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	Susan Tsang
Project title	BatCode: Biodiversity education through portable barcoding workshops
RSG reference	18810-1
Reporting period	April 2016 to January 2017
Amount of grant	£5000
Your email address	susan.m.tsang@gmail.com
Date of this report	February 7, 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
To create a new appreciation for and perception of biodiversity through genetics				Our workshop indicated an increase in participant appreciation perception of bat biodiversity and general biodiversity concepts through the pre- and post-assessments. The final long-term re-assessments are still being processed, as the gap time between assessments has not finished yet
To teach basic concepts of barcoding, conservation, and practical laboratory skills to at least 100 Indonesian students from 3 sites				We were only able to hold two workshops at two sites during this year due to scheduling limitations of the workshop team, and have plans for a third and fourth site in order to fully achieve this goal. In total, 47 students from four workshops, along with 12 lecturers, laboratory assistants and other scientific staff participated in this workshop. Assessment data were collected only from students due to scheduling and cultural barriers with assessment of more senior participants.
To generate barcodes for all captured bats				We were able to successfully amplify barcodes for all captured specimens, along with specimens that students brought in

To open a dialogue with students and locals about biodiversity and conservation				We were able to successfully engage in dialogue regarding biodiversity and conservation, particularly in ways that were not previously taught at the university previously and synthesising this with wider issues such as disease ecology and wildlife trafficking.
To teach non-experts about bats and their importance to the environment				With the exception of three of the students, experience working with bats was very limited. The link between bats and their importance to the environment was not only very clearly made, but interesting questions from the students were asked as to how this may affect other conservation concerns

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

There were difficulties related to our ability to capture bats at UNHAS due to the weather. To overcome this, we used specimens that were available through the department already. We had some difficulties with shipping the specimens to Macrogen for sequencing because of a misunderstanding by the shipping companies of what the material is, even though it was approved by Macrogen. We had to hire a separate scientific shipping company to do so, which cost a little more than the normal costs for shipping, and this did delay the samples being received by Macrogen by a month and a half.

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

a) We were able to successfully create an appreciation for bats in ~50 Indonesian participants varying in career level (undergraduate to lecturer/researcher). Many expressed that they were not aware of any of the facts we presented about the importance of bats to other disciplines, such as conservation and disease ecology, and how important those bats are for maintaining forests and biodiversity. They also did not fully know how unique and diverse bats were in Indonesia, and learned to rethink of bats animals that should have more scientific attention paid to it.

b) We were able to successfully train ~50 participants in field capture of bats, laboratory, and bioinformatics techniques. Bat capture and bioinformatics are almost never offered in workshops, as there are few experts within Indonesia in these subjects. Laboratory skills workshops are rare due to the high cost of reagents for local researchers, and class sizes generally are too big to allow for students to really practice the practical technical skills. We offered a comprehensive programme of training for conservation genetics of bats in order to fill these gaps. Students were able to do the work in the workshop with supervision largely on their own and were able to take these skills home with them, which will be enormously helpful to their careers.
c) We were able to collect and contribute more bat barcoding data from Java, along with bat fly data, much of which was not on BOLD previously. We were unable to capture bats at UNHAS due to the weather, but were provided specimens of a reef fish that is of great interest to the conservation community. The bat fly and these fish specimens are all the first record of their species in the BOLD database.

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

The importance of bats that we have taught to the students has encouraged many of them to try and understand these historically ignored animals more, and many have expressed a desire to go back to their home communities to transmit this information to the local communities. This is important to our team due to our inability to speak many of the local dialects and helped us form a network of participants who now have an interest and some familiarity with bats. We will follow up with them on outreach activities they would like to conduct.

5. Are there any plans to continue this work?

Yes, there will be a third and fourth workshop at two other sites in order to expand the reach of the workshop in other parts of Indonesia and fully achieve the number of students planned. We will likely be holding the third and fourth workshops in Bali and West Kalimantan given the interest that has been expressed already by local universities. In the future, we will also include collection of faecal matter to conduct diet analyses and collection of ectoparasites for identification and barcoding. The capacity we have built here has created the possibility for larger funding bodies to come to Indonesia to do other types of practical training work, of which I have now become involved with.

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

We will contact appropriate Indonesian researchers in order to share the data and encourage collaborations between them and interested students. There are currently three potentially publishable projects that can be generated from what we have collected, and we will help shepherd projects to completion and publication. The effectiveness of educational assessments have been shared multiple times by team members to encourage more conservation education and planning of assessments before interventions. The assessment data have also been shared with others in development and implementation offices to promote conservation education. The genetic data will be widely available through internationally accessible open databases BOLD and GenBank once they have been verified and approved. We also intend to follow up with students who have expressed interest in conducting more outreach activities locally.

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 was used from April to August 2016 for purchase of tickets, equipment, and shipping costs. The project timeline in the field matched the anticipated length and the delay in shipping occurred after that portion of the project was completed. This delayed our ability to have the students get the data in a timely fashion and subsequently delayed when we could do the post-assessments. We had to determine new benchmarks for when those would occur for collection of data. This led to a total delay of completion of final assessments (of which we have one more time benchmark to make).

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.

All figures were generated using oanda.com historical currency conversion rates on the date of purchase.

Item	Budgeted Amount	Actual Amount	Difference	Comments
E-Gel Go 2% Starter Kit	520	229	-291	Found a cheaper scientific supply company
E-Gel Go 2% Gels (20	225	225	0	

pack)				
Illustra Pure Taq Ready-To-Go-PCR Beads	250	389	+139	Price for RTGP Beads went up
Promega Wizard Genomic DNA Purification Kit	125	125	0	
Macrogen EZseq DNA	396	500	+104	The increase cost in shipping to Macrogen increased the costs for this line due to the misunderstanding of the shipping agent
Custom DNA Oligos Forward and Reverse Primers	16	16	0	
Eppendorf Research Plus 6-Pack of Pipettes	1154	1154	0	
Roundtrip US to ID	1518	931	-587	PI had funding from alternate source for some of travel to SE Asia.
Domestic flights in Indonesia	396	474	+78	Prices for tickets increased in time between grantwriting and purchase
Sterile tips	400	600	+200	More tips were needed and price increased
Printing costs	0	93	+93	Omitted from original budget due to financial limitations. For all worksheets and certificates
Meals for participants	0	159	+159	Omitted from original budget due to financial limitations. Meals for participants during duration of workshop (included lunch and dinner due to length of time needed to work)
Local transportation	0	120	+120	Omitted from original budget due to financial limitations. Taxi rides to and from airports, plus tolls
Total	**5000**	5015	+15	

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

We would like to ensure that the students retain this information and have continued to remain in contact with them via a Google Group in order to make ourselves available for questions related to implementing any of the programmes and skills that they have learned. Several students have really taken advantage of this opportunity and have shown a deep interest in continuing with this work and we will work to support their ambitions to continue in the sciences.

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?

We used the Rufford logo on the worksheets for the workshop that we provided to the participants to indicate that it was the funding body for the project. There was some university level coverage of our arrival to conduct the workshop at UNHAS, though, it was wholly unexpected and therefore we had no materials from RSGF. We also provided participants with certificates of completion which have the Rufford logo on it, indicating that it is the funding body.

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

Dr Susan Tsang – Research Director and PI for BatCode. Conceptualised project, budgeted project, arranged travel, scheduling, co-creation of lectures, taught bat lectures, taught phylogenetics lectures, assessments, bat capture, pre-workshop prep for all components

Dr Stephen Harris – Research Director for BatCode. Coordinated with Macrogen, co-creation of lectures, taught laboratory lectures, pre-workshop prep for laboratory component, taught bioinformatics lectures, assisted in fieldwork

Ms Sheherazade, B.Sc. – Education and Outreach Specialist, Local Coordinator – logistics with local universities and during workshop, bat capture, assisted in field components, obtaining permissions and recon prior to arrival at site, interpreting

12. Any other comments?

I would like to thank the Rufford Foundation for financial support for this project. Without your help, I would not have been able to go out to my team and bring biodiversity barcoding out to Indonesian students, and also teach them more about the importance of bats to the environment.