Final Evaluation Report

Your Details	
Full Name	Woo Chee Yoong
Project Title	Developing non-invasive methods to monitor otter populations in Peninsular Malaysia
Application ID	28938-1
Grant Amount	£ 4,653
Email Address	woocheeyoong@gmail.com
Date of this Report	1st October 2021

1. 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 answer ecological questions pertaining to three sympatric species of otter in Malaysia regarding habitat use, home ranges, movements, activity patterns and behaviour, which will inform future management and conservation actions				We refined project methodology to focus on spatial distribution and habitat relationships of the Asian small-clawed otter (*Aonyx cinereus*), smooth-coated otter (*Lutrogale perspicillata*) and hairy-nosed otter (*Lutra sumatrana*) along the coast and subcoastal areas of the North-central Selangor Coast (NCSC), Selangor. We are using non-invasive genetic methods to identify otter spraint to species, from which we will map otter distribution, habitat relationships and hotspots. The study area has been extended to cover the central part of NCSC. Theft of eight camera traps in a high human density area surrounding Kuala Selangor Nature Park necessitated refinement of objectives and methodology.
To educate the local communities especially the fishermen and aqua culturist and spreading awareness of the importance of otters for healthy aquatic ecosystems				Eight local people were trained as field assistants to assist the principal investigator (Woo Chee Yoong) during field surveys. We held a workshop at Kuala Selangor Nature Park to provide staff with knowledge of otter identification and ecology. Thus far, four aquaculture farms have been interviewed. Collaboration with the Department of Fisheries Malaysia is underway to involve more aqua culturists in the human-otter conflict survey.
To develop a reliable radio-telemetry method on the wild otters of Southeast Asia				This activity was planned for the 2nd year of this project. Due to changes in the project methodology, which was to use a more effective approach (PCR-RFLP) to answer ecology questions of coastal otters, plans for radiotelemetry have been postponed.

To continue the efforts of securing Ramsar recognition for the Kuala Selangor Nature Park (KSNP)				We surveyed the park systematically for otter signs and placed three active camera traps around the artificial tidal lagoon. Results from camera traps and PCR-RFLP proved the presence of both the smooth-coated otter and Asian small-clawed otter classified as "Vulnerable" by IUCN in KSNP. In particular, a group of Asian small-clawed otters was recorded with two pups, for the first time in the park. These data will be important to support current efforts to secure Ramsar recognition for KSNP by fulfilling Criteria 2, 3 and 4 of Ramsar Sites.

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

During the granted period, COVID-19 continued to persist in Malaysia and the government imposed periodic partial lockdowns. We were able to obtain permits to conduct field research and laboratory work. In June 2021, the COVID-19 positive cases surged beyond 10,000 every day and a full lockdown was implemented until the present. Laboratory activities were allowed, but field research, which required that the crossing of district lines, was prohibited. With the vaccination programme gaining momentum and most of the population (including the PI) now fully vaccinated, the government had announced the relaxation in inter-district and state travelling. We will resume field research activities in September 2021.

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

a) We developed more appropriate project methodology and changed the title of the current granted project to 'Developing non-invasive methods to monitor otter populations in Peninsular Malaysia' to better reflect what was completed this year. The study site and overall objectives are the same as mentioned in the proposal.

b) We developed an effective PCR-RFLP method to successfully identify three sympatric species of otter (smooth-coated otter, Asian small-clawed otter and hairy-nosed otter) using spraints collected in the field and mapped otter occurrence and potential hotspots along the coastline and subcoastal areas of Kuala Selangor district.

c) Preliminary data on human-otter conflict has been collected. Thus far, four aquaculture farms were interviewed. All farm owners/workers perceived otters as pests, using multiple actions ranging from chasing otters away, to using electric fencing (which has electrocuted otters), to killing otters using other means. Collaboration with the Department of Fisheries Malaysia is

underway to include more aquaculture farms in the human-otter conflict survey.

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

Eight local people were trained as local field assistants and assisted the principal investigator during the field surveys. They were trained by the principal investigator to understand otter ecology, survey for otter sign, set up camera traps, collect otter spraint, interview aquaculture farms for human-otter conflict data as methods of monitoring otter populations.

The staff of the Kuala Selangor Nature Park were equipped with knowledge of otters. Staff will patrol the lagoon daily and provide monthly updates on otter sign and/or observations to the principal investigator. In addition, they attended the MNS Otter Workshop that was organised by MNS on 6th February 2021, where five local people attended. This workshop was also opened to public for online attendance.

Thus far, four aquaculture farms were interviewed to obtain preliminary data on human-otter conflict. At the same time, they were educated with otter protection status and the importance of otters in coastal ecosystems and for surrounding local communities.

5. Are there any plans to continue this work?

Yes, during the 2nd year, we will complete the survey of the entire study area (Klang and Sabak Bernam districts), collect samples for species identification and determine the spatial distribution and habitat relationships of these three species to identify critical habitats and patterns of spatial partitioning and overlap. Human-otter conflict in the landscape will be documented simultaneously for future conservation management. We hope to conduct a radio-telemetry study once we identify hotspots of activity among the three species of otter along the coast after this 2-year project. Telemetry will permit the collection of important ecological data on daily movement, activity pattern, home range and behaviour, but inference may be greatly limited by small sample sizes that permits allow.

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

We have submitted an article to the Malaysian Naturalist (MN), a popular nature magazine that the Malaysian Nature Society (MNS) produces quarterly to showcase research efforts and conservation issues in and around Malaysia. The article will be posted in the September 2021 issue. At the same time, we are currently preparing a manuscript which will be submitted to the journal Global Ecology and Conservation (GECCO).

During the grant period, I delivered two public talks on the project.
On 16th October 2020, I was invited by the Have Hope organisation to deliver a talk entitled "Otters – Malaysia's Unsung Mammal". The link to the talk's recording is:
https://fb.watch/6VaYiaJ5tr/

On 26th May 2021, I was invited by the International Otter Survival Fund to deliver a talk entitled "Research on the Kuala Selangor Otters (including the rare hairy-nosed otter) and the work of the Malaysian Otter Network" in conjunction with World Otter Day 2021. The link to the talk's recording is:
https://www.youtube.com/watch?v=Y6wWGgZz_Tc&t=177s

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

The grant was used from September 2020 to September 2021. However, due to the spike of COVID-19 cases (~20,000 new cases per day) starting in June 2021, the government imposed total lockdown and inter-district and state travelling was prohibited. Hence, field research activities were stalled for 3 months. Significant progress was made in the laboratory with previously collected faecal samples. The field survey is due to be resumed in September 2021 with the recent lifting of inter-district and state travelling bans.

8. Budget: 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. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Accommodation (conducting fieldwork in KSNP)	1611	852	-759	The local exchange rate used is 1 £ sterling equals 5.38912 Malaysian Ringgit. Field accommodation costs were partially covered by co-funding. The remaining amounts were used to support the honorarium for two laboratory research assistants to achieve the main objectives of this project
Transportation (toll and fuel for travelling to KSNP and travel around to adjacent wetlands for socioecological survey)	921	921		Field transportation cost was fully covered by The Rufford Foundation.
Boat renting with local communities as driver and provide assistance for remote camera	1381	1162	-219	Honorarium for local field assistants' cost had been partially covered by co-funding. The remaining amounts were used to

deployment and checking, and socio ecological survey				cover the honorarium for two laboratory research assistants
Miscellaneous field supplies (batteries, SD card, mineral water, torchlight, etc.)	740	48	-692	Field miscellaneous supplies cost had been partially covered by co-funding. The remaining amounts were used to cover the honorarium for two laboratory research assistants
Honorarium for two laboratory research assistants in conducting the optimization of PCR-RFLP		1670	+1670	The remaining amounts from the budgeted amounts were used to cover this item which helps to accomplish the main objective of this project
TOTAL	**4653**	**4653**		

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

During the 2nd year, we will complete the survey of the entire study area (Klang and Sabak Bernam districts), collect samples for species identification and determine the spatial distribution and habitat relationships of these three species to identify critical habitats and patterns of spatial partitioning and overlap. Human-otter conflict in the landscape will be documented simultaneously for future conservation management.

10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

Yes, we have submitted an article to the Malaysian Naturalist (MN), a local popular magazine that Malaysian Nature Society (MNS) produced quarterly to showcase MNS's efforts and conservation issues in and around Malaysia. The article acknowledges that the project is funded by The Rufford Foundation. It will be posted in the September 2021 issue.

During the grant period, I had delivered two public talks on the project, highlighting the Rufford logo and with acknowledgement of support from Rufford.
On 16th October 2020, I was invited by the Have Hope organisation to deliver a talk entitled "Otters – Malaysia's Unsung Mammal". The link to the talk's recording is:
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https://www.youtube.com/watch?v=Y6wWGgZz_Tc&t=177s

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

Mr. Woo Chee Yoong, Malaysian Nature Society and Sunway University, Malaysia: Principal investigator of this project who led the field research and laboratory activities and training the local field team

Assoc. Prof. Shyamala Ratnayeke, Sunway University, Malaysia: Main supervisor of Woo Chee Yoong's MSc study in this project who supervised Woo Chee Yoong in methodology and data analysis

Dr. Sandeep Sharma, University of Goettingen, Germany: Co-supervisor of Woo Chee Yoong's MSc study in this project who supervised Woo Chee Yoong and the research assistants in PCR-RFLP

Dr. Chew Jactty, Sunway University, Malaysia: Co-supervisor of Woo Chee Yoong's MSc study in this project who supervised Woo Chee Yoong and the research assistants in laboratory activities

Late Mr. Balu Perumal, Malaysian Nature Society, Malaysia: Superior of Woo Chee Yoong's MNS Otter Project in this project who supervised Woo Chee Yoong in local community works and overseeing the operation of the project

Dr. Pazil Abdul Patah, Department of Wildlife and National Parks Peninsular Malaysia, Malaysia: Local collaborator in this project who is the local otter expert and conducted PhD study on otter ecology in Malaysia, guided Woo Chee Yoong on otter ecology and permission matters from the government authority

Mr. Michael Isthyben Sawaminathan, Kuala Selangor Nature Park, Malaysia: Park manager who provided the permission to conduct survey in the park and assistances from the park staffs to assist Woo Chee Yoong in the survey and information about the otter in the park

Ms. Suganiya Rama Rao, Sunway University: Laboratory research assistant who assisted in the optimization process of PCR-RFLP

Mr. Adrian A/L Kannan, Sunway University: Laboratory research assistant who assisted in the optimization process of PCR-RFLP

Mr. Azlie bin Aris, Malaysian Nature Society: Local field assistant who assisted Woo Chee Yoong during the field research survey

Mr. Shakh Muhammad Iszuan bin Shakh Manzar Ahmed Manzu, Malaysian Nature Society: Local field assistant who assisted Woo Chee Yoong during the field research survey

Mr. Hassan Bin Mat, Malaysian Nature Society: Local field assistant who assisted Woo Chee Yoong during the field research survey

Mr. Shakthi A/L Periasamy, Malaysian nature Society: Local field assistant who assisted Woo Chee Yoong during the field research survey

Mr. Kahar bin Buntal, Malaysian Nature Society: Local boatman who assisted Woo Chee Yoong during the field research survey

Mr. Kamarul bin Abdullah, Malaysian Nature Society: Local field assistant and boatman who assisted Woo Chee Yoong during the field research survey

Mr. Haizan anak Kamarul Zaman, Malaysian Nature Society: Local field assistant who assisted Woo Chee Yoong during the field research survey

Mrs. Norsyila binti Ali, Malaysian Nature Society: Local field assistant who assisted Woo Chee Yoong during the field research survey

12. Any other comments?

We hope The Rufford Foundation is happy with our progress. We intend to apply for a 2nd Rufford Small Grant to support the 2nd year of this project.