Final Evaluation Report

Your Details	
Full Name	Sayam U. Chowdhury
Project Title	Intertidal mudflat features important for the conservation of globally threatened migratory shorebirds in Bangladesh
Application ID	35313-2
Date of this Report	14 October 2022

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
1) Understanding key ecological factors influence shorebird distribution and abundance in coastal Bangladesh			✓	We are still working on full scale data analysis and will share publications derived from this objective with RSG in due course.
2) Quantifying anthropogenic disturbance and site-specific threats			✓	We have quantified direct threats at some of the key sites. We will add more materials to this section during peer-review publication.
3) Conducting shorebird surveys at selected sites			✓	Described in detail below (c).
4) Promoting globally threatened shorebird conservation through various outreach events			✓	Described in detail below (d).

2. Describe the three most important outcomes of your project.

(a) Objective 1: New information on shorebird diet and density of prey species was collected. A total of 29 shorebird species and 22 macroinvertebrate taxa were recorded during the study period at the eight coastal sites. Major groups represented in the sample of 2,621 macroinvertebrates included bivalve molluscs (44% by number), polychaete worms (28%), oligochaete worms (11%) and amphipod crustaceans (7%). Density of Eurasian curlew was highly correlated with the numerical density (per m^2) of bivalves ($R^2 = 0.77$, $p = 0.004$) but this correlation was weak for common redshank ($R^2 = 0.012$, $p = 0.79$), lesser sand plover ($R^2 = 0.27$, $p = 0.19$) and spoon-billed sandpiper. Similarly, the density of Eurasian curlew was strongly correlated with the numerical density of oligochaete worms (per m^2), with densities of common redshank ($R^2 = 0.34$, $p = 0.13$) and lesser sand plover ($R^2 = 0.23$, $p = 0.23$) showing a similar but not significant pattern. The density of spoon-billed sandpipers showed a slight tendency to be positively correlated with the numerical density of amphipod crustaceans, but again this was not significant ($R^2 = 0.29$, $p = 0.16$).

In addition, preliminary results indicated that shorebirds exhibited variation in density related to elevational gradient, even though biomass and numerical density of macroinvertebrates did not vary consistently with elevation. Probability distributions of density of shorebirds in the tidal flat elevation zones were significantly different (Kruskal-Wallis test: $K = 15.3$, df = 2, $p < 0.05$), while macroinvertebrate densities ($K = 3.05$, df = 2, $p = 0.21$) and total biomass ($K = 4.16$, df = 2, $p = 0.12$) were similar across the zones.

(b) <u>Objective 2</u>: Major human activities across all plots include fishing (57.8%, n = 114), shell collection (18.4%) and crab hunting (10.5%), none of which appeared to affect shorebird numbers considerably (Figure 2). However, we detected significantly (Welch's two sample t-test: t = 7.50, df = 2.53, p < 0.05) fewer shorebirds at transects when sand dredging was ongoing.

(c) <u>Objective 3</u>: Selected shorebird sites were monitored throughout the boreal winter (2021-22) and important count data on the occurrences of globally threatened shorebirds species such as the Critically Endangered spoon-billed sandpiper (*Calidris pygmaea*), and Endangered Nordmann's greenshank (*Tringa guttifer*) as well as great knot (*Calidris tenuirostris*) were gathered. Using these and data from secondary sources, we have identified priority shorebird sites in the eastern coast of Bangladesh. These data will be used to propose as important wetlands sites in the east coast of Bangladesh.

(d) <u>Objective 4</u>: Our outreach activities include visiting four local schools. Around 350 students of different classes and 14 teachers were reached out through these two events. Organisers/researchers delivered speech on migratory birds, shorebirds with special focus on shorebirds, their importance and threats. Participants were also informed about the importance of the coastal wetland, mudflat, shorebird diversity of their locality considering national and international aspects. Some local schoolteachers also delivered speech on importance of birds and healthy environment for people. Informative leaflets and spoon-billed sandpiper t-shirts (as a flagship species) were distributed. After the talk, quiz and painting competitions took place. A total of 30 winners were rewarded with education related materials such as school bags, books on nature/wildlife and painting materials.

In addition, we conducted two semi-structured questionnaire surveys, one during our first visits to the village and one during the final visit, we then compared local people's knowledge and interest in nature conservation especially shorebirds. We found their (*n* = 42) knowledge increased by 35% and 78% if only considered schoolchildren (*n* = 18).

Photo 1. Outreach events at local schools.

Photo 2. Data collection to understand factors influence shorebird distribution and abundance

Photo 3. Shorebird surveys and macroinvertebrate (shorebird diet) data collection.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

N/A

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

A total of nine community members were employed as field assistants during our fieldwork. A minimum of 350 local schoolchildren and 20 community leaders were informed on the sustainable use of tidal flats and importance of their local coastal wetlands. According to some of them, this information will help them protect the sites against small and large-scale developments that happens in and around tidal flats. The project also helped establish a relationship between research and key members of the local community, which will help us to continue long-term conservation work in the area.

5. Are there any plans to continue this work?

Yes, we hope to continue the research work at our project sites. The next steps will involve satellite tagging of migratory shorebirds to understand their local habitat use and further engagement with local communities.

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

We have already shared our preliminary results with local stakeholders and Bangladesh Forest Department. We are now working on a manuscript to publish our results for international scientific communities.

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

We will now zoom into the site-based management and work on shorebird local habitat use to inform the Forest Department which will help to develop management plans. We expect that the information on the habitat use of shorebird during the boreal winter would be useful for other shorebird sites within Bangladesh and elsewhere in Asia.

8. 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 printed Rufford Foundation's logo on our campaign materials such as leaflet, t-shirts and banner.

9. Provide a full list of all the members of your team and their role in the project.

Professor Rhys Green [Department of Zoology, University of Cambridge]: Advisor

Professor Andrew Balmford [Department of Zoology, University of Cambridge]: Advisor

Md. Foysal: Research Assistant

Nazim Uddin Khan: Research Assistant

Syed S. Inam: Research Assistant

Samiul Mohsanin: Volunteer expert

Omar Sahadat: Volunteer expert

Sakib Ahmed: Volunteer

Zohra Mila: Volunteer

Shahriar Rushdee: Volunteer

10. Any other comments?

We are happy to share any additional materials including project photos. We will share our papers related to this project with The Rufford Foundation when published.