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	Diane Gendron
Project title	Remote monitoring of whale watching activity and blue whale diving behaviour with an IP camera-based system in Loreto Bay National Park, Mexico.
RSG reference	26195-B
Reporting period	September 2018- August 2019
Amount of grant	10,000
Your email address	dianegendroncicimar@gmail.com
Date of this report	September 11, 2019

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
Pre-meeting to evaluate monitoring system				Highest attendance since 2014
Refine and modify the infrastructure design of the camera system				Site-specific adaptations enabled an easier and more effective installation of the system on the island
Install and test camera system in CICIMAR				
Connection of the IP camera to the Internet at the field site				The test was carried out using a Telcel modem (cellular modem), but the 4G internet signal was not strong enough at the reception site. There is a better Internet connection with the Telmex company (telephone Mexico) but a contract needs to be made.
Monitoring of WW activity during 2019				
IP camera video training of three voluntary students				
Analysis of achieved video				100 % completed. Dedication to the reviewing and analysis of recording was highly time-consuming.
Compare the results of IP camera system and focal survey at sea				Results are comparable and we conclude that the IP camera monitoring is viable.
Post-meeting to evaluate monitoring system				The director of the NPBL postponed the meeting for November 2019. So gasoline for transportation was purchased in August and the rest of the cost will be provided by the local hotels and restaurants.

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

The apps contained in our field computer (Panasonic Tough Book) that allow us to track and monitor whale behaviour during our focal follows failed to give our position from the beginning of the season. We managed to send the computer to the dealer for fixing, but, although they charged us to inspect it (cost paid by Rufford Foundation), they could not fix the problem. However, we managed to monitor the whales and WW at sea using the computer data sheet and by manually recording the positions, which was not too complicated. We also found that noting the diving parameters of whales and during WW interactions could not be done simultaneously during the daily recording with the IP camera. The amount of concentration to follow the whale and interactions from the monitor was demanding enough to be done by itself. This situation prevented us from analysing both in situ (at sea) and IP camera video data during the field season, and thus the analysis and comparison was initiated in mid-April. The annotation of the diving parameters (time at surface, number of blows and time when diving) from the IP camera video had to be done manually, which proved to be very time-consuming. A total of 252 recording hours of focal whale follows was achieved during 24 days of recording, (in general from 7am to 5pm). The annotations of whale diving behaviour naturally and during interaction of WW of these recording was also time consuming. It involved an average 6 hours per day for 5 days per week for approximately 7 weeks, which represents about 210 hours of data revision, which is almost equivalent to the total recording hours on site.

The internet signal from the Telcel modem was not strong enough to transmit the video from the IP camera in real time, so we had to evaluate other options, such as: satellite Internet or Internet with Telmex modem. The Telmex model option is viable but requires a 2 year contract to install the connections onsite.

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

1. The achievement of 115 hours of IP camera recording of blue whale tracking their natural diving behaviour (without the presence of boats) for 17 hours, 86 recording hours of blue whale tracking during interaction with WW boats and 12 hours of whales in the presence of our research boat. The analysis brought us to the conclusion that this new IP camera recording method is comparable to our field method at sea and can be used to monitor whale presence and diving behaviour, both naturally and in the presence of WW boats.

2. We also conclude that the information taken from the recordings on the number of boats and the time they spent with a particular whale or group of whales can be estimated using the IP camera.

3. The assistance with real-time video supporting the visualisation of whale watching activities to the Loreto Bay National Park (LBNP) authorities and the ability to direct them to sites when they were conducting supervision at sea. This greatly increased efficiency in targeting irregular whale watching activities, which permitted them to take action in a timely manner. Likewise,

documented videos showed perfect conduct of WW boat captains using the passive WW method with no presence of either LBNP authorities or our research boats.

In summary, the success of this project has exceeded our expectations and demonstrates clear evidence of the multiple benefits to all involved, the whale watching service providers and users, the authorities in charge of the protection of the Loreto Bay National Park, the researchers who study the behaviour and monitor the of health of blue whale and, ultimately, the whales themselves.

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

During the 2018 meeting that took place on November 8th and 9th 2018 with the WW service providers, we were very pleased to see the highest attendance ever since 2013, with 79 boat captains ranging from 20 to 74 years old, service providers and representatives for the LBNP, Port captain, SEMARNAT authorities as well as our team (see Annex 1). They were most interested in learning why blue whales continue to appear underweight and discussed in more detail the method of passive WW. We presented results on the identity of the whales observed during 2018 with an anomalous majority of adult males, many of them photographed as calves 21-25 years ago. We also presented the measurement of the whale's body condition index and some general health related research results, as well as some ideas/hypotheses on the reason for the low body condition observed in whales. In addition, a short presentation on the blue whale and WW monitoring with the IP camera was given by MS Ricardo Mirsha Mata Cruz to insure that everyone understood the goal of this project and the benefits of implementing the passive method.

During this meeting a short survey on the IP camera project was responded to by 48 WW boat captains. We found that 94% agreed that monitoring the WW activity using the IP camera is necessary, although only 45% knew how the camera works and 67% are willing to take part in examining the recordings. Finally 98% judged that it is important to regulate speed in the area where the whales spend most of their time and judged it useful to have real time information on the area where whales are observed.

At the end of the talk they showed great interest in and acceptance for the IP camera project. During the next meeting, postponed until November 2019, videos will be presented showing the effectiveness of the passive method, notably how whales are staying at a particular site for longer periods of time, which provides a better experience with whales, without affecting their behaviour.

5. Are there any plans to continue this work?

The data on number of WW boats and hours spent with whales can be monitored in more detail than can be achieved at sea. This way the tendency of the number of boats in relation with the number of different whales observed during a particular

season can be observed. This type of information would be useful in determining the BLNP carrying capacity (maximum number of whale watching permits that can be issued per year), which makes this a valuable asset in the decision-making process of the director of the BLNP.

To be fully functional, the IP camera images need to be accessible to be manipulated and/or analysed remotely across the Internet network. Due to the remote site (Isla Tijeras) where the camera is positioned, it is necessary to evaluate alternatives of Internet transmission devices and forms (cellular modem on the island or telephone modem on our land base), as well as the development of a web platform to transmit the video in real-time. This will make it easier to monitor and analyse the recording, since a greater number of people could participate, including the boat captains that showed interest during the meeting.

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

Aside from what we mentioned regarding sharing the IP camera recordings with the BLNP users and authorities, the objective is to publish the use of this method as an independent monitoring system in a general and a scientific journals. We believe that making the information available via Internet and developing a website where the video is transmitted in real time will enhance the utility of this system and perhaps its application in other areas.

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 period proposed for the project was from July 2018 to June 2019. However, we received the funding in September 2018, so the period is considered from September to August 2019.

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
Office desk, chair, router and monitor for continuous land-based monitoring of WW and whales	395	313	-82	
Apartment rent	1414	1652	+238	We rented a 2nd apartment for 3 weeks
Buoy rent at Puerto	653	211	-442	We rented a dock for the research boat instead of a buoy for the

Escondido Marina (5,560MXPX month x3)				sailboat which was not used during 2019.
Fuel for 2019 field trip (45 days at 950MXP per day)	628	628		
Workshop organization, designing perception survey for WW users before and after the WW season	1200	1200		
Transport, per diem x3 days x3 researchers participating in 2 workshops	990	839	-151	
Installation service for: the connection to the Internet, IP camera system and solar power system.	1101	1101		
Salary for maintenance and coordination of the remote monitoring with IP camera system: 238 per month x 8	1904	1904		
Monitor for daily monitoring WW and whale for land base	175		-175	The cost of the monitor was included in the desk set up equipment
Tools for assembling and periodic maintenance of the IP camera system	500	370	-130	
Electrical material to withstand extreme environments: cables of various sizes, terminals, etc. batteries	300	167	-133	
Re-adjustment of the metal platform for the IP camera System and 2 stainless steel security boxes	320	289	-31	
2 Photovoltaic module 150 Watts and fiberglass and polyester cabinet for accumulators and charge controller protection	420	405	-15	
Food during field trips		273	+273	The cost of food had increases substantially, we use the Rufford funding
Postal services, computer repair, bus transportation to the site		282	+282	

bank transfer charges and currency exchange adjustments		366	+366	
Total	**10000**	**10000**		

After bank transfer into US dollars and Mexican pesos, the total fund received was 9634 British pound.

The amount received was fully used to purchase the equipment, the apartment rent, technical assistance to install all the components of the system and 8-month salary for MS. Ricardo Mirsha Mata Cruz in charge of directing and maintaining this system as well as the analysis of the recordings, as well as other field expenses.

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

One of the next steps we need to achieve is to define how to access the camera remotely via the Internet to allow the transmission of the video in real time and make the monitoring and tracking of the whales and the sighting activity easier and more useful for the users, authorities and researchers. Likewise, the creation of a web page where the videos are transmitted would promote the passive WW activity. Another step will be to organise a system for the analysis of the recordings so all useful information extracted (number of boats, time with the whale, diving behaviour etc.) can be easily analysed and rendered more effective for long-term independent monitoring method.

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?

During the meeting that took place on November 8th and 9th 2018, with the Loreto WW community we specifically presented the project as a Rufford Foundation-funded project. This will also be the case at the next meeting that will be held in November 2019.

Since the 1st Rufford Small Grant for Nature Conservation received in 2013, we have collected several biological samples that we considered were also part of the whole WW project in the LBNP. The Rufford Foundation was included in the source of field funding (see attached pdf). Aforementioned web presence will include the Rufford logo.

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

Dr Rocio Marcin Medina, director of AIMACH, organization of the meeting and perception survey

Dr Diane Gendron, director of the Rufford project

MS. **Ricardo Mirsha Mata Cruz**, Coordinator researcher in charge of directing the IP camera system monitoring project.

Antonio Manuel Zamaron Nuñez, boat captain and field technician.

12. Any other comments?

Thanks again for your help in developing and promoting the passive WW method in Loreto.