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	Dr. Siddhartha Pati
Project title	Trade and by-catch assessment of Indian Horseshoe crab along with its conservation by integrating education and awareness among Community along Balasore Coast
RSG reference	Application ID: 24630-1
Reporting period	12 Months
Amount of grant	£4,700
Your email address	patisiddhartha@gmail.com
Date of this report	20.02.2019

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
To understand the local perceptions and cultural values towards the HSC and to assess the level of anthropogenic threats (such as trading, poaching, hunting etc.) on the HSC so that specific conservation and management priorities may be identified.				We completed questionnaire surveys in all of the 10 villages along the Balasore coast and obtained information on social and economic factors that promote the killing and capturing of horseshoe crab. People say: demand for its telson during traditional ceremonies; perceived medicinal value of blood (their blood is believed to cure wound heal when it mixed with boiled mustard oil); and some boat person replied increased demand for the blood by traders mainly from china. We obtained information on reported frequency of horseshoe crab perception by asking respondents if they have witnessed or participated in the killing of horseshoe crab in the last year. Respondents also gave estimates of the number of times they have witnessed or sold horseshoe crab.
To build community capacity and conduct by-catch reduction training programs within the community.				A core group of 20 volunteers was selected among the local community and were trained for by-catch reduction training programmes on HSC conservation. By catch lease activities has been conducted after receding of tide by the trained team. They promised to train the same among other in their village to avoid the heavy mortality
To spread conservation awareness among the local fisher community and other stakeholders who live around HSC breeding areas and nesting sites.				We completed conservation awareness meetings in all selected communities. During conservation meetings, we discussed the vital roles horseshoe crabs play in the ecosystem and the danger of losing species. We addressed issues such as the need to balance cultural needs

				with biodiversity. We worked with focused groups (mainly age grades and some village clubs) in organising and implementing community awareness meetings. The involvement of these focus groups was important in the acceptance of our project by local people and aided in the spread of our conservation message within the communities. For 1 year a strong effort has been dedicated by our team on promoting public awareness for fishermen, local authorities and community people for the conservation of Indian horseshoe crab. Thousands of leaflets (in local languages), posters and sightings data forms have been distributed all over the Balasore district. A major instrument to fulfil our conservation role is by raising public awareness, Habitat cleaning event for better breeding activity, Crab rescue programme and by educating people. In the course of its conservation programs, our team have also executed series of painting and quiz competition along the coastal areas of Balasore district on the theme of "Know me and Save me", with the aim to sensitise the young generation and school children.

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

Difficulties: Attitudes of the local community towards the HSC are tough to change due to the value of its blood for biomedical applications. Potential conflict was high within the local community towards the conservation team. Inaccessibility of certain habitat areas for habitat survey was a major problem for project team.

Tackled: By demonstrating and proving to the local community the advantage of having horseshoe crabs in the local area which help in eco-tourism, add to a lot of biodiversity and hence aid them in the profession of fishing. The local fishing boat was used to reach the yet inaccessible part of horseshoe crab habitat and

spawning grounds. The same local people were partnered to know the illegal trap/supply of Horseshoe crabs.

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

Outcome 1: Beach patrolling initiated
We identified an array of social and economic factors that promote the trading and catching of horseshoe crab in Balasore coast. One of the factor is the general decline in the population of big games which make horseshoe crab blood (blue blood) a traditional medicine and they mix the blood with boiled mustard oil and people sell the liquid as traditional medicine for wound healing and bone fracture. Findings from our study suggest that trade on horseshoe crab and its part is currently insidious in the region. Fifty-five percent of the respondents in our study have witnessed the sale of horseshoe crab parts in the last 2 years. We informed these facts to the local government authority for and they have already started beach patrols during new moon and full moon day in Mahisali, Khandia, Khapra, Bahabalpur, Balaramgadi, Kantiachira estuary and nearby fish market to reduce trading and to stop poachers.

Outcome 2: The reduce rate of poaching/trading activities of HSC along Balasore Coast.
We had already organised various programmes and campaigns to raise awareness in the local community to curb illegal horseshoe crab trade in Balasore coast. This time we distributed 5000 information leaflets to raise public, fishermen and boat drivers concern towards illegal horseshoe crab trade. The information leaflet with image and relevant texts in Odia language will help to sensitise the public, fishermen and boat drivers of entire coast of Balasore district. At the same time, a sensitisation workshop was conducted at Primary School, Bahabalpur. The workshop helped to aware the drivers and helpers about illegal horseshoe crab trade, laws, regulations and punishment regarding illegal horseshoe crab trade as in India horseshoe crab has been included under the Schedule IV of the Wildlife Protection Act of 1972 as per gazette notification no S.O.2293 (E) on sept 2009

Outcome 3 By-catch releasing activity
The project has released trapped horseshoe crab back to the sea. Thousands of live horseshoe crabs those were trapped in fishing nets and jetty stone were removed and released into sea water to avoid heavy mortality. Additionally the fishermen, surrounding population and boat person in particular were made aware of the urgency of situation for protection of horseshoe crab and its breeding ground. In an effort to facilitate nesting and to conserve the living fossil, "horseshoe crab" in the different estuary in Balasore district, the team executes an awareness cum cleaning event about 5 km stretch along the sea beach. Members of the Association for Biodiversity Conservation & Research (ABC), in association with National Service Scheme (NSS) volunteers of Fakir Mohan University, conducted a beach-cleaning programme in a bid to safeguard marine flora and fauna along the Balasore coast

Outcome 4 New breeding ground identification
This project has an important outcome of that New breeding site has been identified along the Bhadrak coast(That took place because of habitat shifting due to the degradation of breeding ground and all anthropogenic activities along Balasore coast). These four places were Chandanipal creek (20.7879°N, 86.9595°E), Dosinga creek (20.8139°N, 86.9636°E), Udabali or Kanika Island (20.8038°N, 87.0177°E) and Chudamani ghat (21.1379°N, 86.8074°E). The first three places come under Dhamara coastal region and the last one comes under Basudevpur coastal region.

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

During awareness and conservation education and outreach programme, we worked closely with Sarpanch, representative of SSH groups, representatives of Fishermen and Fisherwomen Cooperative Society, teachers of the schools and general public in organising and implementing conservation awareness meetings in villages and different schools. Each of the surveyed villages along Balasore coast provided two young volunteers to assist our team as paid guides during field surveys. Working shoulder-to-shoulder with our project team members, these volunteers gained first-hand knowledge on the ecological and economical importance of this valuable species and also realised that this species is the integral part of their ecosystem, and play a vital role in the ecology of estuarine and coastal ecosystems and communities and the way the population is declining and were able to share their experiences with other people in this village during community conservation awareness activities. They also promised to become active agent of our conservation message within their communities beyond the duration of this project.

A core group of 20 volunteers were trained on conducting conservation awareness sessions for HSC conservation among the local community. Volunteers and school teachers were conducted educational programmes for the school children using IEC (information, education and communication) material. Activities such as habitat cleaning, by catch releasing, rally, meeting, street play etc. were also being conducted with school children and the local community. Inter-school competitions in essay, debate, quiz, paintings, songs etc. were held around the theme of the HSC. Local government stakeholders and the media were involved in these programmes as resource persons such as speakers and judges. Environmental camps through community participation were organized in this area to create awareness among the local people so that they do not kill this species or disturb their breeding grounds. Local nearby secondary schools were approached to actively include students in conservation initiatives.

5. Are there any plans to continue this work?

We started to work on conservation education, controlling illegal wildlife trade, wildlife research in Odisha since 2014 and doing small things out of the best what we have. District forest office, local university, local authority and public are really happy with the work we have done in the region and the government has awarded the most prestigious wildlife conservation award that is Biju Pattnaik Conservation

Award for Wildlife Conservation. We are very satisfying with the impact of our work in the region and further more interested to work in the area to understand reason of shifting of its habitat and also interest to work on habitat study. We have also formed a legal non profit non government organization named Association for Biodiversity Conservation and Research (ABC) www.bioconservation.org , registered in 2018 under Indian Trust Act, and has the main objectives of studying and protecting horseshoe crab and other valuable biodiversity found in Odisha

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

We are sharing our results with university students, district authorities and national conservation stakeholders through various talks and workshops. More specifically we have shared the results through community and newspapers, electronic media. We have also shared our results in national and international level like Conservation Management and Leadership Workshop-2018 organised by the Conservation Leadership Programme (CLP)" at Sulawasi, Indonesia, National seminar on Recent Advances on Molecules of Chemical and Biological Importance (RAMCBI) organised by municipal college held at Rourkela, India, Rufford India Conference, Goa 2018 organised by Foundation for Ecological Research Advocacy and Learning (FERAL). An abstract of our findings has already been submitted for an oral presentation in the forthcoming The 4th International Workshop on the Science and Conservation of Horseshoe Crabs 2019 scheduled for 15th – 20th June 2019 in China. We have communicated an article in Journal of Threatened Taxa entitled "Diversity, Distribution and Morphometric Analysis of Horseshoe Crabs along Bhadrak Coast of Odisha, India" and it's under review. We are also working on another journal articles which will be published in peer-reviewed journals and few more popular articles to share the results to the general public and scientific communities.

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 Rufford Foundation Grant was used for a total of 11 months which is 1 month lesser than the proposed length of the project.

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
Others e.g. Contingency	400	350	-50	
Material Print, Publication, Report Production result	350	360	+10	

dissemination, Documentary production				
Reconnaissance	500	500		
Boat Hire	500	600	+100	
Miscellaneous incidentals	1200	1000	-200	The budget for Miscellaneous incidentals was cut down to offset the cost of unbudgeted items
Scientific& Field Material	300	500	+200	We had to get GPS, Refract meter to know the location and hydrology salinity.
Outreach and Education activity material		500	+500	We had to do several awareness activities on the theme of Horseshoe crab to create awareness among students, youth and local community. The initiative was aimed at inspiring "a growing generation, knowledgeable and motivated to take positive actions to conserve Horseshoe crab.
Food for team and expert	300	300		
Accommodation for team	350	350		
Travel and Local transportation (Including fuel)	800	1200	+400	Travel and Local transportation (Including fuel) has been spent for regular field work, survey for their nesting ground, data collection from different zone, and for organizing different by catch releasing programme. Also we had to travel to Bhadrak coast as the habitat is shifting towards Bhadrak coast
Total	**4700**	**5660**	**+960**	We used an internal fund from Association for Biodiversity Conservation & Research (ABC) in cover overspend of project costs.

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

- Strategic community-based conservation awareness campaign along the Odisha coast.
- Develop modalities for training and supporting local people on livelihood options as an alternative to selling horseshoe crab.

- Communication with the central government through Ministry of Environment and Forests regarding national issues to help the government in effective policy making that could serve as a solution to local conservation problems. During these meetings, we will specifically explore the possibility of future collaborations in order to develop an integrated approach that would mitigate the menace of population depletion and breeding ground destruction of horseshoe crab in Odisha coast.
- Collaboration with more local stakeholders, individuals working on horseshoe crab and their conservation and related groups to develop holistic approaches to species-specific conservation.

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?

The Rufford Foundation logo featured prominently in all conservation posters, leaflets that were distributed during our awareness campaigns. We also acknowledged the Rufford Foundation as the sole funder of our project during meetings with villagers, community leaders and focused groups. Further acknowledgement of the support received from the Rufford Foundation was made during the TV talk show, in publications (under review) and presentations that was come from this study. Yes, Rufford foundation got lots of publicity and appreciation in Odisha.

Few online links I got during final report preparation:

https://www.dailypioneer.com/2018/state-editions/raksha-bandhan-celebrated-in-bwar.html
http://www.orissapost.com/wildlife-warrior/
https://www.dailypioneer.com/2018/state-editions/bswar-beach-cleaned-to-save-marine-species.html
https://www.telegraphindia.com/states/odisha/drive-to-clean-beaches/cid/1411653
https://m.dailyhunt.in/news/india/english/odishatv-epaper-odishatv/blue+blood+crab+in+danger+of+being+wiped+out+from+balasore+shores-newsid-96310687
https://www.thestatesman.com/cities/beach-cleaning-drive-abc-1502617498.html
http://bioconservation.org/news/congratulation-siddhartha-pati/

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

Dr Gobinda Chandra Biswal: He is working as a senior lecturer. As max student in his college belongs to fishing community, a smooth linkage was developed which was enable us to carry out the conservation work with less conflict. He has been working as an active member of IUCN SSC Horseshoe crab specialist group.

Mr. A Sai Rajesh: At present working as research fellow and associated with many community organisation. He is having Sound Knowledge in Local Area Locations

and Maps, Excellent Communication Skills with a Sound Public Relations, In-depth Knowledge on the Subject Matter, and Expertise in Computing.

Mr. SanatanTudu: He is working as a researcher. As he belongs to tribal community and his main skills was to narrate about the incredible animal in front of tribal community in tribal language and he was assisting the team leader to achieve the objective of the proposed project.

Artist Kesu Das: Being a Painter, Writer, Sculptor and Active Social Worker right since Master's Degree and Chief Cultural Advisor at NOCCi Business Park, Balasore he is having the vast public contacts, Native of Region rich with Horseshoe Crabs, Excellent Oration and Literary Excellence in Local Language. He was contributing the role of Social and Public Liaison, Soft Skills and Cultural Integration with the Conservation to spread the Awareness and Outreach of the Program, Integration and Propagation of Conservation with Art, Designs and Literature.

12. Any other comments?

We are very happy with the results and look forward to be able to keep working in this area. We immensely thank to Rufford Foundation for funding this project. We anticipate to receiving similar support in the future as well. Below few are the future works to be done to understand and to save this valuable species along Odisha coast.

- Measurements on water current/sediment transport (at river mouth and inside estuary) to study the nesting, density and breeding biology.
- Enact a no-harvest regulation on adult female HSC.
- Increase awareness and education of local people on horseshoe crab's significance and conservation, along with possible health risks if they were consumed.
- Continued monitoring on the arrival of spawning of horseshoe crab at Khandia estuary as well as other places along the Balasore coast.
- Marking, tagging or microchipping for experiments to find revisits of the horseshoe crabs.
- Establishment of a 'Horseshoe Crab Estuary and Research Centre' for population restoration.