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	Gaurav Vashistha
Project title	Population studies on the critically endangered Indian Gharial *Gavialis gangeticus* in the Katarniaghat wildlife sanctuary, Uttar Pradesh, India
RSG reference	19031-1
Reporting period	Nov 2016 – Nov 2017
Amount of grant	4513
Your email address	Gaurav.vashistha91@gmail.com
Date of this report	08-11-2017

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
Population census for gharial population		x		We could do two boat surveys completely focussed on population census; however our first survey was greatly affected due to fog and poor visibility.
Monitoring nesting and hatchling success				We have complete data on the nesting sites, number of trial and actual nests for the year 2017. We also collected data on egg and hatchling mortality and predation.
Sampling for genetic studies to assess genetic diversity				We have collected 75 samples from 2017 breeding season, using non-destructive sampling.
Educational awareness				We successfully conducted educational programme at four local schools, however our target of at least eight educational institutions couldn't be achieved.

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

- **Fog:** The population census is highly dependent on the clear visibility. Because of the nature of the terrain and habitat features in a Tarai landscape, the only phase of highest visibility with longer duration starts after mid-January. This factor affected our work in November-December 2016.
  Plan your objectives accordingly so that population count surveys can be conducted in time of highest visibility.

- **Boat:** We were using boat from the Forest Department on co-operation basis. Tourism is highly developed and Katarniaghat is a well travelled protected area. Also foot survey is very much limited to few point count areas; otherwise a boat is the only way of doing the surveys. This dependence on Forest Department clearly affected our work schedule multiple times. Therefore having your own boat will be a great boost for scheduled completion of work plan.

- **Demonetization across India:** It took place in December, 2016 and we ran out of cash. Since our field work is in a remote area, cash transactions are preferred against net transfers due to poor internet services and other

personal issues. It was something no one predicted and hence we took few measures to keep our payments in cash.

- **Devaluation of currency exchange rate** from pound to Indian rupee at the time of sanction of project amount. The amount was however efficiently utilised by channelising and limiting the expenditure on priority basis activities.

- **Storage of fresh samples:** Due to lack of regular current, we were stuck with keeping the samples in low temperatures. The long duration of field work and remoteness of area adds to the problem. Therefore, we bought several ice packs and thermocol boxes. We purchased industrial ice from a local factory and used that to freeze our ice packs. We used these ice packs in turns to keep our samples at low temperatures. Ice had to be purchased on daily basis. We suggest that one should invest in field sampling ice boxes with better thermal insulation and storage spaces as they can maintain temperature much better and for longer durations. However you will still need ice for maintaining the temperature. Alternatively one can dry the sample and reduce its storage requirements. But this will expose the sample to contamination and degraded DNA content.

- **Presence of elephants at nesting site:** The elephants use the same mid river islands where the gharial nesting sites are present. Also they are in an active feeding and mating stage which collides with the gharial nest hatching. This situation is interesting as we use to wait near our hatching sites for hours while the elephant use to sit in water just below the nesting site. We were charged several times as we approached the site. There is no alternative to this situation as we can only remove the elephant by using crackers and other remedial methods. However they are also in their mating stage and equally threatened as my own species gharial. Therefore a balance should be struck between the two and alternatively one may choose to sit and wait for the elephants to move away.

- **Lack of drinking water:** Ground water at Katarniaghat Wildlife Sanctuary is rich in iron and severely affects the digestion and may also result in skin related issues. We were able to manage RO drinking water from a supplier but the use of ground water for other daily requirements exposed us equally to the iron issue. Best remedy is to never ever use ground water for drinking and brushing. Prefer using river water for bathing and washing clothes.

Being our first time bound and multi-dimensional project, many of the above mentioned issues clearly affected my work schedule and resulted in minor medical issues. However, some of them can be handled with prior arrangements.

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

I. **Population count and ecological study:** we have managed to do a complete population count of gharials in KWS with scientific approach which was lacking for a long duration of time. The information generated on

population ecology is reliable and relevant for the future research and conservation work. The observations on nesting and behavioural ecology were very interesting and significant for the gharial conservation. These observations have provided an insight on the research gap areas in KWS population to be exhaustively studied in the future for sustainable and healthy population of the species.

II. **Awareness among locals:** However our target of awareness component was partially fulfilled but we were successful in targeting the most important schools in the areas where the dependency and interaction with forest resources is highest. The target groups of the awareness activities i.e. school students of different age group and interactive approach in activities played a pivotal role in indirectly reaching the adults of societies who were informed about the species through home assignment activities for the children.

III. **Genetic sampling:** We were able to collect a total of 150 samples for 2016 and 2017. We have already analysed diversity using two microsatellite markers already reported for the gharials (Jogayya et al. 2013). Our analysis could identify separate groups in the sampled population, which is a good indication of population diversity. However we will have to increase the number of markers to gain significance of our results. Also, successful DNA extraction and sequencing proved the efficiency of our non destructive sampling method using extra embryonic membrane. It is a great achievement considering the challenges encountered while sampling the adult crocodilians.

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

The interaction of project team with locals and awareness activities in the nearby villages has opened up a path for their active involvement in the conservation related activities. The people were sensitised by the awareness on gharials on how this species is relevant for their livelihood (involvement in ecotourism) and water resources. The locals were ready to become a part of the information network to provide inputs on any activities related to conservation of gharials whether legal or illegal.

The basic information about the gharials was shared with local communities, so that they can know and understand about the status of species and its importance of conservation for the society.

We involved few young students during our awareness activities. Three local people were also involved in capacity of driver and field help during the surveys.

5. Are there any plans to continue this work?

Yes. We are going to continue our study till the next breeding season in 2018. We will be collecting genetic samples and expand our analysis by increasing our number of molecular markers. We will be conducting a revised population survey in January and February 2018, systematically collecting data using boat survey and camera traps. We will increase the duration of a survey to increase the significance of the population estimates. Also, we will be involving a NGO already working in awareness work, to assist us in our community awareness work as it reduces stress on the team as well as on resources. We will be doing an inter-population study with National Chambal sanctuary for which sampling has been done in 2017). Permission for research work at Corbett Tiger Reserve are being sought to include it in the current study.

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

We have already applied for presentation of our work at student conference on conservation sciences at Cambridge University in March 2018. Our next priority is presentation at IUCN CSG meet at Argentina in May 2018.

We are in process of writing a communication for the nesting ecology and predation which should be submitted by end of November 2017. Our work on genetic sampling is being expanded with more markers and will be finished by end of December 2017. The results are expected to be published in a good impact, peer reviewed journal.

Additionally, our work was published in a national wildlife magazine" SAEVUS" where Rufford's foundation was mentioned as the supporting organisation. Another article titled "The Dilemma of Conservation" was published online by a NGO "The Last wilderness" which focussed on the conservation issues of gharial population in India. (http://thelastwilderness.org/wp-content/uploads/2017/10/The-Dilemma-of-Conservation-Gaurav-Vashistha.pdf)

We have a Face book page "SAVING THE GHARIALS" which can be easily searched using @conservingthegharials as keyword. We share our work related pictures and videos on this page. We are frequently contacted by students and researchers via this page for any enquiry related to our project and your organization.

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 project amount was initially used to procure all the instruments. Expenditures such as travel, food and other budget heads preceded as the project moved ahead. We encountered a major setback at the time of demonetization in December 2016, when all the currencies were replaced by new ones. We had to postpone all the billing to future months while keeping a credit tab on personal assurances. Payment for the field assistants were made mid way and upon

completion of the project. Most of the expenses were completed by June 2017 as monsoons arrived and field work was on halt.

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. 1 £ sterling = INR 82

Item	Budgeted Amount	Actual Amount	Difference	Comments
Fuel for motor boat, field motor cycle	1110	1110	0	The fuel purchase was regulated to keep the expenditure in proposed amount.
Travel to and from field	448	512	-64	Expenses related to travel from last stop to field was not considered as high as it came out in actual.
Food	622	820	-198	We had to additionally spend money for supply for drinking water as we couldn't use the ground water available. We even purchased two life straw bottles to avoid bacterial infection.
GPS Garmin eTrex	88	207	-119	We purchased two instruments on a discount offer; hence we opted on buying an upgraded version of GPS while keeping the total expenses under instrument same.
Binoculars Olympus Trooper	133	65	+68	Discounted price under offer
Awareness and education	1036	1036	0	No overdue
Financial assistance to Field assistants	497	497	0	Paid in cash, upon each field visit
Fish finder 350C	513	246	+267	Brought from an authorized distributor, hence saved on the taxes and received on a discounted price.
Contingency	65	65	0	Used in minor medical issues and stationary
Total	4512	4558	-46	

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

Our work findings suggest that the gharial population is isolated in terms of habitat space, especially nesting sites. Restricted nesting has resulted in high rate of

predation and nest/hatchling mortality. We will be compiling a detailed report of our work post field work in 2018 and submitted the same to the concerned forest department for remedial actions.

The eco tourism centre lacks informative and interactive activities regarding crocodilians for tourist at the KWS. The tourists consider Tiger sighting as the actual achievement of their visit to the KWS and not sighting the gharial or mugger. Therefore we will invest more resources in bringing up the tourist attention to our species.

Gharial population at KWS is one of the four populations in India and faces issues of habitat isolation and fragmentation. We will work towards inter-population studies with all the populations present in India.

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?

Yes, the Rufford Foundation logo was used on all the educational material prepared during the awareness activities. It was also used for the certificates awarded to students during the awareness work. RF has been mentioned as project source on our facebook page and in one of the articles published in a national wildlife magazine.

11. Any other comments?

A project work is equally susceptible to variables as the life history of a species. We encountered multiple issues during our project. We were unable to do our work because it was foggy or the boat wasn't working or the elephant was standing on our nesting site. Although, we were challenged multiple times in the field, we are lot different then what we were before doing this project. We are more experienced and patient now. This project gave us such a wonderful opportunity to move one step ahead towards becoming a good field researcher. Our whole research career will now be made on lessons learned from this project funded by Rufford's small grant.

Few suggestions from field:

1. Work schedule should be flexible enough to accommodate small changes due to weather or other infrastructural issues.
2. Always involve local people as intermediary when doing an awareness activity. It helps convey your idea to the audience.
3. Always maintain a sufficient amount of contingency in project budget to accommodate over dues.


Left: Gharials mating. Right: Female gharial guarding nesting site


Left: Mugger guarding nesting site. Right: Female gharial guarding nesting site


Gharial hatchlings


Left: nesting site. Right: Hatched nesting site for both Gharial & Mugger


Left: Elephant at nesting site. Right: Elephant submerged near nesting site


Cattle near nesting site


Left: Katarniaghat sunset. Right: Dried river channel during Barrage clean-up


School education programme