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	Pilar Herrón
Project title	Sustainability of the artisanal fishing gears used in the Colombian Pacific coast
RSG reference	19522-1
Reporting period	August 2016 – November 2017
Amount of grant	£4.992
Your email address	pilarherron@gmail.com
Date of this report	November 20th 2017

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
Examine the catch composition of species caught with the most common artisanal fishing gears			■	Field collection data was carried out three times per week at the three rural landing sites (coastal communities) selected in Buenaventura (central Colombian Pacific sub-region), from August 2016 to August 2017. Data previously collected by the regional NGO MarViva in the northern Pacific sub-region (Choco), from 2011 to 2013, was acquired, cleaned and validated with their support. Data processing and analysis started in October 2017 at the Leibniz Centre for Tropical Marine Research (ZMT) in Bremen, Germany, and it is planned to continue until the first semester of 2018, as part of the PhD thesis writing process.
Examine temporal variations in catch abundance and composition			■	
Identify the factors and trade-offs behind the choice of fishers for the use of fishing gears		■		A socio-economic survey was carried out based on a questionnaire applied to 102 fishers from the three selected coastal communities in Buenaventura (central Pacific sub-region). The same survey was also planned to take place in the northern sub-region but was not possible (see details below)

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

- Sampling catch composition from the artisanal trawling net - one of the fishing gears used at La Bocana, landing site was more challenging than sampling the other gears due to two factors: (a) the abundance and diversity of small-sized fishes and invertebrates (see complementary photo) which required a longer time (at least 30 minutes) to identify; and (b) most fishers that used the trawling net normally threw away the by-catch (non-target and non-commercial species) before arriving to the landing site. To overcome these challenges, we decided to sample between 20-25% of the catch, based on an initial estimation of species richness in the catch through a rarefaction curve. Additionally, we talked to the fishers using this gear to

explain to them the relevance of sampling the entire catch to accomplish the project's goals.

- During the cleansing and validating process of MarViva´s data-set, several errors in typing and species classification were detected, which deemed necessary to verify a substantial amount of information directly with the hard copies (paper) of the data formats. This process was carried out with support from MarViva staff and was coordinated mainly via internet (e-mail and skype talks). However, a couple of meetings in April 2017, at their office in Bogotá, were necessary as part of this coordination.
- Preliminary data analysis during the fieldwork phase was not very efficient due to the intensive travel schedule and the sampling activities themselves; also, the lack of permanent electricity at the sampling sites made it difficult to use computer at night. Time spent in the city (Cali, Colombia), between field trips was mainly dedicated to data entry into Excel. As a consequence, there is a current delay in the data analysis and results interpretation phase of the project that began in October 2017.
- Socio-economic surveys to fishers in the northern sub-region of the Colombian Pacific (Choco) were not carried out due staff reduction and limited funding by MarViva Foundation. However, data on monthly prices of fish is available for the past sampling period (2011-2013).
- As reported in one of the project's update, an accident that occurred during fieldwork activities in April 2017, resulted in a broken bone in the lower part of my left leg. Therefore, I had my leg immobilized for 6 weeks, followed by 2 weeks of physiotherapy, for a total of 8 weeks of medical disability. Data in the field continued to be collected by the local assistants, with minor gaps in data collection, related mainly to daily fishing activity.

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

- Deeper understanding of the potential ecological impacts of different artisanal fishing gears at two sub-regions of the Colombian Pacific coast, based on systematically gathered information on taxonomic, biomass and size composition of the catch of the different gears used. Seasonal patterns can also be identified, since data was taken weekly for one entire year in the central sub-region and for 3 consecutive years in the northern sub-region. The new knowledge will allow resource managers and users to move beyond the traditional single species fisheries management, to a more holistic approach that takes into account the multi gear and multi species nature of artisanal fisheries in the tropics.
- New knowledge on socio-economic factors that are involved in fishers' decisions related to fishing effort (e.g. time spent fishing) and the type of fishing gears that are used in the Colombian Pacific coast. This knowledge will allow the inclusion of socio-economic variables into the design of future fisheries management strategies, which have generally only focused on the maximum harvesting potential of fisheries resources, ignoring the human dimension of fishing.
- Increased awareness of local communities, from the Pacific coast of Colombia, about the potential ecological effects of fishing gear on the

marine ecosystems and about the importance of continuous monitoring of fish landings in order to better understand temporal dynamics of fisheries resources.

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

Local leaders and fishers' associations at each of the sampling communities were involved and informed about the project´s objectives and activities from the onset of the project and throughout it. Regular meetings were held with them to keep them informed of the progress and/or difficulties that arose, and to answer specific questions they might had. Fishers in general were very interested in taking part in the project and were stimulated to know that, other than government´s official visits, an outsider from the community was interested to know more about their livelihoods and daily challenges.

At each of the three coastal communities, one local assistant to the project was selected based on their interest in the project, their knowledge of fish species and their time availability to carry out the work. Once selected, local assistants were hired with 12-month, part-time (50%) contracts. The assistants were trained in the methodology for data collection and were given a set of materials and equipment to carry out the monitoring tasks.

A workshop with fishers and local leaders was carried out at each of the coastal communities at the end of the field phase, in August 2017. During the workshops, preliminary results from data collected at the respective community were presented, as well as next steps in the research project. As a result of the workshops, valuable feedback was received from the fishers that will be valuable in the results interpretation phase of the project.

5. Are there any plans to continue this work?

Yes. During the course of this project several research needs and potential management strategies were identified, which could contribute to a more sustainable fishery in the Colombian Pacific. Some examples of these ideas are:

- Specific research on gear selectivity of sizes and species based on experimental fishing, involving different hook or mesh sizes of main gears used in the area (long-lines and gillnets). Comparison of catch per effort.
- Participatory design of "input control" local fisheries management measures, whereby fishing effort is regulated, aiming to improve catch (kg) per effort and/r economic benefits for fishers (two variables not always proportionally related). Some of the potential measures are to limit the number of active fishing boats per gear per day/week, limit the size of mesh or hooks used, limit the total area of the gillnet or the number of hooks used, rotation of fishing grounds, etc.

- Design of an economic alternative to add market value to by-catch or low-value species that are commonly caught, aiming to gradually reduce fishing effort while increasing fisher's income.

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

As part of the PhD requirements, at least two scientific publications are planned to present main findings to the scientific community. These publications are scheduled for the first semester of 2018. Acknowledgments to Rufford Foundation will be included and digital copies will be sent to Rufford Foundation.

A summary of key findings, written in non-scientific language, will be produced for the government fisheries authority in Colombia (Aunap), national NGOs working in marine conservation in the Colombian Pacific, local community leaders and fishers' associations. This outreach document will be also sent to Rufford Foundation.

Once data analysis and thesis writing is over, a final visit to the coastal communities where the sampling took place will be made to carry out meetings to present main results to local leaders and fishers that were involved in the project. These visits will be funded by CEMarin, the institution that gives me the scholarship and that gave partial funding for this research project.

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 funds were used from August 2016 until September 2017.
- The fieldwork phase was carried out during the time period originally planned.
- The data analysis and interpretation phase was originally planned to take place from October 2017 to January 2018. However, due to the circumstances explained above (Section 2.), it is delayed approximately 6 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
Maritime transport from Buenaventura to rural communities (boat rental and fuel)	2,400	1,890.6	509.4	Part of the difference is related to savings for approximately £200 on boat rental, due to consecutive field trips among the coastal communities, which reduced the total number of rental days needed.

				The rest of the difference was due to the two months' medical disability (May-June 2017) where regular visits to the coastal communities were not carried out.
Attending International Congress of Conservation Biology (ICCB) in Cartagena, Colombia. July 2017		334.8	- 334.8	Taking into consideration the savings mentioned above, a budget reallocation was requested to attend the Conservation Biology Congress taking place in Colombia. Authorization to reallocate the funds was given by e-mail from Jane Raymond, on May 24th 2017.
Local trained observers (part-time dedication)	2,592	2,858.4	- 266.4	The exchange rate between Colombian Peso and Pound Sterling considered in the project's proposal was slightly higher than the actual rate given at the moment of receiving the funds.
Total	4,992	5,083.8	- 91.8	Funds from the scholarship received from CEMarin to use on personal expenses (food and housing), were used to cover this difference between budgeted and actual expenditure.

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

- Complete data analysis, interpretation and writing.
- Present final results to National Fisheries Authority with management recommendations.
- Share results with other key stakeholders both at the local and national level (e.g.: Municipality of Buenaventura)
- Present results to local communities, including fishers' associations, involved in the project
- Design a follow-up project with participation of local community leaders and key stakeholders, aiming to improve management of fisheries based on the current project´s results.

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?

All printed materials used during the project and shared with the community, such as summary sheets of the project, power point presentations and data collection formats, included the logo of Rufford Foundation.

During the course of the project I personally attended three academic and conservation events, besides the Rufford meeting in Colombia in April 2017, where I presented the contents of my research project and some preliminary results. These presentations included the logo of Rufford Foundation on the slides or printed material (poster), plus specific mention of the Foundation support during the talks.

These events were:

- Workshop "Tropical Fisheries in a Changing World" at the Centre for Tropical Marine Research, Bremen - Germany. February 7-9th 2017. Oral presentation.
- International Congress of Conservation Biology (ICCB), Cartagena, Colombia. July 23-27th 2017. Oral presentation.
- XIV Colombian Congress of Ichthyology and V Meeting of South-American Ichthyologists, Cali - Colombia. August 14-20th 2017. Poster presentation (see attached pdf).

11. Any other comments?

I want to express my sincere gratitude for this opportunity to carry out applied research for marine conservation, given to me by the Rufford Foundation. As you all must be aware, funding for science and environmental conservation is very limited in tropical developing countries, so this kind of opportunities enable conservation scientists to continue carrying out their work in many places around the world. My sincere thanks also to all the staff from the foundation for their permanent support throughout these past months.

Left: Fishing boats at the coastal village of Humanes Mar, Buenaventura. Right: Fishers' lunch break on the boat. © Pilar Herrón.

Top left: Fisherman fixing his net in the coastal village of Punta Bonita, Buenaventura. © Pilar Herrón. Top right: Local fishermen weigh a fish at the storage center in the coastal village of Punta Bonita, Buenaventura. ©Carlos Segura. Mid left: Local assistant measuring fish. Mid right: Weighing lobster. Bottom left: An abundant catch with purse sein net. Bottom right: Catch sample from trawling net.