, from a local perspective, in National Marine Park of Abrolhos we found higher values of functional richness in the MPA and functional evenness, common species, and dominant species in unprotected localities. Also, a non-random relationship was identified between the gradient of functional traits and some environmental conditions, thus serving as an environmental filter that plays a role in community structure and reef fish distribution. The local scale was important to find this non-random relationship and to establish the environmental filter.

4. What do you consider to be the most significant achievement of this work?

5. Briefly describe the involvement of local communities and how they have benefitted from the project.

The budget from boat rentals has always gone to local boats, sometimes fishermen's boats. Some of these fishermen showed interest in the activities that were carried out, which may serve for a paradigm shift in the development of their work, perhaps betting more on a tourism activity to know the area, or not fishing within marine protected areas.

6. Are there any plans to continue this work?

It would be interesting to continue with this work of functional diversity and take it to other areas to evaluate the particularities of each marine protected area and the respective habitats found in them. Therefore, an approach to this topic from a seascape point of view would be a perfect continuation of this work.

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

This work is part of my PhD thesis which I intend to disseminate in three ways: by participating in national or international congress, by producing scientific articles and to engage meetings with managers and users of the marine protected areas studied.

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

The grant was used in two different time periods. First in January 2019, where the campaigns of the part of the Banco dos Abrolhos and a part of the Banco Royal Charlotte were carried out, where we did not manage to finish all the proposed points, and then between December and March 2019-2020 to carry out again the part of the Banco Royal Charlotte to make all the samplings of that area in the same austral summer.

9. Budget: 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. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Print toner	£ 100	£ 100		Used to buy 2 print toners for laser printer
Pencil, rubber, sharpener	£ 10	£ 10		Used to buy office material
Paper	£ 40	£ 40		Used to buy office material
Field notebooks/ folder	£ 20	£ 20		Used to buy office material
Fish identification guide (book)	£ 30	£ 30		Used to buy an identification guide
Scientific/field equipment and supplies	£ 220	£ 220		Used to buy material to conduce underwater visual censuses
Rent boat for Abrolhos Bank	£ 3000	£ 3000		Used to carry out the samplings
Rent boat Royal Charlotte Bank	£ 1180	£ 1180		Used to carry out the samplings
Displacement	£ 400	£ 400		Used to take the team to the sampling localities (ticket bus, fuel)
Total	**£ 5000**			

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

We believe that the next steps are to focus research on these key groups and implement, together with local populations and relevant managers, marine protected areas in order to recover the biodiversity lost by anthropic actions. We also think that the current marine protected areas should have specific areas identified to protect the functionality of the ecosystem, because most of the current ones are focused on species of anthropic interest, mainly for fishing.

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

For the academic presentation of my thesis. In the near future, they will be used in conferences and in all meetings with managers and users. Also, in publications in scientific journals, in the acknowledgements section the foundation together with the project number.

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

Carlos Werner Hackradt: Idea, collected data and corrections and orientations

Fabiana C. Félix-Hackradt: Collected data and corrections and orientations

Alexandre Schiavetti: Corrections and orientations

João Lucas Feitosa: Collected data

Sara Buttrosey Kennedy: Collected data

Inajara M. Bezerra Oliveira: Collected data

Jessyca Luana S. Teixeira: Collected data

Ramón Hernández Andreu: Idea, collected data and analysis

13. Any other comments?

More detailed results will be found in the future in order to answer questions that have remained unanswered and others that have appeared. We will focus this on knowing if any of these species has a more key role than another. In case these species do not have a correct management or are vulnerable to some anthropic action, we will propose measures for that management.