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	Divya Panicker
Project title	Cetacean diversity and distribution in the Lakshadweep Islands, India
RSG reference	16159-2
Reporting period	January 2015 – September 2017
Amount of grant	£ 5000/-
Your email address	Divya_145@yahoo.com
Date of this report	30 September 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
To assess encounter rates of cetacean species through conducting boat based surveys				A total of 3880. 33 km and 78 routes covering nine inhabited islands were surveyed using a line transect framework between October 2015 and May 2016. Six strip transect surveys covering 133.38 km were conducted off the Kavaratti reef to understand encounter rates near an island between March and May 2016.
To document past and present perceptions of local communities towards cetaceans and to identify potential threats to cetaceans				We conducted semi-structured questionnaire interviews with 34 informants from fishing communities in Kavaratti and Minicoy. Six interviews were also conducted with administrative and scientific staff. A total of 40 interviews were completed.

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

One of the main difficulties faced in commencing fieldwork of the project was delay pertaining to research and entry permissions from the administrative authorities to visit and conduct research on the islands. Lakshadweep islands come under a restricted category in India and people visiting from the Indian mainland are strictly regulated. This may also be one of the reasons, why there has been so little cetacean research work conducted in the past from these waters. Therefore, the project, which was designed to start in February 2015 after receiving the Rufford grant, could only be initiated towards late October 2015.

Another unexpected difficulty, although causing a more of a minor delay of few weeks, occurred when the principal investigator contracted dengue fever while working on the islands. This was compensated through extra time and effort during the rest of the field season.

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

First outcome: The study demonstrated that the area has a high incidence of cetacean sightings that ranged across families and species. The total number of

cetacean sightings during the study period was 141 sightings of which 76 sightings were successfully identified (Figure 1, Table 1). During survey effort, 78 cetacean sightings were recorded of which 31 were successfully identified (Figure 2, Table 1). The number of sightings per day was at a mean of 2.52 (SE = ±0.26, range = 1-6, Table 1). The encounter rate of cetaceans was 2.01 sightings per 100 linear km during survey effort. Encounter rates for each route is given in table 2. A total of eight toothed whale species and one baleen whale were sighted during the study period of which seven toothed and one baleen whale was seen on effort (see Table 1 for list of species). The most abundant sighting on effort was the spinner dolphin; *Stenella longirostris* followed by short finned pilot whales, *Globicephala macrorhynchus*. A group of two individuals of *Baleanoptera* species was observed on 7th November 2015 on the ferry route between Chetlat and Amini islands and photographed however species identification could not be determined with certainty. The possibility of humpback whale and sperm whale can be decisively ruled out based on dorsal fin shape (see Figure 3). Although Bryde's whale is a possibility, the size estimate (blowhole to dorsal fin) was much larger and more similar to a pygmy blue or fin whale.

Unidentified sightings were categorised into unidentified cetacean, unidentified small dolphin (below 2.5m), unidentified dolphin (approx. 2.5 to 5m), unidentified small whale (5 to 10m), unidentified large whale (above 10m) or unidentified blackfish (black colour, 5-10m and negligible beak structure) based on estimated body size. An unidentified large whale was sighted on Kavaratti to Kalpeni route and blow was visible from a distance and could have been any of the large whale species. Only one sighting of an unidentified small whale was observed between Bitra and Amini Island the individual was light brown in colour, had a falcate fin placed further along the back and surfaced twice. The head was not observed. The estimated size range was 5-7m.

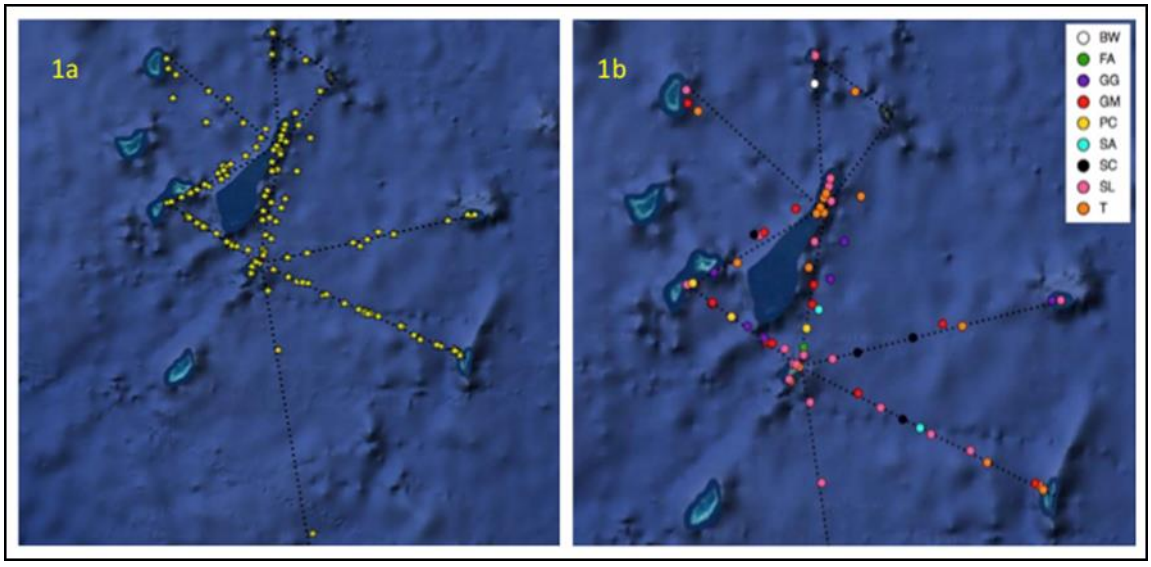

Figure 1: a) Cetacean sightings including on and off effort sightings. b) Species level sightings including on and off effort sightings (FA: Feresa attenuata, GG: *Grampus griseus*, GM: *Globicephala machrorhyncus*, PC: *Pseudorca crassidens*, SA: *Stenella*

attenuata, SC: *Stenella Coeruleoalba*, SL: *Stenella longirostris*, T: *Tursiops species*, BW: Baleen whale)

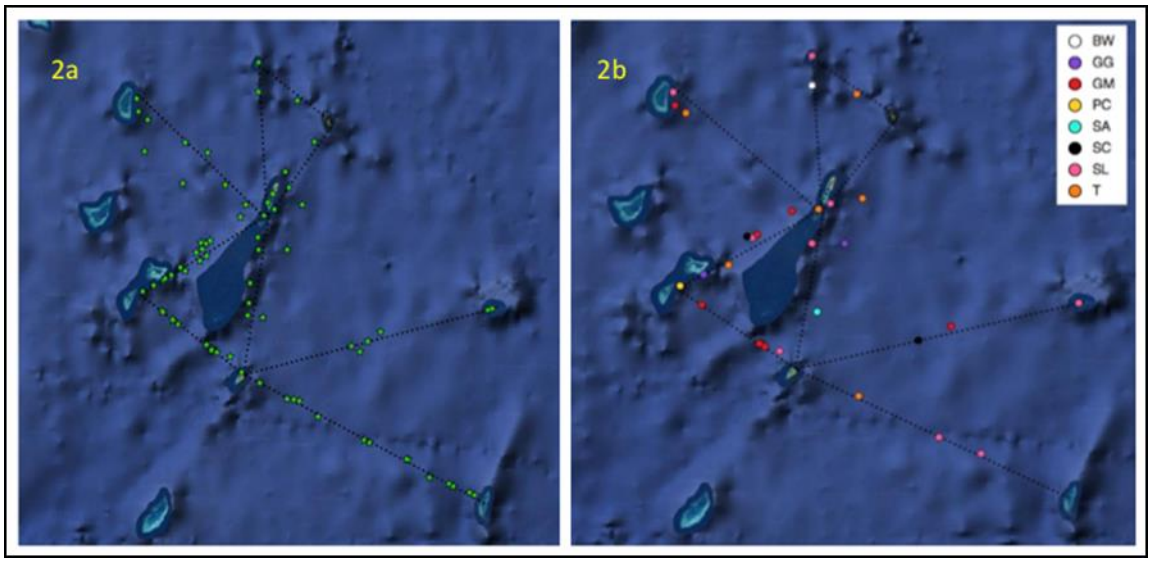

Figure 2: a) Cetacean sightings on effort sightings. b) Species level sightings on effort sightings (GG: *Grampus griseus*, GM: *Globicephala machrorhyncus*, PC: *Pseudorca crassidens*, SA: *Stenella attenuata*, SC: *Stenella Coeruleoalba*, SL: *Stenella longirostris*, T: *Tursiops species*, BW: Baleen whale)

Table 1: Species recorded during on and off effort in the study period including number of times sighted and group size.

Species	**No: of Sightings On effort**	**Group size**		**No: of Sightings On & Off effort**	**Group size**	
		Mean	**Range**		**Mean**	**Range**
Spinner dolphin, *Stenella longirostris*	9	87.44± 64.42	5-600	22	96.10± 35.68	5-600
Pan tropical spotted dolphin, *Stenella attenuata*	1	30	-	3	67.00± 43.86	30-150
Striped dolphin, *Stenella Coeruleoalba*	2	45± 25	20-70	5	40± 10.48	20-70
Bottlenose dolphin (Common & Indo-Pacific), *Tursiops species*	7	4.42± 1.17	1-8	18	6.23± 1.61	1-10
Short-finned pilot whale, *Globicephala machrorhyncus*	8	21.25± 4.98	4-40	13	17.46± 3.59	2-40
False killer whale,	1	4	-	4	8±	3-20

Pseudorca crassidens					4.02	
Risso's dolphin, *Grampus griseus*	2	21± 9	12-30	7	19.14± 5.4	2-40
Baleen whale, *Balaenoptera species*	1	2	-	1	2	-
Pygmy killer whale, *Feresa attenuata*	-	-	-	1	10	-
Unidentified cetacean	5	-	-	5	-	-
Unidentified small delphinid	13	-	-	20	-	-
Unidentified dolphin	25	-	-	34	-	-
Unidentified large whale	-	-	-	1	-	-
Unidentified small whale	1	-	-	1	-	-
Unidentified blackfish	3	-	-	4	-	-

Table 2: No: of routes completed over the survey period and corresponding encounter rates. Amini and Kadmat have been combined to the Amini-Kadmat complex as these islands are very close to each other. Surveys were conducted between Amini and Kadmat to capture any variation between these islands. Key: Agatti – AGT, Kadmat – KDT, Amini – AMN, Amini-Kadmat complex – AKC, Kavaratti – KVT, Bitra – BTR, Chetlat – CHT, Kilthan – KLT, Kalpeni – KLP, Androtт – AND.

Route	**No: of trips**	**No: of sightings**	**Encounter rate for each route** (On effort sightings) **per km.**	**Encounter rate for each route** (On effort sightings) **Per 100 km.**
AGT – AKC Dist.: 387.83 Km	7	5	0.012	1.2
AGT – KVT Dist.: 330.76 Km	7	3	0.009	0.9
AKC – BTR Dist.: 279.56 km	5	0	0	0
AKC – KVT Dist.: 326.28 km	7	1	0.003	0.3
AKC – CHT Dist.: 292.78 km	7	1	0.003	0.3
AKC – KLT Dist.: 212.14 km	6	0	0	0

AND – KVT Dist.: 557.69 km	8	3	0.005	0.5
BTR – KVT Dist.: 472.53 km	7	7	0.014	1.4
CHT – KLT Dist.: 174.74 km	5	2	0.011	1.1
KVT – KLP Dist.: 705.97 km	9	3	0.004	0.4
KDT – AMN Dist.: 103.26 km	9	2	0.019	1.9
KVT – KLT Dist.: 36.79 km	1	4	0.108	10.8
Total	78	31		

Figure 3: Baleen whale on Chetlat Amini route

Second outcome: During the ferry surveys, cetacean sightings seemed to be higher as we approached the island. Additionally although the ferry surveys were ideal to cover large areas across different depth profiles, since the islands were quite a distance from each other, the near reef habitat was likely to be underrepresented. Therefore, it was important to do a finer scale survey near an island to understand distribution/diversity patterns in this habitat better. Six near-shore preliminary strip transect surveys were conduced between March and May 2017 to document the near-island cetacean diversity from a hired tuna fishing vessel. Information on cetacean species, group size, location and behaviour was obtained including photographs of dorsal fins for individual identification. This photographic database is the first attempt at individual identification and would be important baseline information for future studies on these populations (see figure 4). We documented three groups of spinner dolphins with a mean group size of approximately 63.33±6.67

and one group of bottlenose dolphins with a group size of six. Some individuals in the group were seen in all three months suggesting a summer resident population near Kavaratti. Using markings on dorsal fins, a long-term mark-recapture study would help to identify annual to inter-annual variations in spinner dolphins groups as well as abundance estimates. These are also the same pods used by fishermen to identify tuna shoals occurring near the islands as dolphins and tuna are often associated with each other.

Figure 4: Photographs of dorsal fins of spinner dolphin individuals near Kavaratti

Third outcome: Semi-structured interview surveys with 40 respondents covering topics on cetacean distribution and diversity, perceptions towards cetaceans and threats were carried out. 100% had come across dolphins and 94.9% across whales in the Lakshadweep waters. Lal mohan (1985) mentioned that dolphins were used to identify tuna shoals. All respondents stated that dolphin activity on the water surface was used as a visual cue to identify potential tuna shoals which people associated to occur together. 31.5%, 36.8% and 28.9% stated dolphin numbers have been increasing, decreasing and remained the same respectively over their fishing years. 61.8% of respondents identified no threats to cetaceans. Others identified fishing practices, habitat changes such as variations in water currents, temperature, salinity, pollution and vessel strikes as potential threats to cetaceans in the region. 5% identified hunting to be a threat to dolphins. Burton (1941), Lal Mohan (1985) and Manikfan (1991) show evidence for traditional hunting of dolphins for local consumption through harpoons and drive fishery in the Lakshadweep Islands (except in Minicoy). During our interviews, respondents mentioned that although traditional hunting did occur, currently such hunting has been reduced to a large extent as it was made illegal through the wildlife protection act of 1972 attracting legal penalties. Additionally the rise of expertise in pole and line tuna fishery has greatly reduced the market for species such as dolphins. On the flip side, since spinner dolphins are used as visual cues to find tuna, there may be new threats

associated with vessels approaching groups. Hence additional research on this aspect is required.

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

The local community was heavily involved in arranging the field logistics and facilitating our study. During the ferry surveys, the local police staff, port authorities, vessel captains, officers and crew were involved in arranging our passage on the speed vessels and safety of our team. The project aims, methodology and specific sightings information and species were shared with them verbally throughout the project. Additionally boat crew contributed sightings they had on a voluntary basis while we were not surveying. These sightings were included in the analysis only if we could confirm the species identification. A modified sightings sheet was shared with some of the vessels to collect data during our absence however this was not included in our analysis as this was anecdotal in nature and crew was not trained for species identifications. This data was useful to understand general cetacean distribution.

Fishermen were involved in arranging tuna boats for our near reef surveys in Kavaratti. These boats were owned and manned by local fishermen who accompanied us during these surveys. Details on how to handle the boat when dolphins were around as well as our aims and methodology of the survey was discussed with boat men. Additionally rationale for species identification was also shared verbally with local fishermen when possible including pictures from Jefferson et al. (2015).

Our interviews with fisher folk and local authorities spanned from 45 minutes to an hour where many aspects of cetacean distribution, diversity, stories, perceptions, threats and legal protections were discussed to understand their knowledge and perceptions on cetaceans. These interviews apart from data collection also helped raise the profile of these animals within the community and often led to discussions on how to tell species apart, why tuna-dolphins are associated and what are the drivers for seasonal distribution of cetaceans after the interview was completed.

Towards, the end of the study, talks on the progress of the study including future directions of research and need for awareness and stranding workshops were highlighted to the Collector of the Lakshadweep administration, the Director and staff of Department of Science and Technology, the Chief wildlife warden, wildlife warden and staff of Ministry of environment and forests in Lakshadweep.

5. Are there any plans to continue this work?

Yes, we do plan to expand this project to a larger scale. This study provides crucial baseline information showing us that cetaceans consisting of multiple species use this region frequently. Following this project, the principal investigator has started preparations to conduct a doctoral study in the south west Indian waters that will include the Lakshadweep waters. The focus of the study would be on distributional

patterns and acoustic characteristics of cetacean populations in these waters. The study would also determine key oceanographic features that drive cetacean composition and distribution in the region.

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

The results of this work have been shared with the department of science and technology, Lakshadweep as a technical report. Additionally as mentioned in the previous sections power point presentations were given to the department of science and technology and ministry of environment and forests in Lakshadweep Islands. Some results of the study pertaining to the baleen whale sightings have been reported to the scientific committee of the international whaling commission (Sutaria et al. 2016). A manuscript is currently under preparation to be submitted to the journal of marine biodiversity records to communicate the results with the larger scientific community. A popular article on cetaceans in Lakshadweep waters is also under preparation to be submitted to a leading magazine or newspaper in India.

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

In the Rufford proposal, the fieldwork of the study was to take place between January 2015 and November 2015. The grant was received in late February 2015. In March 2015, as permissions were pending for approval, the principal investigator travelled to the islands to meet with officials and relevant authorities to expedite the permitting process. This trip was also coupled with a reconnaissance survey near the islands and on ferryboats and to initiate local links with the community. The bulk of the grant was used once fieldwork began from October 2016 to May 2017 after the research and entry permits were granted. Data compilation, analysis and report writing was initiated during June and July 2016, however this was only completed in August to September 2017. This delay occurred as the PI received admission for a doctoral program and had to leave the country and pursue coursework between September 2016 and July 2017. Therefore the anticipated time to finish the project was 12 months, the actual length of the project turned out to be 13 months. As there were delays from unforeseen circumstances the timing of these 13 months did range over a longer time than expected.

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.

Exchange rate when grant was received: 1 GBP = 94.66 INR (Total: 4,73,300 INR).

Item	Budgeted Amount	Actual Amount	Difference	Comments
Travel to Lakshadweep from the Indian mainland	436	468	+32	
Local travel (within island)	0	104	+104	Cycle purchased for local travel, as it was more cost effective than hiring auto rickshaws to get around the island. Initial travel at the field site and some travel involving multiple researchers still required auto rickshaw hire (buses are not available on the island). This unexpected cost was covered with the extra money from the ferry and food budget.
Ferry Trips	1012	927	-85	
Boat hire costs (near island surveys)	0	426	+426	The initial ferry surveys and interviews showed a high incidence of spinner dolphins near the islands. The ferry surveys conducted towards objective 1 did not cover the near shore habitats at a finer scale. Given the high incidence of spinner dolphins around Kavaratti island, we hired a local tuna boat to conduct near island surveys to assess spinner dolphin populations and collate a photographic catalogue of dorsal fins of the population. Due to the lower than expected expenditure of food budget, we compensated the extra boat hire with this amount.
Lodging at study sites	800	819	+19	Lodging for 8 months as budgeted earlier along with lodging during recce trip for project set up and permitting procedures that was not included in the initial budget. The supplies budget was used to cover this extra cost.
Food costs during field work	1440	965	-475	Food costs were reduced, as there was a cooking facility at lodging premises. The budget head was used to cover extra unforeseen costs of local travel and boat hire charges
PI living	800	800	0	

expenses				
Equipment for project	200	225	+25	A marine GPS was purchased for it's high sensitivity receiver in open ocean habitats as accurate location was critical to the data. Additionally a binocular that was originally budgeted was not required as we received an IdeaWild grant for binoculars. The contingency budget was used to cover this extra cost.
Supplies & materials (Stationary, cells)	40	12	-28	The rates for some of the supplies were lower than expected. This budget head was used to extra expenditure in lodging and communications budget head.
Communications	60	74	+14	The communications charges were higher than what was expected on the islands. A local base model phone was purchased for the use of field logistics. The supplies budget was used to cover this extra cost.
Printing of questionnaires, data collection sheets, reports, postage & freight)	62	81	+19	The printing costs on the island were much higher than expected. The contingency budget was used to cover this extra cost.
Contingency	150	110	-40	Contingency budget was used for unexpected travel by flight to mainland due to medical emergency (researcher contracted dengue fever). It was also used to cover extra costs for printing and project equipment.
Total	5000	5011	+11	

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

This study provides baseline information for cetacean occurrence and distribution in Lakshadweep waters. A number of important future steps are required to better understand this taxon in this region. Some potential topics have been delineated below:

1. The presence of cetaceans using Lakshadweep waters regularly has been demonstrated in this study. In-depth knowledge on their spatial and temporal patterns of usage is vital to design appropriate management and conservation strategies. Hence efforts to undertake long-term monitoring (on an annual scale) would be important to understand inter-annual distribution trends as well as abundance estimates for the different species found here.

2. The present study surveyed primarily from platforms of opportunity such as passenger ferries. While this is a fantastic method for initial studies, more detailed knowledge on abundance estimates, ecology and seasonal distribution trends require passive acoustic monitoring and dedicated boat-based visual surveys. This would also help to cover areas and seasons (monsoon) that are typically difficult to cover by ferries, as they do not operate during rough weather.
3. Spinner dolphin groups were observed during near-shore preliminary surveys between March and May at Kavaratti. Some individuals in the group were seen in all 3 months suggesting a summer resident population near Kavaratti. Using markings on dorsal fins, a long-term mark-recapture study would help to identify annual to inter-annual variations in spinner dolphins groups as well as abundance estimates around the islands. Since fishermen often use these groups of dolphins as visual cues to provide crucial information on tuna shoal presence around the island, this distribution in conjunction to tuna occurrence would be useful to understand.
4. Oceanographic conditions like sea surface temperature, salinity, upwelling processes and depth characteristics are integral to understand cetacean distribution as shown in other regions of the world (Tynan et al. 2005, Ballance et al. 2006). A study on cetaceans that also collect associated oceanographic data would be an important and logical next step to predict distribution patterns and understand variability.
5. During the study period, two sightings of large whales were recorded from the passenger ferries. In addition, Kavaratti fishermen reported that whales (identified by blow) were sighted near Kavaratti, Pitti and Suheli Islands. Anecdotal reports by fishermen from Kalpeni Island also reported higher whale sightings especially during monsoon. Given that observations such as humpback whales were recorded near Cochin (Mahanty et al. 2015) and Redfern et al. (2017) predicted areas including Lakshadweep to be an important blue whale habitat, in addition to the steps aforementioned under points 1 and 2 in this section, the presence of baleen whales and seasonal distributions need be further investigated.
6. Two fishermen reported a killer whale sighting near Suheli (identified by tall dorsal fin, coloration and field photo guide). Although anecdotal, we consider this to be an important contribution as killer whale sightings have been reported from very few areas in India namely, Agatti island, off Goa and Karnataka coast and in the Andaman Island (Rohan Arthur pers comm 2002, Abhilash et al. 2011, http://www.marinemammals.in/). Further surveys in this region are required to investigate this further.
7. While local residents are aware of cetacean presence, more in-depth knowledge on ecology, types of species, fisheries interactions and stranding responses are needed so that the community is able to make informed decisions on conservation measures. We propose more in-house training among Lakshadweep officials and awareness campaigns in the local communities would be an important future step and that would help towards this goal.

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?

We used the Rufford logos on different species photographed in Lakshadweep waters and distributed to local authorities, port offices and vessels (used for transport regularly by locals) plying between the islands to raise awareness on the diversity found in the region (Figure 5). The Rufford logo was used in all power point presentations on the results of the study and a special mention was made during the talks (Figure 6). The Rufford foundation was acknowledged in the technical reports given to the department of science and technology and to the international whaling commission. The RF would also be acknowledged in the scientific manuscript and popular article that is under preparation currently. Apart from this, we have mentioned and acknowledged RF contribution to this study to all whose inputs we sought during the study period. We would continue to acknowledge RF in the future at all opportunities where data or information from this study is used.

Figure 5: Photographs of spinner dolphins shared with stakeholders in Lakshadweep

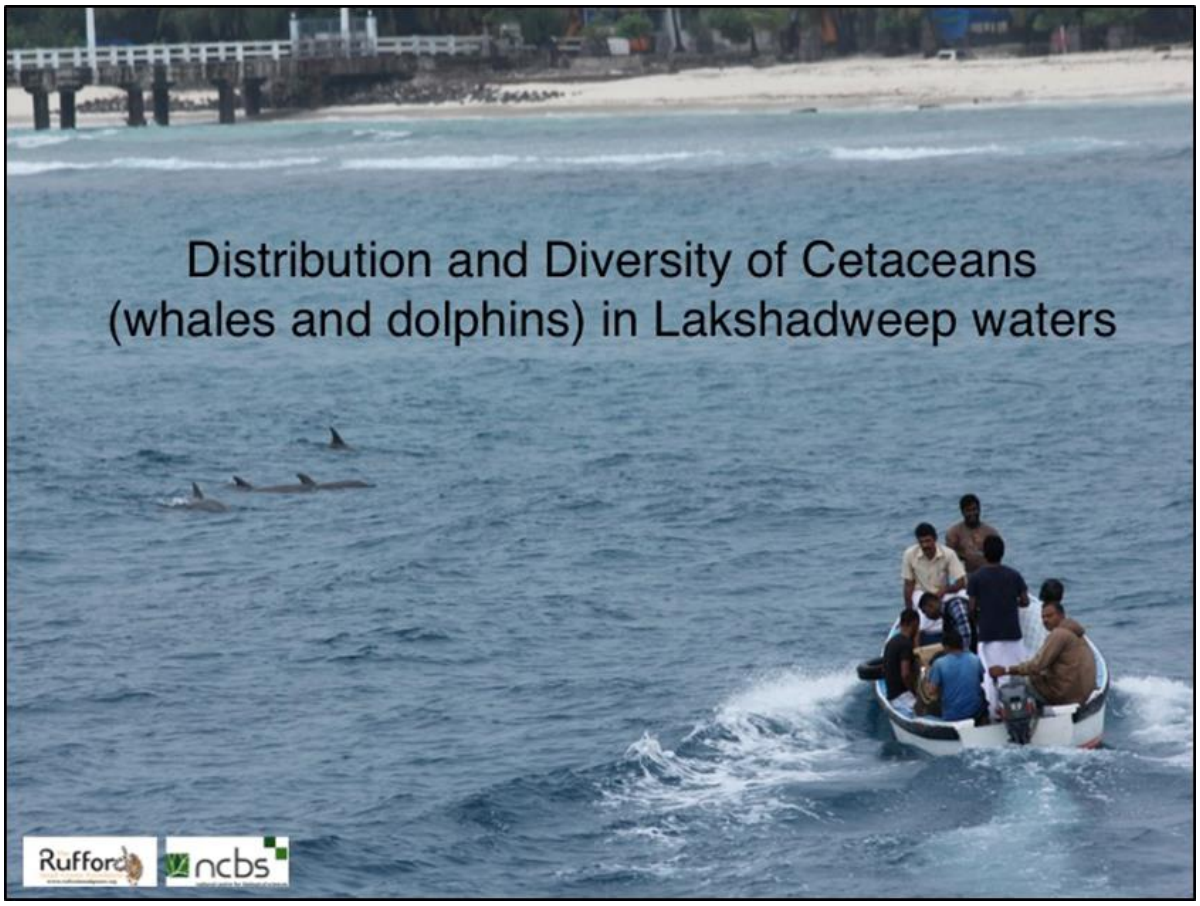

Figure 6: Title slide of presentation on cetaceans in Lakshadweep waters for department of science and technology and ministry of environment and forests

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

Divya Panicker, the principal investigator was involved in all aspects of the study from conception to final report including conceptualisation, design, data collection, analysis and report writing. Dr. Dipani Sutaria played a crucial advisory role in the project including field logistics, study design and data collection procedures. Dr. Ajith Kumar played an advisory role including assisting with permitting process and other field logistics. Faiza Mookherjee, Sachin Vaishampayan and Darshika Manral played an important role in field logistics, data collection and other field related support. Anwar Hussain facilitated the boat-based research, interview surveys and field related logistics. Mayuresh Gangal contributed towards the study conceptualisation, design and data collection. Dr. Rohan Arthur and Dr. Mark Baumgartner gave inputs on study design. Dr. Kate Stafford contributed towards data analysis and manuscript writing. Dr Idrees Babu and Mr Karanjit Vadodaria contributed greatly towards field logistics and local knowledge support. Cheriyakoya, SPORTS staff and Sandy dive shop staff assisted with field logistics. The vessel captains and crew ensured safety of the survey team while at sea.

12. Any other comments?

We are particularly thankful to Rufford Foundation for granting us funds for the second time. This study would have not been possible without this critical support. I also deeply appreciate the additional time RF granted us to alleviate the delays that occurred during the project period. This greatly helped us complete this study. We strongly believe this study was able to collect important baseline data for this much-understudied region due to the funding Rufford has provided and could be of use for future studies in Lakshadweep.

Literature cited:

Abhilash KS, Anoop B, and Yousuf KSSM, Jeyabaskaran R, Vivekanandan E. Occurrence of Killer whale Orcinus orca in Andaman waters. In: Dr. S Jones Centenary Colloquium on 'Challenges in Marine Mammal Conservation & Research in the Indian Ocean', Kochi. 2011.

Ballance LT, Pitman RL, Fiedler PC. Oceanographic influences on seabirds and cetaceans of the eastern tropical Pacific: a review. Progress in Oceanography. 2006: 69(2), 360-390.

Burton R. A visit to the Laccadive Islands. Journal of the Bombay Natural History Society. 1941. 41: 489-513.

Marine mammals of India database. http://www.marinemammals.in/ accessed on 26th August 2017.

Jefferson TA, Webber MA, Pitman RL. Marine Mammals of the World: A Comprehensive Guide to Their Identification. 2nd ed. Academic Press. Elsevier Science; 2015.

Lal Mohan RS. Some observations on the marine mammals and marine birds. CMFRI Bulletin Marine living resources of the union territory of Lakshadweep An Indicative Survey With Suggestions For Development, 1985; 43: 195-199.

Mahanty MM, Latha G, Thirunavukkarasu A. Analysis of humpback whale sounds in shallow waters of the Southeastern Arabian Sea: An indication of breeding habitat. *Journal of Biosciences*. 2015: 1-11.

Manikfan MA. A note on the capture of the smaller cetaceans for food in the Laccadive Islands. Cetaceans and Cetacean Research in the Indian Ocean Sanctuary. UNEP, Nairobi. Marine Mammal Technical Report. 1991; 3: 106-109.

Redfern JV, Moore TJ, Fiedler PC, Vos A, Brownell RL, Forney KA., ... & Ballance LT. 2017. Predicting cetacean distributions in data-poor marine ecosystems. *Diversity and Distributions*.

Sutaria D. Sule M, Jog K, Bopardikar I, Panicker D, Jamalabad A. Baleen whale records from the Arabian Sea, India from June 2015-2016. 2016: SC/66b/SH/34.

Tynan CT, Ainley DG, Barth JA, Cowles TJ, Pierce SD, Spear LB. Cetacean distributions relative to ocean processes in the northern California Current System. Deep Sea Research Part Ii: Topical studies in Oceanography. 2005:52(1),145-167.

Striped dolphin on a ferry survey. ©Divya Panicker

Spinner dolphin off Kavaratti. ©Divya Panicker

Risso's dolphin near Bangaram. ©Divya Panicker

Pan tropical spotted dolphin. ©Divya Panicker

False Killer Whale on a ferry survey. ©Divya Panicker

Team member surverying for cetaceans. ©Divya Panicker