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	Laia Juliana Muñoz Abril
Project title	Trophic ecology and connectivity of yellow-fin tuna (*Thunnus albacares*) between the Galapagos Marine Reserve and Ecuadorian mainland.
RSG reference	18382-1
Reporting period	October 2016
Amount of grant	£5,000
Your email address	laiajulianamu@gmail.com
Date of this report	September 30

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
Know the genetic diversity of individuals of tuna from artisanal fisheries in the Galápagos Marine Reserve and the Ecuadorian mainland			X	
Establish possible variations in the trophic position as a result of fluctuations in the diet resulting from the temporal and spatial oceanographic changes in feeding areas			X	
Determine mercury levels in tuna of artisan fisheries in the Galápagos Marine Reserve and off the Ecuadorian coast.			X	

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

None.

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

- There is one single yellowfin tuna population within the Galápagos Marine Reserve and the Ecuadorian mainland. The analysed population of yellowfin tuna has a decreased number of heterozygotes and it is vital to have more and deeper analyses to identify what might be affecting the population.
- Nitrogen Isotopes supported the hypothesis of the preference of yellowfin tuna for warmer waters. Although there was a relation between the concentrations of nitrogen and the size of the individuals, the data suggest nitrogen should not be used to infer the age of an individual based on their trophic level. Similarly, to other studies, carbon concentrations showed that juveniles of yellowfin tuna forage in areas of high primary productivity, near the surface and the coast. The opposite occurs with adult individuals who prefer places of lower productivity.
- Mercury levels were related to the size of individuals. Increasing Nitrogen levels in larger individuals support the idea of biomagnification of this metal along the

food chain. This study is among the ones that show highest concentrations of mercury in the world.

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

Local fishing communities both from the Galápagos and the Ecuadorian mainland have been constantly involved in the development of the fieldwork. The fishermen were very excited by the project and are interested in knowing if the Ecuadorian tuna is fully resident and about the levels of mercury in the fish.

5. Are there any plans to continue this work?

Definitely. Due to the low number of heterozygotes found, it is critical to continue studying the populations of yellowfin tuna in the Pacific Ocean. It is possible that there are more than one stock or population affected by fishing.

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

Divulgation of the project was conducted at the fishing communities with whom the project was developed (Artisan fishing association of Galápagos, COPROPAG, and fishing association Santa Rosa) as well as at San Francisco de Quito University.
A scientific paper is currently being written with the objective to publish the results of the project in a peer-reviewed journal.

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

As originally planned, the study required 10 months for its completion and it is expected to be published in the next two 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.

USD 1.00 = £0.68

Item	Budgeted Amount	Actual Amount	Difference	Comments
Lab equipment for DNA extraction	680	680	-	1000 USD
Genetic and Stable isotope analyses	3084.94	3084.94	-	4500 USD
Lodging (total of 6 moths) and transportation in/to Galápagos and Ecuadorian Coast.	1723.85	1713.85	-	2500 USD
Total		=5000		

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

- Understand the reason for the low number of heterozygotes in the analysed population of yellowfin tuna. A reduction of heterozygotes in a commercially exploited population could result in its extinction.
- Compare individuals caught in Ecuador with those fished in surrounding regions to determine if they belong to the same population or if there is more than one stock in this region of the Pacific.
- Continue monitoring the mercury concentrations in tuna consumed by the Ecuadorian population.

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?

Yes, in every speech regarding to the project at the communities and at the University.