

## The Rufford Foundation Final Report

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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](mailto:jane@rufford.org).

Thank you for your help.

**Josh Cole, Grants Director**

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Grant Recipient Details	
<b>Your name</b>	Carolina Chong Montenegro
<b>Project title</b>	Critical Assessment of the Pacific Goliath Grouper in Pacific Colombia: Natural History, Fishery Sustainability, and Benefits of a Marine Reserve
<b>RSG reference</b>	17936-1
<b>Reporting period</b>	September 2015-April 2016
<b>Amount of grant</b>	£3775
<b>Your email address</b>	carochong@gmail.com
<b>Date of this report</b>	1.06.2016

**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
Study the natural history of the Pacific Goliath Grouper (PGG) in and around a Utria National Park				I was able to conduct my work in the area and obtain some data, but for reasons mention in section 2, I couldn't fully achieve this objective. However, my 50 interviews with local fishermen have revealed important insights into the natural history of the species, and will act as a foundation for further studies.
Importance of the MPA as a nursery ground				Despite low numbers of PGG in the MPA, and very limited working time in the UNP, comparing catch per unit effort for juvenile fish inside and outside the MPA shows that the MPA serves as an important refuge for the species in the area.
Estimate juveniles and adult landings of the PGG along the Pacific coast of Colombia				I was able to fully achieve this objective as I have a time series of landings data of the study species along the Pacific coast of Colombia that would allow me to compare juvenile and adult landings through time and across fishing grounds.
Estimate the willingness of fishermen and tourist in trying PGG ecotourism as an alternative source				I was able to conduct 50 interviews with fishermen to determine their willingness to use the PGG as a possible ecotourism resource. Sixty tourist questionnaires regarding willingness to pay to see the species were also completed.
Study the habitat preference and abundance for the juveniles of PGG inside the marine reserve				Due to problems described in section 2, I could only work inside the park for less than 3 weeks. However, during my time in the park I surveyed different habitats (rocky shore, coral, and mangrove) to discover that indeed the juveniles of PGG exclusively use the mangroves of the UNP as a nursery habitat. Despite the rarity of

			finding this fish inside the UNP, I think the outcomes are valid.
Collect spine, fin ray, and otolith samples to create an age and growth curve for the species			N=216, samples currently in preparation and analysis to create the age and growth curve

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

Challenges and difficulties faced during fieldwork included robbery, administrative and logistic issues with the Utría National Park (UNP).

**Robbery**

One evening in October of 2015, our residence in El Valle was forcibly entered and burgled. All of our money and phones were taken. Previously that morning we had withdrawn project funds to pay for our research canoe, monthly rent, and monthly food costs, so a significant amount of money was stolen (£350). We made an official police report, and though the police eventually caught the offenders (after 1 week), they had already stolen again, and sent money elsewhere, so we were ultimately unable to recover anything. They were underage (~14 years old) and therefore protected by law, and were released after only an hour or so in police custody.

It is necessary to point that the robberies in the area are not frequent and most offenders are teenagers. Juveniles are protected by law, and they take advantage of this situation. There are many social problems in the area, such as lack of parental responsibility, or abandonment of children, therefore these situations have put children in difficult situations, and they have no discipline.

I must say that these situations are not unique to the area but for other parts of the world that have similar social problems. I would still highly recommend working in the area, but one must be aware of some of the regional social problems.

**Administration of UNP**

Originally, the project was use the marine reserve of the UNP as a focal point for studying the natural history of the subject species. Despite having a research permit for the project, I was ultimately not permitted to work in the park due to bureaucratic issues that were never clarified or given a valid argument for. Prior to this however, I had for several weeks been trying to enter the park and work. Since daily transport to/from the park was costly (~£55 per day), I sought housing within the park, which the WWF had informed us would not be a problem. I was not offered any reasonable housing by the UNP or the privately-administered hotel (~£50 s per person per day for tourists), who's owner was not willing to negotiate with us, moreover the hotel owner and the administration of the park had internal conflicts making it more difficult to negotiate with the both parties. The park officials eventually did offer us a remote "sleeping platform" with no walls or doors, which was later destroyed by a falling tree. Considering the value of our equipment (and lives) and the security issues, this was not considered a safe option. Ultimately, I was

able to secure a space in the park guardhouse for 15 days. Luckily my team and I were able to conduct intensive work covering two major areas of the park.

#### Rarity of study species in the MPA Utría

Natural history data collection in the northern region of the Pacific Coast of Colombia was complicated not only by all of the above issues, but also by the fact that the *Epinephelus quinquefasciatus* is presently rarely landed and landings have decreased in the past years (intense fishing pressure) in the region of UNP, and finding live or landed fish was a resource-intensive endeavour. For example, there is a small (~10 m) sunken boat in the UNP which I was told adult fish (3-4 individuals) had previously used as habitat. This was to be one of the sites for tagging adult fish. However, they were all apparently caught by fishermen (despite being inside a marine reserve) prior to our arrival. Lack of management and control inside the MPA was visible. Within the marine reserve, in fifteen days of rigorously running transects, timed visual searches, and fishing, we were only able to locate five juvenile groupers.

#### Solutions to Problems

These problems lead to losses of precious time and project funds. However, I continued to collect data. While I waited for resolution of the UNP issues, for example, I focused on running interviews for local ecological knowledge about the biology and ecology of the species, monitoring landings (biological data), and collecting ecotourist questionnaires. My original plan was to work in several different local communities, which ultimately gave me the flexibility to move to another community and continue collecting data. This of course became costly, and transportation and lodging became major budgetary items. However, as mentioned before, over time I forged trustworthy local connections and was able to find more reasonable options. Because of the issues working in UNP, and the rarity of the species in the area, for the last month of field work I moved to Buenaventura, the largest fishing port on the Pacific Coast of Colombia, to collect samples from landed groupers that came from different parts along the Pacific Coast. During my time in Buenaventura I was able to collect valuable information of the fishery and also biological data to complement the surveys from the northern region.

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

- I have collected enough samples (n=216) spines and rays to create an age and growth curve of the Pacific goliath groupers (PGG). This will be the first biological data produced for this species. This is important for assessing future management strategies.
- I have PGG landings data across 4 years along the Pacific coast of Colombia with information about length, weight, and fishing grounds, with this information I can provide size frequency of catch of each fishing ground across years, and relating this to the ecosystems (mangrove or rocky reef) can help determine the areas that are most important for this fishery and can also provide suggestions of areas for potential MPAs or those that need further management.

- I interviewed fishermen (n=50) to determine the local ecological knowledge about the biology and ecology of this species. These interviews were essential, and significant and interesting information was collected about the PGG, to serve as a platform for further studies (movements, spawning aggregations, diet, etc.). Moreover I was able to determine the willingness of the fishermen to use the PGG as a source of ecotourism. Complimented by tourist questionnaires (n=60), this information will highlight the feasibility of alternative, more sustainable use of the resource. I am still in the process of compiling and analyzing these data.

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

I generally worked directly with the local communities. At the beginning of my work I had to introduce myself to the local community councils, present a proposal of my work, and describe how and why it was important for the community. Overall, it was very well accepted and the locals generally appreciated that someone was willing to help the community and eventually educate them about the importance of this valuable resource. Moreover, I worked directly with the local fishermen to evaluate their catch and while taking samples (spines, rays, and otoliths) of the PGG I was teaching the fishermen what were these samples for. They have learned about the importance of this fish and how these samples would help to estimate age. Local fishermen were often employed to help us move from place to place, and were directly involved in the interview process. Local hotel owners and tourism businesses were also involved, were given a presentation of the work, and gave us permission to conduct questionnaires with their clients.

#### **5. Are there any plans to continue this work?**

A fundamental aspect of this work is education, and I will eventually return to Colombia to discuss the results of the project with local communities. In addition I would like to continue studying the Pacific goliath grouper throughout the Panama Bight region, as Ecuador, Panama, and Colombia have varying levels of fishing effort and coastal development. Collecting local ecological knowledge and landings data across this region will be important to extend the knowledge of this fishery along its distribution. Moreover, I would like continuing studying groupers as a resource for communities, it is an important group of fish for small-scale fisheries. Mostly of the fish caught by small-scale fisheries go unrecorded in catches and they have a high impact on the ecosystems. The results of the ecotourism potential aspect of the project look very promising, and this aspect should definitely be pursued in the form of a pilot project, so that local communities can experience first-hand the potential alternative value of the species.

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

Currently I am writing my MSc thesis about the results of this work and also preparing peer-review publications about the outcomes (one for age and growth, and

another for LEK). Moreover, the results will be presented to the leaders of the communities in the Pacific Coast of Colombia for distribution, as they act as the governing bodies in the region.

**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 Rufford Foundation grant was used during the entire period of the project (September 2015-April 2016).

**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
Terrestrial transport	60	60		
Maritime transport	325	375	+50	Funds budgeted for fuel was used for maritime transport
Fuel	150	100	-50	
Lodging	1200	1200		
Meals	1200	1200		
Tagging gear	150	150		
Fishing gear	150	150		
Small canoe	90	90		
Boat engine (2.5 hp)	450	450		
<b>Total</b>	3775			

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

The important next steps are to inform local community leaders of the results of the project, to raise awareness about the levels of exploitation of this valuable resource at the regional level, and to expand this work along the theorised distribution of the species in the Tropical Eastern Pacific. Given the relatively high level of coastal development and fishing pressure in other countries within the PGG's range (Mexico to Peru), the Pacific coast of Colombia could be serving as a refuge. The species may already be functionally extinct in countries with high fishing pressure and coastal development (i.e. loss of mangrove nursery habitat). This has become more evident through literature searches and personal communications (e.g. Ross Robertson of STRI in Panama, fishermen in Ecuador) in other regions, which reveal low or no landings of the species despite high fishing pressure. LEK-based interviews with fishermen and analysis of landings would confirm this. In addition, vital biological information is necessary for proper management of fisheries, and ultimately the conservation of the species. Specifically this includes: 1) age/size at

first capture and first maturity (shift from juvenile to adult); 2) reproductive strategy (hermaphroditic or gonochoristic); and 3) movement patterns (e.g. adult spawning aggregations). Since there seems to be a stable population of PGG in Colombia, biological investigations would be focused there, while LEK and landings investigations would be broader-based.

Continuing the ecotourism-potential aspect of the project is also vital to conservation of the species in Colombia. An important next step would be to run a pilot project to test the feasibility (both economic and logistic) of PGG ecotourism in the region.

**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, I have used the logo for the blog I have about the project:  
[Easterpacificgroupers.wordpress.com](http://Easterpacificgroupers.wordpress.com)

And I have use the logo for my ppt presentation of the project.

**11. Any other comments?**

I want to thank the Rufford Foundation for giving me this amazing opportunity to lead my project, for believing in conservation, and granting people around the world the support they need for their important research. I wouldn't have been able to accomplish all this hard work without your support. I hope I can continue with your support in further projects.