

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	Pema Khandu
Project title	Foraging Activity Patterns of the Critically Endangered White-bellied Herons (<i>Ardea insignis</i>) in Punatsangchu and Mangdechu river basins of Bhutan.
RSG reference	26102-1
Reporting period	July 2019
Amount of grant	£4994
Your email address	pksesay@gmail.com
Date of this report	30 July 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
Investigate the diet composition and prey species availability in White-bellied Heron (WBH) foraging sites.				We found out that WBH feeds on three genus of fish species from 12 species of fish available in their foraging habitat.
Investigate the factors affecting the foraging activity patterns of the WBH				We found out that microhabitat types, seasons, time of the day and age are important factors which affects their foraging activity.
Create awareness on the importance of the conservation of the WBH				Gave awareness talks to local fishermen group, foresters, academicians and scientists. Carry out art, essay writing and speech competitions in two selected schools (which falls within the premise of WBH habitat districts) on WBH coinciding with Earth Day 2019

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

We were confronted with numerous unexpected challenges during our field work. We tried locating the WBH by walking along the riverbank which we later realised was a futile effort on our part because it caused more disturbance to the bird by flushing out the bird from its foraging spots more easily than locating the bird from the roads. Therefore, we tried locating the WBH from the roads as transects. It was much efficient than using riverbank as transects because most roads which we used as transects were running parallel to the rivers and it provided access to vantage points to make our observations rigorously without causing any disturbance to the foraging herons. Initially we also attempted to score the foraging behaviour and required raw data into the prepared datasheet, but it seldom missed certain events in the total foraging bout, thus videotaping and re-evaluation of the foraging activity helped overcome such issue.

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

1. Understanding the diet composition of WBH: one of the very significant result of our study was gaining insights into overall diet composition of the WBH. We could carry out a quantitative assessment of the three fish genera consumed

by the WBH, although there was also some diet type which we could not determine its identity due to prey size being too small to allow any identification or observer located at a faraway distance from the focal species. We also found out fish prey biomass catch per unit effort in each type of river microhabitats (pool, riffle, pond and run).

2. Relative use of microhabitat types: out of four categories of river microhabitat types (pool, riffle, pond and run), we found out that WBH mostly preferred riffle and pool microhabitats relative to its availability. Run was the least preferred microhabitat by the WBH.
3. Create awareness on conservation of WBH: besides our empirical findings on their foraging ecology, we could also create awareness in the local community which is an important aspect of conservation. We helped report illegal fishing and educate the local fishermen group. We targeted two central schools in the WBH habitat region to actively engage the young learners and educators (about 2000 individuals) to kindle and spread the conservation message by initiating numerous arts, speeches and essay writing competitions on WBH.

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

We involved the members of the WBH local working group in numerous field trip expeditions to share and learn from each other. Local working group members learnt how to locate the herons by scanning the suitable habitats on which the WBH prefers to forage. They also gained experience on identification and sampling techniques of fish prey available in the WBH habitat. We hired local community member for our entire field works. We involved students and educators coming from the habitat regions to create awareness. These activities were carried out to generate positive outlook in the mindset of the community and community support for the conservation of the WBH.

5. Are there any plans to continue this work?

Certainly, we had a plan to monitor the foraging behaviour of the WBH over a long period of time in collaboration with local working group, foresters and relevant organisations. We will continue to create awareness through dialogues and availing opportunities.

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

I have already shared our preliminary results to the Royal Society for the Protection of Nature (RSPN) and relevant WBH field researchers in Bhutan on May 11th 2019. I have been also able to make a special seminar in Prince of Songkla University, Thailand whereby I have presented the most part of our study findings. We also intend to publish our findings in international peer-reviewed journals for dissemination of the information to the scientific community. I will also deposit a copy of my thesis book to Department of Forest and Park Services, National Biodiversity Centre, Ugyen

Wangchuk Institute of Conservation and Environmental Research and my university for the future reference.

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 utilised from July 2018 to July 2019 which is the total duration of the project planned for.

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
Research equipment (Camera, binocular, telescope, printing, fishing gears etc.)	1355	1921	+566	Used from funding received from RSPN, Bhutan.
Food cost and logistics	1685	1264	-421	
Gasoline	905	905		
Subsistence payment for research assistants	1049	1655	+606	
Total	4994	5745	+751	

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

Although we have tried to quantitatively investigate the type of diet and factors affecting their foraging activity, still numerous aspects on the basic biology and ecology of the imperiled species remains largely to be explored. Therefore, we would like to suggest for the following actions:

1. Determine the home range size of the WBH including their roosting and foraging areas for better management and protection of their habitat.
2. Restore foraging habitats lost to developmental activities (hydropower and sand mining).
3. Create suitable microhabitats and enhance the native and preferred fish species in the WBH foraging areas.
4. Find out the nesting predators of WBH which causes one to two nesting failures every year culminating to 25% to 50% of nest predation and develop mechanisms to control and protect nests.
5. Studies on prey density, availability and migration will be useful for

appropriate management interventions.

6. Study on roost site use and selection will be useful to protect their roosting habitat along with the riverine forests.

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

We used the Rufford Foundation logo during all awareness campaign, meetings, and seminars. Besides usage of logo we also fully acknowledge the Rufford Foundation in our oral presentations.

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

Mr. Pema Khandu:

I am the principal investigator of this project. I am responsible for planning, executing and communicating all research goals.

Assist. Prof. (Dr.) Sara Bumrungsri and Prof. (Dr.) George A. Gale:

They were my thesis advisors who guided my work until completion. Dr. Sara also made visits to my study sites during the early execution of this project for his timely help and advice.

Mr. Sonam Dorji, Mr. Tenzin Dorji, Mr. Krishna, and Mrs. Chencho Bidha:

Provided their support in my field works to survey and locate WBH, and video tapping the foraging activity and fish sampling.

Mr. Gyeltshen and Mrs. Sonam:

They supported me to create awareness in their schools and locality for the conservation of the WBH.

Mr. Kinley:

He works as senior forestry officer of Tsirang forest division and helped me installing camera traps.

12. Any other comments?

We remain deeply grateful to the Rufford Foundation for providing financial support for our research which enabled us to execute our planned activities efficiently. To this end we have been able to successfully achieve our research goals. We are confident that our findings will aid in better conservation of the white-bellied herons not only in Bhutan, but also in other range countries (Myanmar, India, and China).