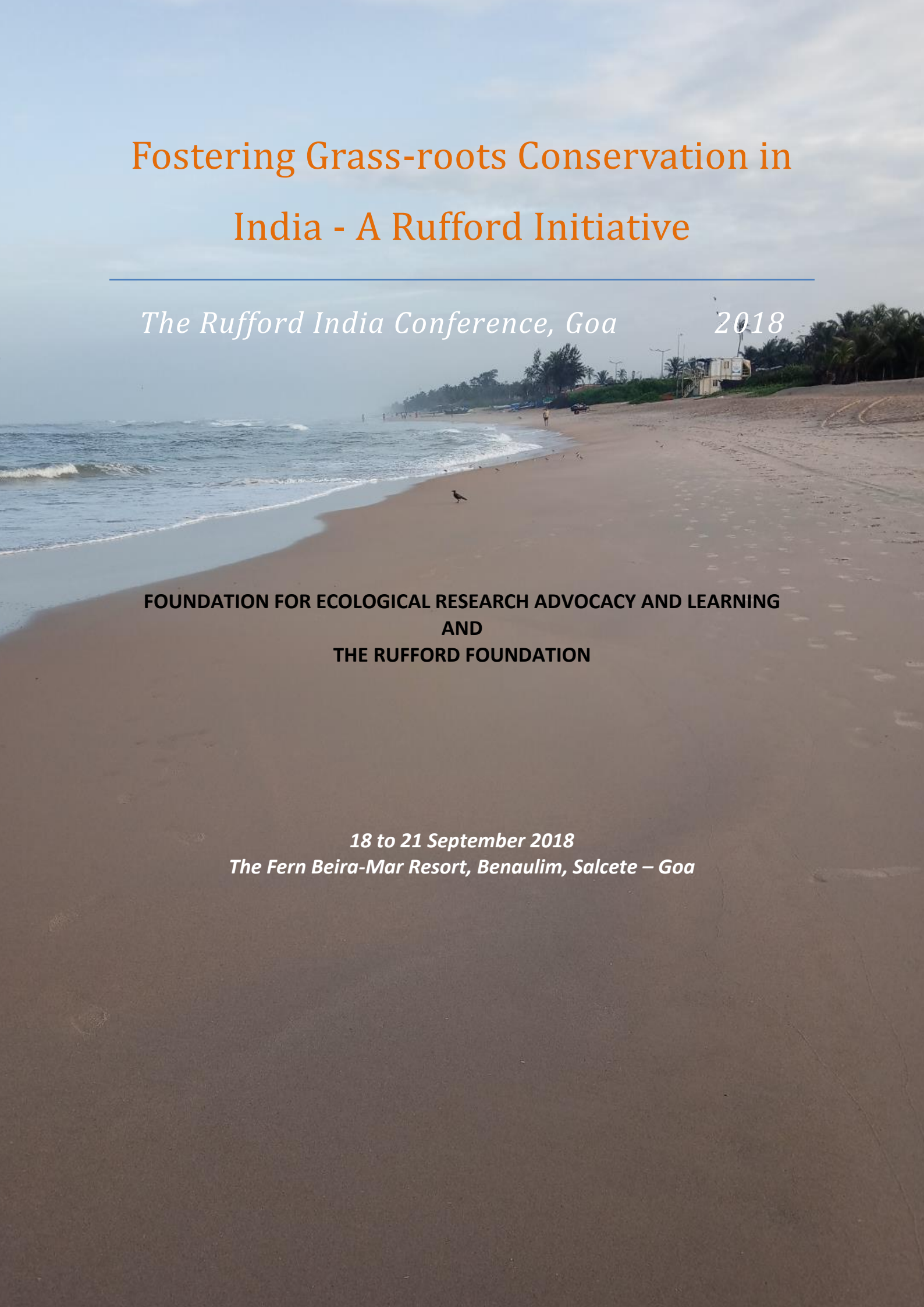

Fostering Grass-roots Conservation in India - A Rufford Initiative

The Rufford India Conference, Goa 2018

FOUNDATION FOR ECOLOGICAL RESEARCH ADVOCACY AND LEARNING
AND
THE RUFFORD FOUNDATION

18 to 21 September 2018
The Fern Beira-Mar Resort, Benaulim, Salcete – Goa

Fostering Grass-roots Conservation in India - A Rufford Initiative

The Rufford Foundation has played a crucial role in the field of nature conservation in developing countries worldwide. Its small grants have offered immense opportunities to young professionals and amateurs to explore and contribute to wildlife research and nature conservation. The Rufford Foundation has supported more than 1046 research and conservation projects in the Indian sub-continent. Since 2012, The Rufford Foundation has been holding conferences in collaboration with local organisations in different parts of the world with the aim to facilitate direct communication between their grant recipients. These conferences have been providing a forum to discuss ideas, problems, and issues and create invaluable networking opportunities.

This year the conference was organised in Goa in collaboration with Foundation for Ecological Research, Advocacy and Learning (FERAL) from 18th to 21st September 2018. This is the fourth conference that is being organized in India for the Rufford grantees, and the third Rufford India conference that is being organised in collaboration with FERAL. The previous conferences were held in New Delhi and Bengaluru in the year 2013, and in Sawai Madhopur, Rajasthan in 2017. This conference is aimed to provide a common platform for the RSG grantees from India to meet at one place and share their experiences.

Aim of this conference was to provide a common platform for the RSG grantees from India to meet at one place and share and learn from each other's' conservation experiences. It also provided an opportunity for the grantees to interact with the conservationists working in Goa and other coastal and marine areas in India and learn on-ground conservation challenges and opportunities from them. The conference was attended by 31 Rufford grantees working across India. In addition to Rufford grantees we had seven participants representing local non-governmental research and conservation organisations. The grant recipients presented their work as oral presentations (long talks of 18 minute and speed talks of 8 minute). On the first day of the conference we had an interactive session where participants introduced themselves and their work through photographs of their study landscape and work.

Mr. Srinivas Vaidyanathan (Senior Fellow, FERAL) welcomed all the participants and the representatives of local NGOs and The Rufford Foundation. He explained the aim and objectives of the RSG conferences and emphasised on the role played by the RSG in the careers of young researchers.

Apart from presentations from grant recipients, the conference included talks by Ms. Puja Mitra, Terra Conscious, Goa, Dr. Vardhan Patankar, Wildlife Conservation Society, India, Dr. Divya Karnad, Bay of Bengal Programme – IGO, InSeason Fish, India, and Mr. Atul Borkar, Wild Otters Research Private Ltd, Goa.

Invited Talks

Ms. Puja Mitra (Terra Conscious, Goa) spoke about the rationale, approach, process and outcome of establishing collaborative community networks for conservation of marine mammals in Goa. She discussed about the efforts of Terra Conscious has made to establish a public-private marine wildlife stranding response and monitoring network and the success of this initiative. She also narrated the success story in establishing an eco-conscious dolphin watching tours through a transformative approach with the fishermen. She further discussed about forming a responsible tourism collective in Goa to further eco conscious travel in the state.

Mr. Vardhan Patankar (Wildlife Conservation Society, India) described his journey of documenting the impacts of catastrophic disturbances (including mass bleaching and Tsunami) on the coral reefs of Andamans and their recovery. He also discussed about the unique traditional marine management systems followed in the Nicobar archipelago and setting up of long-term reef resilience protocol in the Andaman Islands. He also highlighted the scope and opportunities for coral reef research in the Andaman and Nicobar Islands.

Figure 1. Mr. Srinivas Vaidyanathan giving Welcome Remarks

Figure 2. Participants introducing themselves and their work through photographs in the interactive session

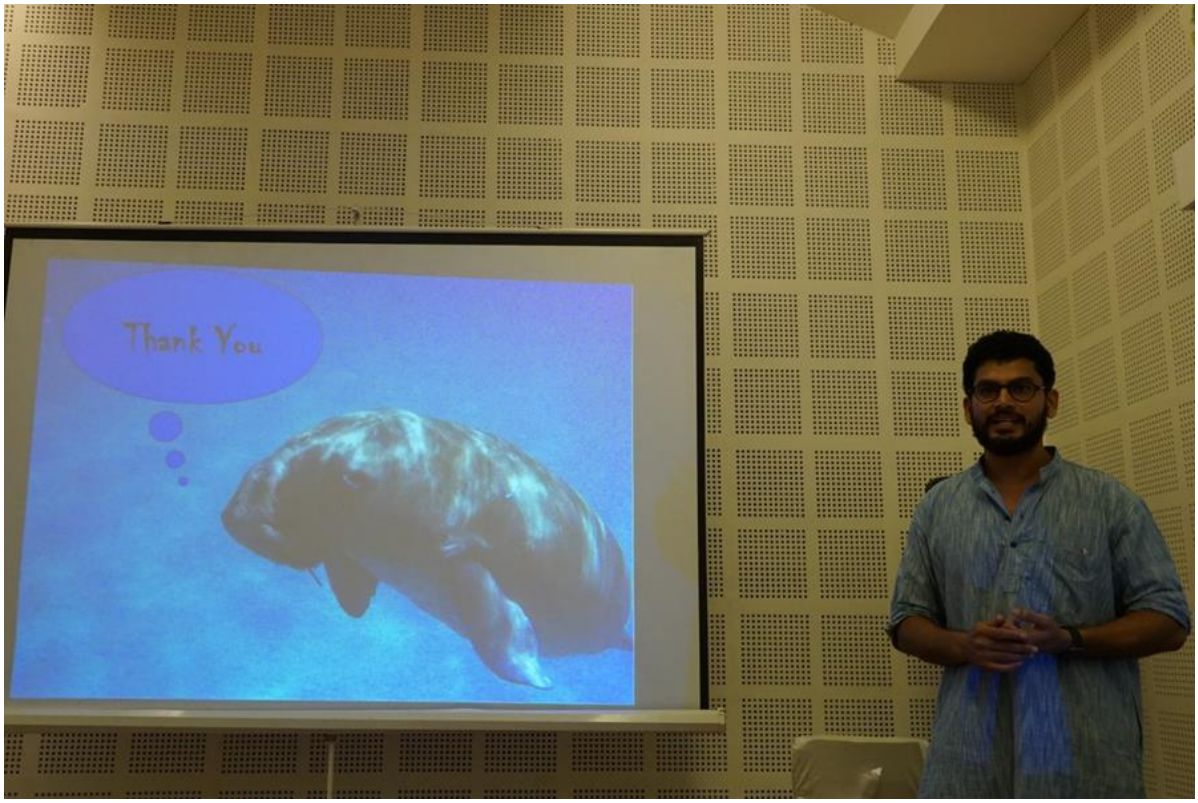

Figure 3. Invited Speakers, Ms. Puja Mitra and Dr. Vardhan Patankar giving talks

Dr. Divya Karnad (Bay of Bengal Programme- IGO, InSeason Fish) in her talk discussed the challenges in addressing the overfishing in our seas. She explained the selective demand that exists for certain types of seafood and how this can lead to extinction of certain species. She also showed how certain species that are caught from sea go wasted due to lack of demand for them. She then spoke about innovative conservation solutions and the initiative called InSeason Fish, a sustainable seafood initiative that is working to connect fishermen and seafood consumers.

Mr. Atul Borkar (Wild Otters Research Private Ltd) delivered a talk entitled *"Human Animal cohabitation"* where he discussed about human dimensions in conservation. His talk gave insights into the human-animal dimension of conservation and how each of us could contribute to improve the conservation scenario.

Figure 1. Invited Speaker Divya Karnad giving a plenary talk.

Presentations by grant recipients

We had 28 presentations by the Rufford grantees, 18 oral presentations, 10 speed talks.

The work of grantees mainly highlighted the important role that The Rufford Foundation has played in its support of conservation projects in India. This fourth Rufford India conference was restricted to the Rufford grantees who received grants between 2016 and 2018. The studies ranged from obtaining baseline data on species distribution and population status, biodiversity assessments to determining environmental flows and landscape studies to awareness, education and outreach programs.

A large number of participants were early career researchers whom RSGF had supported to achieve their goals. RSGF supported **Zoya Tyabji** in pursuing her interest in understanding extent and impact of shark fishery in the Andaman Islands. Her work highlights the need for systematic fish landing surveys which could be used to inform management of fisheries in the Andaman Islands. **Akash Verma** initiated a study to understand factors driving firewood harvesting in the Himalayas with the support from RSGF. His work found that in spite of accessibility to LPG households preferred use of firewood, and this is mainly because of socio-cultural beliefs in the Himalayas. He suggests improving stove design could reduce the use of firewood in these landscapes. **Gaurav Vashishta** conducted study on nesting ecology of critically endangered Gharials *Gavialis gangeticus* in the Katarniaghat wildlife sanctuary. He found cattle grazing, collection of forest products and digging of nests by humans as the main anthropogenic factors, while growth of vegetation on the nesting sites as the major natural

factor that affected nesting and hatching success of gharials. **Ashutosh Tripathi** studied movement ecology and seasonal activities of Indian narrow headed softshell turtle *Chitra indica*. **Caleb Daniel Gnanaolivu** studied adaptability of Spiny tailed lizard *Saraa hardwickii* to changing habitats and anthropogenic pressures. **Tanmay Wagh** conducted his work on coral reef fish. He assessed the role of herbivorous reef fish in controlling algal growth on recovering coral reefs in the Andamans. He found presence of herbivores as an important factor in preventing a community shift from a coral dominated system to a one dominated by macroalgal species. His study emphasizes the role of herbivory in enhancing coral reef resilience in the face of climate change and anthropogenic stresses.

Figure 5. Participants and the invited speakers

The RSGF has supported several projects which aims at awareness and education local communities. **Sethu Parvathy**, initiated an education campaign for the school children from indigenous communities in Kerala which aimed at building a positive profile for the endangered purple frog *Nasikabatrachus sahyadrensis among the children*. She found a change in perception among school children and the campaign improved the appreciation of the purple frog by the children to a great extent. Through her work she suggests that by conducting regular education and awareness programme for stakeholders a strong conservation group for the frogs and nature could be created locally. Similarly, **Siddhartha Pati**'s work aimed at promoting public awareness among fishermen, local authorities, and local communities for the conservation of Indian Horseshoe Crabs in the coastal parts of Orissa. RSGF supported **Thangsuanlian Naulak** in assessing conservation challenges in the district of Manipur. His study involved conducting questionnaire surveys and informal discussions with students and villagers. His work suggests that most of the villagers are against

declaring Protected Areas, and he emphasizes on the need for facilitating educational support for children, and providing technical input for participatory management of forest resources and reconciling existing traditional knowledge with modern conservation practices.

RSGF has been supportive in funding landscape and ecosystem studies and supporting work on species and ecosystems that are traditionally difficult to fundraise for. **Rutuja Kolte**'s work involved documenting the herbaceous vegetation diversity in the lateritic plateaus of Northern Western Ghats, which are often considered as wasteland by the government authorities, and involving local communities in the habitat conservation by initiating awareness programme. It was exciting to know that her awareness programme was a great success with active involvement of village communities, and now they are aware of their biodiversity and eagerly protecting these lateritic habitats. **Bashida Massar** presented her work on assessing environmental flows in terms of water discharge in the rivers and its relationship with fish abundance in the Meghalayas. Pollinators play an important role in terrestrial ecosystems and **Joyeeta Singh** studied abundance and distribution of pollinator insects and their interaction with flowering plants in the high altitude mountains of Himalayas. **Deepthi Narasimaiah** addressed an important issue of lack of policies and guidelines to protect riparian habitats in India. This RSGF supported work aimed at assessing the ecosystem services provided by riparian forests along the River Kaveri in South India and understanding people's perception of riparian ecosystems. **Ravi Jambhekar's** work included understanding the influence of landscape factors and resource abundance on the distribution and densities of butterfly populations in the human dominated forested landscapes.

Figure 6. Partcipants presenting their work.

Some of the RSGF supported studies contributed towards generating important biodiversity information for the landscape. **Priti Hebbar** studied diversity of amphibians in privately owned forests in the Western Ghats. She used this information to create awareness among local people through conducting amphibian trails and initiating 'Honey Valley' batracharium which aims at creating awareness and develop curiosity about frogs. **Abhijit Boruah** presented initial findings RSGF project which aimed at assessing the population status and habitat of endangered White winged wood duck *Asarcornis scutulata* in Assam. **Megha Rao** conducted an extensive survey to gather data on distribution of critically endangered white-bellied heron in north-east India. She found white-bellied heron in only a very few sites which is of grave concern and the results suggest a need to conserve habitats from developmental activities such as construction of dams. **Tijo K Joy** studied the impact of land-use changes on bat species diversity and behavior in the southern Western Ghats. **Annesha Chowdhury**'s work aims at assessing avifaunal diversity in different management regimes such as large tea plantations, small tea plantations, organic plantations, Rainforest Alliance certified and non-certified plantations etc. **Pooja Pawar** estimated hornbill populations and abundances in a human dominated landscape in the southern Western Ghats. Her study highlights the adaptability of hornbills in human modified areas and its relevance to long-term conservation of these species. **Maitreya Sil** used molecular techniques to estimate the true siversity of freshwater snails in the Western Ghats. His work revealed a few species which were not described from India before. **Isha Bopardikar**'s study presents the first detailed description and classification of the Indian Ocean humpback dolphin *Sousa plumbea* whistle repertoire off the Wsetern Coast of India. An analysis of behavioural context of different vocalization

could help in understanding how changing habitats and increasing underwater ambient noise levels possibly affect communication and the acoustic behavior of humpback dolphins.

Human-wildlife conflict is an important conservation topic and the RSGF supported several studies which assessed the conflict and mitigation measures. The RSGF supported project by **Rakesh Basnett** aimed at understanding the socio-ecological factors leading to human-Asiatic black bear conflict in the Himalayan range of Sikkim, which could help in generating adequate information required for effective mitigation measures. He suggests that following traditional methods and cropping patterns are more effective in preventing crop and livestock raid by Asiatic black bear. **Vikram Pradhan** also worked on human-wildlife conflict in Sikkim and assessed various approaches used to manage such conflicts. **Aritra Kshettry** presented a case study of a model where scocio-ecological studies and stakeholder integration form the backbone in informing human-wildlife conflict mitigation. His work suggests that simple solutions which are acceptable by locals may reduce human-wildlife encounters in divers human-dominates forested landscapes. **Saloni Bhatia** studied factors influencing the interaction between humans and wildlife and the factors that affect peoples' attitude and behavior towards snow leopard and wolves in the high-altitude landscape of Ladakh. The RSGF supported project of **Subhajit Saha** assessed conflict between human and non-human primates in the Askot region of the Himalayas. **Mrunal Ghosalkar**'s largely focuses on transforming the fear that humans have for the large carnivores such as leopard, which often found in close proximity to human residence, into a greater understanding of leopards by imparting knowledge from both scientific and traditional origins on leopard behaviour and thereby reduce conflict.

Figure 7. Participants got an opportunity to interact with each other and share their experiences

Figure 8. Participants relaxing after a long conference day

Figure 9. Field visit to Chorao Island Mangroves

Appendix I
List of Rufford grantees

Name	Email address	Organization	RSGF support
Abhijit Boruah	abhijitboruah11@gmail.com	Independent Researcher	Travel, food and accommodation
Akash Verma	verma.env@gmail.com	National University of Singapore	Travel, food and accommodation
Annesha Chowdhury	annesha.chowdhury@atree.org	Ashoka Trust for Research in Ecology and the Environment	Travel, food and accommodation
Aritra Kshettry	kolkatalife@gmail.com	Centre for Wildlife Studies-Wildlife Conservation Society	Travel, food and accommodation
Ashutosh Tripathi	ashutosh_tcp@live.com	Madras Crocodile Bank Trust	Travel, food and accommodation
Bashida Massar	bashidamassar@anthonys.ac.in	St. Anthony's College Shillong, Meghalaya, India	Travel, food and accommodation
Caleb Daniel Gnanaolivu	caleb992@gmail.com	Indian Institue of Science	Travel, food and accommodation
Deepthi Narasimhaiah	deepthi.padma@gmail.com	Bangalore University	Travel, food and accommodation
Gaurav Vashistha	gaurav.vashistha91@gmail.com	University of Delhi	Travel, food and accommodation
Isha Bopardikar	isha.bopardikar@gmail.com	Independent Researcher	Travel, food and accommodation
Joyeeta Singh (Chakraborty)	joyeeta.u@gmail.com	Forest Research Institute, Dehradun	Travel, food and accommodation
Maitreya Sil	maitreya.sil@gmail.com	Indian Institute of Science	Travel, food and accommodation
Megha Rao	megha@ncf-india.org	Nature Conservation Foundation	Travel and food
Mrunal Ghosalkar	mrunal8ghosalkar@gmail.com	Centre for Wildlife Studies	Travel, food and accommodation

Name	Email address	Organization	RSGF support
Pooja Pawar	pawarpy.1992@gmail.com	Nature Conservation Foundation	Travel, food and accommodation
Priti Hebbar	priti.gururaj@atree.org	Ashoka Trust for Research in Ecology and the Environment (ATREE)	Travel, food and accommodation
Rakesh Basnett	rakeshbasnett88@gmail.com	North Eastern Regional Institute of Science and Technology	Travel, food and accommodation
Ravi Madhav Jambhekar	ravijambhekar04@gmail.com	Indian Institute of Science	Travel, food and accommodation
Rutuja R. Kolte	rutu24kolte@gmail.com	Department of Botany, Goa University	Travel, food and accommodation
Saloni Bhatia	saloni@ncf-india.org	Nature Conservation Foundation	Travel, food and accommodation
Sethu Parvathy	sethuparvathy13@gmail.com	Conservation Research Group, St. Albert's College, Kochi, Kerala	Travel, food and accommodation
Siddhartha Pati	patisiddhartha@ymail.com	Association for Biodiversity Conservation and Research (ABC)	Travel, food and accommodation
Subhajit Saha	ssaha88@gmail.com	Independent	Travel, food and accommodation
Tanmay Wagh	twagh97@gmail.com	Centre for Wildlife Studies and National Centre for Biological Sciences	Travel, food and accommodation
Thangsuanlian Naulak	thangsuanliannaulak@gmail.com	Ashoka Trust for Research in Ecology and Environment	Travel, food and accommodation
Tijo K Joy	tijokjoyz@gmail.com	Department Zoology and Bat Research Laboratory Sarah Tucker College, Tirunelveli	Travel, food and accommodation
Vikram Pradhan	vikram.pradhan@atree.org	Ashoka Trust for Research in Ecology and the Environment, Regional Office, Eastern	Travel, food and accommodation

Name	Email address	Organization	RSGF support
		Himalaya Northeast India, Gangtok Sikkim	
Zoya Tyabji	zoya.tyabji@gmail.com	Andaman Nicobar Environment Team	Travel, food and accommodation
Vardhan Patankar	vardhanpatankar@gmail.com	Wildlife Conservation Society, India, National Centre for Biological Sciences, Bengaluru	Travel, food and accommodation
Divya Karnad	div.karnad@gmail.com	Bay of Bengal Programme- IGO, InSeason Fish	Travel, food and accommodation

Appendix II
Schedule

Rufford India Conference: Fostering Grass-roots Conservation in India - A Rufford Initiative, 2018

18 September, 2018

SESSION	TIME	EVENT
	12.30 – 14.30	**CHECK IN, REGISTRATION and LUNCH**
Post-lunch session	15.00 – 15.15	**WELCOME ADDRESS** Srinivas Vaidyanathan Senior Scientist, Trustee Foundation for Ecological Research, Advocacy and Learning
	15.15 – 17.00	**INTERACTIVE SESSION**
	17.00 – 18.30	**OUTDOOR ACTIVITY**
	19.30 – 21.00	**DINNER**

19 September, 2018

SESSION	TIME		
Morning session	08.30 – 09.00	**REGISTRATION**	
	09.00 – 10.00	**POPULAR TALK** *Building collaborative community networks for conservation - Goa* Puja Mitra Founder - Director ,Terra Conscious	
	10.00 – 10.30	**TEA BREAK**	
	10.30 – 13.00	**ORAL PRESENTATIONS**	
		Sethu Parvathy	*Let the purple frog lead you through the storm! Building the profile of Nasikabatrachus sahyadrensis among indigenous children in the Western Ghats.*
		Zoya Tyabji	*Diversity of sharks landed in the Andaman Islands, India, with a focus on the life history of the five most common species*
		Bashida Massar	*Determining environmental flows and fishing patterns in River Rymben, Meghalaya, India*
		Sachin Vaishampayan	*Using public perceptions to document cetacean-fisheries interactions on the Andaman Islands*
		Gaurav Vashistha	*Nesting ecology of gharials in Katarniaghat wildlife sanctuary*

		Joyeeta Singh (Chakraborty)	*Abundance and ecology of pollinator insects in high-altitude ecosystems of Himalaya*
		Ravi Madhav Jambhekar	*The Influence of landscape composition and resource distribution on butterfly populations in human-dominated tropical grassland-forest landscapes*
		Kumar Chandrasekaran	*Awareness, survey and conservation of rays in Indian coastal lines*
	13.00 – 14.00	**LUNCH**	
SESSION	**TIME**	**EVENT**	
Post-lunch Session	14.00 – 15.00	**Speed talks**	
		Priti Hebbar	*Ecological assessment and conservation education on amphibians from Kodagu region of the Western Ghats,India*
		Thangsuanlian Naulak	*Conservation challenges in North-East India: Experiences from Southern Manipur*
		Rakesh Basnett	*Human-Asiatic black bear conflict: A preliminary study in and around the Khangchendzonga national park, Sikkim, Eastern Himalaya*
		Vikram Pradhan	*Assessing approaches to manage human wildlife conflict in Sikkim*
		Akash Verma	*Firewood for fuel: Dependence on biomass for energy driving deforestation in high altitude Himalayan forests.*
	15.00 – 16.00	**ORAL PRESENTATIONS**	
		Rutuja R. Kolte	*In-situ conservation of herbaceous endemics of Chaukul lateritic rocky outcrop in northern Western Ghats by community involvement*
		Subham Banerjee	*Hydrology driven transition and land-use/land-cover change analysis of sub-tropical grassland-woodland community in Eastern Himalaya*
		Deepthi Narasimhaiah	*Assessing ecosystem services and community perception towards riparian ecosystems along River Cauvery, south India*
	16.00 – 16.30	**TEA BREAK**	
	16.30 – 17.30	**POPULAR TALK** *Catching-up with catastrophe: socio-ecological changes in marine systems in the Andaman and Nicobar Islands* Dr. Vardhan Patankar DST_INSPIRE Faculty Fellow Wildlife and Conservation Society, National Centre for Biological Sciences	

20 September, 2018

SESSION	TIME	EVENT	
Morning session	08.30 – 09.00	**REGISTRATION**	
	09.00 – 10.00	**PLENARY TALK** *Fishing for solutions in marine conservation* Dr. Divya Karnad Bay of Bengal Programme – IGO, InSeason Fish	
	10.00 – 10.30	**TEA BREAK**	
	10.30 – 13.00	**ORAL PRESENTATIONS**	
		Aritra Kshettry	*Paving the way for human-wildlife co-existence in shared landscapes*
		Saloni Bhatia	*What affects peoples' response to predators?*
		Subhajit Saha	*Human-nonhuman primate conflict in Askot landscape: Notes from 1.5 years of study*
		Mrunal Ghosalkar	*Janata Waghoba: Creating awareness on human-leopard interactions by utilizing the potential of youth to increase understanding of the issue.*
		Dhawal Mehta	*Abundance and distribution of the four horned antelope (Tetracerus quadricornis) in Gir protected area*
		Tijo K Joy	*Study the effect of anthropogenic land use-change on bat diversity, changing behavior and ecology in high range mountains of Idukki landscape, southern Western Ghats.*
		Ashutosh Tripathi	*Spatial ecology and seasonal activities of Indian narrow headed softshell turtle (Chitra indica) in India*
		Abhijit Boruah	*Reviving the white winged wood duck from extinction in Dehing Patkai wildlife sanctuary, Assam*
	13.00 – 14.00	**LUNCH**	

SESSION	TIME	EVENT	
Post-lunch Session	14.00 – 14.45	**SPEED TALKS**	
		Isha Bopardikar	*Acoustics of the Indian Ocean humpback dolphin (Sousa plumbea)*
		Tanmay Wagh	*Assessing the role of herbivorous reef fish in controlling algal growth on post-disturbed reefs of the Andaman Islands, India*
		Siddhartha Pati	*Conservation of Indian horseshoe crab and protection of its breeding ground through community participation*
		Caleb Daniel Gnanaolivu	*Spiny tailed lizard and its changing habitat.*

		Maitreya Sil	*Integrative taxonomic approach to estimate the diversity of freshwater snails in India*
	14.45 – 16.00	**ORAL PRESENTATIONS**	
		Pooja Pawar	*Birds beyond borders: hornbill population, nesting and conservation in contiguous rainforests and adjoining plantation landscape in Anamalai Hills, India*
		Megha Rao	*A search for the white-bellied heron in north-east India.*
		Annesha Chowdhury	*Birds'eye view of the Darjeeling tea-forest landscape : What lies beneath?*
	16.00 – 16.30	**TEA BREAK**	
	16.30 – 17.30	**POPULAR TALK** *Human-animal cohabitation* Atul Borkar Founder and Director, Wild Otters Research Private Limited	

21 September, 2018

SESSION	TIME	EVENT
Morning session	06.00 – 11.00	**FIELD VISIT**
	11.00 – 11.15	**CONCLUDING REMARKS** Srinivas Vaidyanathan, Rajat Nayak Foundation for Ecological Research, Advocacy and Learning
	11.15 – 13.00	**LUNCH and CHECK OUT**

Appendix III
Abstracts

Let the purple frog lead you through the storm! Building the profile of *Nasikabatrachus sahyadrensis* among indigenous children in the Western Ghats.

Sethu Parvathy

The Endangered purple frog *Nasikabatrachus sahyadrensis*, endemic to the Western Ghats, though formally described in 2003 was already well known among numerous indigenous communities. This frog is active above the soil only for two weeks every year during the breeding season. It has been consumed by indigenous communities since decades as medicine, meat and used as amulets to reduce fear among children. We conducted two different campaigns: a book-reading campaign (1st-4th standard) and a visual presentation campaign (5th-7th standard) for 1597 children from indigenous communities in Kerala across the distribution range of *N. sahyadrensis* from 4 June to 18 August 2017. This was undertaken to build a positive profile of the species and symbolically reducing the fear of storms among children without necessarily having to physically use them as amulets thereby, reducing its utilization. To understand whether the campaign lead to a better profile for the purple frog, surveys to understand the appreciation of six charismatic vertebrate species that included the purple frog were conducted with the participants before and after the campaign. The campaign improved the appreciation of the purple frog by 50% and 150% among lower primary and upper primary children respectively. In the post-campaign surveys, the purple frog has been displaced from being the least favorite species to the second least, thereby displacing the Indian rock python. This infers that though the preference towards the charismatic megafauna is perdurable, a niche could be carved out for amphibians among stakeholders. Such campaigns if conducted regularly could further improve the appreciation of frogs and eventually their conservation.

Diversity of sharks landed in the Andaman Islands, India, with a focus on the life history of the five most common species

Zoya Tyabji

India is amongst the top three global shark harvesters with a targeted shark fishery still operating in the Andaman Islands. Despite being a biodiversity hotspot, official fish-landing data is limited to overall quantities of landings with no species-specific information. To address this gap, we conducted systematic fish-landing surveys, from January 2017 to February 2018, at major fish-landing sites of South Andaman. We sampled 3244 sharks and assessed diversity across gear types and seasons, while interviewing fishing vessel crew regarding fishing areas. Of the 35 species recorded, nine are new records for the archipelago and one for India; with two species showing range extensions. Landings were dominated by five species, namely the slit-eye *Loxodon macrorhinus* (32.6%), grey reef *Carcharhinus amblyrhynchos* (26%), scalloped hammerhead *Sphyrna lewini* (10.2%), silvertip *Carcharhinus albimarginatus* (7.6%) and slender weasel *Paragaleus randalli* (4.5%), comprising 81% of total shark landings. The size at 50% maturity for males of these five species indicated that males caught of the small-bodied species (<1000 mm TL) were mostly mature while large bodied species (>1000 mm TL) were mostly immature. Females of 16 species were gravid and neonates of ten species were observed with open umbilical scars. Abundance of landed species did not differ significantly across seasons and gears. The data also suggests the presence of nursing and breeding grounds in the study area. Our findings highlight the need for systematic fish landing surveys for elasmobranchs, the results of which could be used to inform management of fisheries in the Andaman Islands.

Determining Environmental Flows and Fishing patterns in River Rymben, Meghalaya, India
Bashida Massar
Environmental flows are defined as the amount of water flowing through streams and rivers that is essential to maintain aquatic ecosystems and the services they provide, such as water quality maintenance and fisheries. However very little information on flows and flow-ecosystem relationships exists in Northeastern India. This study monitored monthly river discharge in the Rymben River (Meghalaya) and fish abundances based upon monthly fish catch data over a year (2016-2017).

Peak flow occurred in June-July (rainy season) and low flows during December-February (dry season), with much of the river drying up to isolated pools. Fish associated with swift currents, and hence requiring highly oxygenated waters, such as mahseer (*Tor sp.*) were not seen in the dry season. Fish abundant in dry season such as loaches (*Badis sp*) are common in small pools, indicating that these fish can survive in low oxygen environments.

Rymben River currently supports moderate fish stocks, however with a skewed age class. Individuals yet to attain sexual maturity are caught and retained, thereby impairing population growth. Our data suggests that overfishing and harvesting immature fish has immediate consequences upon fish populations. Perennial flows and high fish diversity suggest that the flow regime has not been severely altered; however flows are vulnerable to land use change (deforestation), dams, water abstractions and climate change. A hundred year rainfall analysis indicates an increasing fraction of annual rainfall in July compared to other months, with possible changes in the timing of the static-high flows affecting fish migration.

Using public perceptions to document cetacean-fisheries interactions on the Andaman Islands
Sachin Vaishampayan
Cetaceans and fisheries share a common space and target the same resource, fish. This brings them in close contact with each other and many interactions such as depredation, bycatch and damage to gear have been observed. Cetacean-fisheries interactions have been studied worldwide, right from Hawaii (Heeny, 1977) to Malaysia (Jaaman et.al., 2009).

In India, it was observed that the fisheries sector results in more than 10,000 cetacean mortalities each year (Yousuf et.al, 2012). Of the total 25 cetacean species found in India, eight have been reported from the Andaman waters. The status of cetacean mortalities, damage to the fisherfolk, vulnerability of certain gear types and general beliefs about cetaceans in the fisher community was still unknown from the islands.

In our study conducted from November, 2016 to December, 2017, we carried out interviews (n=210) at 22 sites across six islands on the Andaman group. The fishermen were interviewed using a semi-structured questionnaire and questions related to their fishing practices, use of cetacean presence as indicator of underlying fish stocks, effects of cetacean presence during operation on catch, instances of depredation, damage to gear and accidental entanglement and their general perceptions and beliefs about cetaceans were asked. Based on our findings, we were able to deduce that gill nets have the most interactions with cetaceans. Areas of frequent sightings were also identified across the islands eg. Ross Island, Cinque Island, Inglis Island. General perceptions about the cetaceans were also positive, with majority of the fishermen being aware about their protected status.

Nesting ecology of Gharials in Katarniaghat wildlife sanctuary

Gaurav Vashishta

Gharial *Gavialis gangeticus* is a critically endangered crocodilian species and is endemic to the Indian sub-continent. Gharial population in Girwa River, Katarniaghat wildlife sanctuary is the second largest population which has undergone severe population decline. Our first population count found 4-7 males and 39-42 breeding females in 2016. The average number of nesting sites and nests was five and 23 for the period 2015-17.

First phase of our study in 2016 identified multiple natural and anthropogenic factors affecting the nesting and hatching success of gharials. Cattle grazing, human presence for collection of forest products and digging of gharial nests were main anthropogenic factors. Presence of elephant and growth of vegetation on nesting sites were the natural factors which were directly resulting from redundant water flow in river due to a barrage upstream. Rapid growth of tall reed species such as Phragmites and Typha on potential gharial nesting sites resulted in mortality of over 170 hatchlings in one single season.

In Phase two, we have initiated a pilot study using camera traps to get insights into the nesting behaviour of gharials. We have also initiated an alternative manual modification of nesting sites with the forest department in the March, 2018 to assist in gharial nesting.

Abundance and ecology of pollinator insects in high-altitude ecosystems of Himalaya

Joyeeta Singh (Chakraborty)

High-altitude ecosystems of western-Himalaya are fragile, data-deficient as well as host many rare, endemic and endangered insects and plants. Pollinator insects, which play irreplaceable role in terrestrial ecosystems and are important bio-indicators as well, are much understudied in the region. Present project aims to document abundance and distribution of pollinator insects across critical habitats of high-altitude (~3000 m) ecosystems of Kedarnath Wildlife Sanctuary and understand their interaction patterns with host flowering-plants. Additionally, relevant educational outreach programs will be conducted among local community and tourists. Field work has been initiated since May 2018. Preliminary observations on the abundance and diversity of alpine pollinators together with interaction with their host plants will be presented. Challenges faced during field work and probable solutions or alternatives will be discussed. This is the first study to address plant–insect pollinator interaction beyond alpine tree-line eco-tone region in Indian Himalayan region. Results are expected to produce useful ecological knowledge gaps, development of pollinator database from the region, identify priority species/groups or network for conservation. Insights on overall status of plant-pollinator insect network in the region will in turn indicate the functional integrity of these fragile ecosystems.

The influence of landscape composition and resource distribution on butterfly populations in human-dominated tropical grassland-forest landscapes

Ravi Madhav Jambhekar

A central question in ecology involves understanding the processes underlying patterns in population abundance and the distribution of species at small and large spatial scales. The distribution of individuals of a species across a landscape may be influenced by both local factors, such as resource abundance; and by landscape-level factors, such as the size of habitat patches, connectivity between patches and the permeability of the matrix surrounding habitat patches, all of which influence the colonisation and extinction of local populations and the movement of individuals between populations. How these local and landscape-level factors affect the distribution of a species may vary widely between species, because the response of species to these ecological conditions may depend

on species-specific traits, such as body size, behaviour and other functional traits. There is relatively little known about how ecological factors interact with functional traits to influence species distribution in a landscape. I investigated the ecological processes at landscape level influencing population densities by taking a behavioural ecological approach and using butterflies as a model system. I also examined how functional traits affect the relationships between ecological factors and species distribution in a landscape. I also look at how landscape-level factors, specifically patch size, connectivity and matrix permeability, affect butterfly populations. I tested whether the apparent response of a species to landscape-level factors was affected by species-specific traits, specifically whether it was a habitat generalist or specialist and how permeable the matrix was to it.

Awareness, survey and conservation of rays in Indian coastal lines

Kumar Chandrasekaran

Rays (Class: Chondrichthyan) produces less number of offspring during their life cycle. Hence, continuous exploitation of this species due to unregulated fishing practices leads to vulnerability of the rays resources. India is the second largest Chondrichthyan fishing nation in the world. Annual landing of elasmobranchs of India in 2014 was estimated at 47242 tons (CMFRI 2015). Among the elasmobranchs, rays constitute 52.7% of the total landings. Despite the commercial exploitation, there is no serious research attempts were made towards the awareness, conservation, species specific abundance and biological data of rays particularly in Indian peninsular. Hence, this study is aimed to pay special attention to IUCN categorized rays exploitation status, abundance and creating awareness among fishermen and identifying conservation measures towards protecting them from extinction. In this study, the species specific diversity of rays were recorded from the major fish landing centres such as Chennai, Tuticorin, Nagapattinam and Colachel from June 2016 – June 2017. Identification of rays was done by following the guidelines of Food and Agricultural Organisation (FAO) and International Union for Conservation of Nature (IUCN). During this period, 26 rays from 5 major families were identified. Among them, 57.69% of rays belong to the family Dasyatidae. Based on the results, the awareness programme was conducted among the fisherman community.

Ecological assessment and conservation education on amphibians from Kodagu region of the Western Ghats, India

Priti Hebbar

Private forests harbor tremendous amount of biodiversity but are threatened due to conversion of forests into agriculture. Studies from India show that private forests are under serious threat due to developmental activities but need more scientific studies to determine the conservation potential. Among vertebrates, amphibians are known to be most threatened species and many of them have gone extinct. In India, Western Ghats amphibians show remarkable diversity and more than 80% of them are endemic. Recently, many new species have been discovered from outside protected areas, such as private lands. Basic information on species diversity, abundance, distribution and ecology of the species from such privately owned landscape can be helpful for creating awareness among local people and can help in long term conservation efforts. In this study, the diversity and distribution of frogs from two private forests (Kaloor Coffee estate and Honey Valley homestay) of Kodagu region of Western Ghats were determined. Overall 30 species of anurans and 2 species of Gymnophiona were observed from both private forests. As a part of conservation education, amphibian trail was carried out for students where they were trained to identify amphibians. Also this study initiated Honey valley batracharium, a unique approach to create awareness and develop curiosity about frogs from Honey valley in the form of a small book and handouts.

Conservation challenges in North-East India: Experiences from Southern Manipur

Thangsuanlian Naulak

The Indo-Burma Biodiversity Hotspot is well known for its biodiversity richness and accounts for 2.3% and 1.9% of the world's total endemic plant and vertebrates respectively. North-East India is known for its hunting practices especially in the tribal areas. Due to the changing dynamics of economy, the ever increasing population and the need to derive monetary gains for economic benefits, what was once a sustainable practice such as hunting, timber extraction and others for household consumption has turned commercial which inadvertently takes a toll on the overall biodiversity.

The study attempted to assess i) how communities in Churachandpur District of Manipur try to achieve economic stability, ii) why fortress conservation would fail and iii) what can be done to enhance conservation in these parts. These findings are based on questionnaire surveys and informal discussions conducted among 588 students and 129 villagers. A staggering 95% and 60% of students and villagers respectively, thinks that conservation of wildlife is necessary. However, 83% of villagers think that declaration of protected areas would deprive them of their livelihoods and a majority (60%) of them thinks that it would not create livelihood opportunities.

These results reveal that for conservation to be successful in these areas passive intervention of the Forest Department and the Government at large is necessary. This is in terms of facilitating educational support for children and providing technical inputs for participatory management of forest resources and reconciling existing traditional ecological knowledge with modern conservation practices.

Human-Asiatic Black bear conflict: A preliminary study in and around the Khangchendzonga National Park, Sikkim, Eastern Himalaya

Rakesh Basnett

Human-Asiatic black bear conflict is one of the severe and serious problems in Sikkim especially in those villages that share the boundary with the protected areas. Conflict may have a direct or indirect effect on the livestock, agricultural or even sometimes to human life. The equate knowledge, research and literature are still poor in this region. The present study was aimed to look into these socio-ecological factors leading to the conflict of Asiatic black bear with humans with an aim to generate adequate information required for effective mitigation measures in the KNP and its buffer areas. The study was conducted from July 2016- December 2107. Field data was collected through personal interviews, pre-structured questionnaire survey and organizing PRAs in the villages located in the fringe of KNP. Based on our one and half years research work, a total 18 incidents of human-bear conflicts have been recorded in which bears have visited human habitation areas like neighboring villages, school compound areas, agriculture field, and damaged the like crops, livestock and injured the human beings inhabiting in and around KNP. The major cause of conflict is the gap in the wild fruiting of *Quercus pachyphylla*, *Symplocos theifolia*, *Machilus sp.* in the forest, plantation of fodder tree along with *Machilus sp* in the buffer areas of KNP and the dull and same agricultural practice over the year. Based on the observation the traditional methods and cropping pattern is more effective measures to prevent the crop and livestock raid by Asiatic black bear.

Assessing approaches to manage Human Wildlife Conflict in Sikkim

Vikram Pradhan

Sikkim comprises 0.22%geographic area of India but has a very wide altitudinal gradient (300m to 8598m). Thus within a small geographic area, the state has very high biodiversity. 47.62% of the land in Sikkim is under forest cover. Of this 82.31% is under state management and of this almost 31% is under the protected area system. Therefore, there are diverse wildlife species, living in close proximity

to human settlements, leading to regular human-wildlife interaction most of which are negative leading to Human-Wildlife Conflict (HWC).

A study undertaken in four villages in the fringe areas of Kitam Bird Sanctuary and Barsey Rhododendron Sanctuary revealed that the impacts of small mammals, including herbivores are high, in contrast to the damages caused by large mammals. However, the policies pertaining to wildlife damage focus only on larger mammals as these are the main species in the mainland. Damage to the cash and food crops which provide livelihoods sustainability to communities were higher than direct encounters with wild animals. The availability of scientific information regarding these damages and its management is scarce, resulting in problems while developing strategies to mitigate HWC. The study further suggests different approaches and viable community-based strategies for better management and mitigation of HWC.

Communities residing in the fringe areas with low socioeconomic status were not able to access high investment HWC mitigation measures. Thus the project aims to link these to various government schemes where the convergence can be made.

Firewood for Fuel: Dependence on biomass for energy driving deforestation in high altitude Himalayan forests.

Akash Verma

Firewood remains the dominant energy source in high altitude regions of the Himalayas. Lack of accessibility to LPG and economic factors have been repeatedly highlighted as obstacles for large scale adoption of LPG. Unsustainable firewood extraction puts pressure on delicate mountain ecosystems, which have already exceeded their carrying capacities. We aimed to study the factors driving firewood harvesting at different elevation zones of the central Himalayan region through field survey and questionnaire-based approach in three villages and two tourist lodge areas. Our results showed that accessibility is the driving factor for lodges, but firewood remained as the primary energy source, even for households that have access to LPG. Higher elevation settlements harvested more firewood, but fewer numbers of species to meet their energy demands, resulting in species selective deforestation that may go unnoticed. Pressure from tourists and poor stove design contributed towards increased harvesting. Socio-cultural factors played an important role in the continued usage of firewood, along with lack of knowledge transfer between settlements. We recommend that the authorities overcome the socio-cultural barrier by convincing villagers to utilize LPG as the primary energy source along with improving their stove design.

In-situ conservation of herbaceous endemics of Chaukul lateritic rocky outcrop in northern Western Ghats by Community involvement

Rutuja R Kolte

Lateritic rocky outcrops in northern Western Ghats, which are either plateaus or table-lands, are rich in unique, habitat specific, narrowly distributed endemic herbaceous plants. Recently these habitats are receiving lots of scientific attention. But on other hand, they are still being viewed as barren lands by Government departments as well as local people. These are being used for various developmental activities, resulting in loss of habitats of endemic species which the local communities are not aware of. Hence, Chaukul plateau (Amboli) has been taken up as a model for documenting the herbaceous vegetation and involving local people in the habitat conservation by initiating awareness programme.

Frequent field visits were carried out from January 2016 to November 2017 (10-12 days of interval during June-November and once in a month during remaining period). Total of 135 herbaceous species from 39 different families have been documented out of which 60 species are endemic to Western

Ghats. To initiate awareness about conservation of biodiversity among locals, right from the beginning Biodiversity management committee, Forest department Amboli, Chaukul Grampanchayat and villagers, Chaukul high school, Malabar Nature conservation Club Amboli, etc. have been included as partners. Activities such as 'workshop on habitat conservation', field visits, pamphlets distribution among villagers about 'Endemic or unique plants of Chaukul plateaus', etc. have been carried out which created enthusiasm among locals about biodiversity. Participation of locals from Chaukul and surrounding villagers increased day by day. Now the Chaukul villagers are aware of their biodiversity heritage and eagerly protecting the habitats.

Hydrology driven transition and land-use/land-cover change analysis of sub-tropical grassland-woodland community in Eastern Himalaya

Subham Banerjee

Manas National Park (MNP) is located at the Eastern Terai (foothills of Himalaya) region of India. The tall grassland ecosystem of MNP supports a huge range of vulnerable and endangered grazing animals including the Indian Rhinoceros (*Rhinoceros unicornis*), Swamp Deer (*Rucervus duvaucelii*), Pygmy Hog (*Porcula salvania*), and Hispid Hare (*Caprolagus hispidus*). The Manas Grassland Ecosystem is under threat of conversion (to Tropical Moist Forest) which directly questions the existence of the charismatic grazing animals. So, it is critical to look at the vegetation dynamics of this national park.

With an interval period of 4 years we analyzed the land cover types of 8 different time periods (1988-2016). In our Remote-Sense based study we found that grassland to woodland transition is the major trend in the last 28 years. The grassland coverage decreased to 37.49% (in 2016) from 62.67% (in 1988). Almost at all the transitional periods some part of the grassland converted to Woodland.

We assume that along with anthropological disturbances and fire activity, hydrology and River action play crucial role in this grassland-woodland dynamic. Our study suggests that lower elevation range and low slope regions (ideal for river channel and water logging) are more prone to transition compared to higher elevation and high slope regions.

Assessing ecosystem services and community perception towards riparian ecosystems along River Cauvery, south India

Deepthi Narasimhaiah

Ecosystem services are benefits that people obtain from ecosystems. In riverine systems, riparian zones are interfaces between terrestrial and aquatic ecosystems. River Cauvery, a lifeline to people of southern India; used for irrigation, domestic, industries and hydro-power generation. River Cauvery's riparian buffers are under severe anthropogenic pressure due to agricultural land expansion, sand mining, exotic species plantation and others. However, insufficient policies/guidelines to protect the riparian ecosystem in India is leading to the encroachment and degradation of riparian buffers. Hence, this study attempts to assess the ecosystem services of riparian buffers along river Cauvery and also people's perception based on association with the riparian buffer. The riparian buffer of river Cauvery within Karnataka is broadly associated with three landscapes: coffee-agrosystem, agricultural land and protected area (PA). A mixed method approach was adopted (Focus groups, informal interviews, questionnaire). The preliminary result indicates that among the three landscapes, coffee-agrosystem and PA derived relatively higher provisioning services compared to agricultural land and these were either market-based or subsistence. In coffee-agrosystem, the services were honey, fruits, recreation and religious, while in PA, it was majorly honey, fuelwood, fodder, fruits and rarely mushroom. In agricultural land, it was fuelwood, fodder and religious. Coffee planters and forest dwellers were familiar with the biodiversity present in their riparian buffer, while in agricultural landscape, they hardly knew what was present. Thus, compared to agricultural landscape, the coffee-agrosystem and

PA are potential service providers with positive community perception towards conservation and management.

Paving the way for human-wildlife co-existence in shared landscapes

Aritra Kshettry

Ensuring the persistence of large wildlife such as elephants and leopards are increasingly challenging due to small sized protect areas in India. Therefore, their presence in human-use, non-forested areas throw up opportunities as well as challenges for conservation. The primary challenge to the persistence of potentially dangerous large wildlife is the ensuing conservation conflict. I will be presenting a case study of a model where socio-ecological studies and stakeholder integration form the backbone in informing conflict mitigation. The study is based on continuing ecological research as well as conservation action in a tea plantation dominated landscape of north-eastern India. The ongoing work is in a high conflict area where more than 100 people are injured and 20 die each year due to encounters with elephant and leopard outside forested areas. Our studies suggest that simple solutions which are acceptable to locals may reduce such encounters. Furthermore, we also find that conservation practitioners need to wear multiple hats when affecting conservation on ground. It is crucial to identify the important stakeholders who are affected by the problem and also the stakeholders who may be involved in alleviating the problem. The study underscores the challenges and opportunities in making conservation work in an ethnically diverse bio-diversity hotpost where the persistence of endangered mega-fauna is threatened due to escalating conservation conflicts.

What affects peoples' response to predators?

Saloni Bhatia

Predators and people often live alongside each other, experiencing the numerous challenges and opportunities that characterize their interactions. These interactions are influenced by a range of socio-cultural, economic and ecological factors. We attempted to synthesize existing research on people-predator interactions by examining and classifying diverse interdisciplinary factors into those that are proximate (i.e. correlates) and those that are ultimate (i.e. mechanistic/ causal) in nature. We then tried to understand what factors affect peoples' attitudes and behaviours toward snow leopard and wolves in the high-altitude landscape of Ladakh, at the level of the individual and at the level of the community. The findings of this exercise will be presented at the conference.

Human-Nonhuman Primate Conflict in Askot Landscape: Notes from 1.5 years of Study

Subhajit Saha

Askot Landscape lies at the juncture of two important biogeographic zones of the Himalayan range - the Central Himalayas and the Western Himalayas, forming a rich ecotone of biodiversity at the north-eastern border of the Indian state of Uttarakhand. The regionally important site is a milieu of climatic, ecosystem, cultural, geographical, floral and faunal diversity, and is home to one wildlife sanctuary (Askot WLS), an Important Bird Area (IBA/IN099), an Important Plant Area (IPA/10/CIH), and a part of the Nanda Devi Biosphere Reserve. Askot Landscape, like most of the Himalayan regions, experiences a number of human-wildlife conflict issues of which conflicts between humans and nonhuman primates are particularly severe. Our Rufford Foundation supported project is assessing these conflicts in the area with an aim to find possible solutions for these issues.

In this presentation, I would try to draw attention to some of the important aspects of human-nonhuman primate conflict in Askot Landscape that we have understood from our 1.5 years of study (ongoing). Points will be discussed regarding the present state of conflicts, the possible causes of such conflicts, local attitudes towards primates, the distribution of the three species of primates in the area (rhesus macaque, Assamese macaque, and Himalayan langur), the condition of wildlife habitats in the

area, and other important conservation issues. Highlights from some preliminary results from our study will be shown. I would also try to share my experiences in conducting field work in a difficult Himalayan landscape, especially conservation awareness programmes among local people.

Janata Waghoba: Creating awareness on human-leopard interactions by utilizing the potential of youth to increase understanding of the issue.

Mrunal Ghosalkar

The major part of western Maharashtra is an irrigated agricultural landscape which supports large carnivores such as leopards living alongside high densities of humans having agriculture and livestock rearing are main livelihoods. Livestock depredation by leopards is commonly recorded here with very few instances of loss of human life.

There is definitely a fear of the leopards in the landscape which is also fuelled by the extreme negative reporting of leopard incidences in the media. Increased fear also results in undue pressure being put on the managers of the area to take knee-jerk actions such as setting up traps even if leopard has been only seen. The aim of this project was to transform this fear into a greater understanding of leopards by imparting knowledge from both scientific and traditional origins on leopard behavior and the precautions people need to take to reduce conflict.

This work initiated in Niphad (Nashik, Maharashtra) in August 2017 which included conducting workshops for the Forest Department, Schools, Colleges and Media on (i) leopard behavior (ii) precautionary measures related to the safety of humans and their livestock (iii) creating children leopard ambassadors who can spread awareness in their own community.

Our belief and experience are that a greater understanding leads to a reduced fear and a more rational way of dealing with the issue of shared spaces between large wildlife and people. Our work also provides a platform for the different important stakeholders to have a dialogue with each other to increase the knowledge in the community.

Abundance and distribution of the four horned antelope (tetracerus quadricornis) in Gir protected area

Dhawal Mehta

The four-horned antelope (*Tetracerus quadricornis*) is endemic to India. Very few studies have addressed the biology and ecology of this antelope and that too in selected pockets in India and Nepal. This study was carried out to estimate the abundance, understand which habitat factors influence the distribution of the species and identify the imminent conservation threats in Gir protected area. The abundance estimation was carried out using the Distance sampling method. Systematic sampling framework was employed in order to understand habitat preference and selection. The presence/absence data of the species was utilized to understand the occupancy of the species in the area. Direct sightings and indirect evidences of the presence of the species were collected and locations recorded with the help of a hand held GPS unit. The presence/absence data along with the habitat variables collected at these locations were analyzed using GIS tools and Generalized Linear Models to understand the habitat selection and occupancy of the species at different spatial scales in Gir protected area. During the course of the project, the imminent conservation threats were identified and conservation awareness was generated among different stakeholders.

Study the effect of anthropogenic land use-change on bat diversity, changing behavior and ecology in high range mountains of Idukki landscape, southern Western Ghats.

Tijo K Joy

Bats have aroused the interest of people throughout the history. Detailed studies on the life history traits of bats showed that the long lived individuals and low reproductive rates and many mortality factors have the potential to decimate populations. The Idukki district has the highest forest cover in the state of Kerala. The estimated maximum forest cover in the study area is 3930 sq.km. The anthropogenic land use-change from natural vegetation to any other use typically results in habitat loss, degradation, and fragmentation, deforestation is the reason for loss of a natural habitat, with large numbers of trees being cut down for residential and commercial use in study area. The extent and type of land use directly affects wildlife habitat and thereby impacts local and global biodiversity. Monitoring of bats is a high priority given the important role they play in ecosystems and their potential sensitivity to both land-use and global climate change (Jones et al.2009). The study specifically focused on endemic and endangered bat species (we recently reported Salim Ali's Fruit Bat (*Latidens salimali*)) and other bat species conservation, local land-use intensity and landscape features affect the predator– prey interaction of bats and insects. The effect of local land use accessibility on bats and insects and their biological interaction measured in bat's feeding activity. (Acoustic monitoring is a well-established method for monitoring bat activity patterns and changes in habitat use and activity of bats across habitats (Hayes 1997:2000: Broders 2003: Gehrt and Chelsvig 2003:2004: Gorresen et al.2008: Hayes et al.2009: Parsons and Szewczak 2009)) and other bat species conservation, species identification and the importance of conserve bats roosts and caves in High Range Mountains of Idukki Landscape.

Spatial ecology and seasonal activities of Indian narrow headed softshell turtle (*Chitra indica*) in India

Ashutosh Tripathi

Chitra indica, is a riverine species restricted to south Asia. We studied movements and seasonal activities of 11 adults and 1 subadult near Chambal-Yamuna River's confluence in north India. Each turtle radio-tagged with a VHF transmitter attached to the rear carapace, and tracked at 0.5-2 km range, multiple times per week. We logged 697 observations over 389 turtle-days on 4 resident turtles, released at their capture sites (=448 obs.), and on 2 transplanted turtles, shifted 62 river km from their capture site in protected National Chambal Sanctuary (=249 obs.). These observations were made on 165 days, from Dec 2017 thru May 2018; =180 days study period). Four resident females (3 adults; 1 subadult) occupied 2.6, 2.7, 7.3and 11.7 river kms; two transplants occupied 13.1 and 14.3 river kms during the same period. Winter (Dec-mid Mar) behaviors consisted of daytime movements into shallow water (0.5-1m depth), and nighttime retreats to moderate depths (2-4m); tracking signals were strong and detectable day and night. In contrast, summer (mid Mar thru May) behaviors consisted of movements into shallow water at night, and daytime retreats to deep pools (>5m depths) where tracking signals were undetectable. The single male turtle, a transplant, moved more frequently from pool to pool, over longer distances (>5 kms) than any of the tracked females. Transmitter ambient temperatures for 2 turtles ranged from 7-7.5 to 23.3-24.2^{o} C in winter, and from 20.3-21.5 to 29.6-29.9^{o} C in summer. When fishing occurred nearby, tagged turtles moved to adjacent undisturbed areas.

Reviving the white winged wood duck from extinction in Dehing Patkai wildlife sanctuary, Assam

Abhijit Boruah

White-winged Wood Duck *Asarcornis scutulata* is an endangered species found only in some pockets in South East Asia. The species is in dire strait to survive because of destruction of riverine habitats including loss of forests across its range. The Dehing Patkai Wildlife Sanctuary, situated in the state of

Assam in India, is one of the last strongholds of the species. Recently, Increasing human population and its growing demands for land and biological resources have further affected the Dehing-Patkai landscape to a great extent. Fragmentation of habitat has primarily occurred as a result of infrastructure development, widening of road, Oil Drilling, illegal logging and NTFPs collection from the Sanctuary. The small and fragmented populations are vulnerable to extinction from stochastic events, loss of genetic variability, hunting and collection of eggs and chicks. All these factors are led to decrease the white winged wood duck population. There has not been any comprehensive survey of recent status in Assam. There were sporadic sighting records of the species from the area but no systematic assessment of the population was conducted so far. We followed direct count method by call playback and assessed the habitat of the species. The study area was gridded 1 x 1 km2 and survey was conducted in randomly sampled grids. So, far we were able to identify 25 individuals of White winged Wood Duck in 15 grids from the sanctuary area. This is an ongoing study and only the preliminary findings are presented there.

Acoustics of the Indian Ocean humpback dolphin (*Sousa plumbea*)

Isha Bopardikar

The Indian Ocean humpback dolphin (*Sousa plumbea*), a common cetacean species in India has a diverse vocal repertoire, which to date has not been described in detail. Our study presents the first detailed description and classification of their whistle repertoire recorded off the Sindhudurg coast, Maharashtra.

Acoustic recordings of humpback dolphins were made in the months of May and October 2014, December 2015 and January 2016. Recordings with a higher sampling rate (192 kHz) were made in March-April 2018. The dataset from 2014-2015 was used to characterize the time-frequency features of *S. plumbea* whistles. A total of 2,260 whistles were manually traced using the Silbido contour tracing algorithm in MATLAB 2016b (Roch et al. 2011). A custom written script was used to extract 16 time-frequency based features from the whistle contours. Whistles spanned a wide frequency range between 2.3 kHz and 33.0 kHz, with durations ranging from 0.01 s to 1.60 s. Whistles were first broadly categorized into seven contour classes based on the aural-visual classification method. A supervised classification and regression tree (CART) analysis was then used to quantify variability between the seven contour classes using the measured acoustic features.

Recording made during March-April 2018 are being analysed to understand the behavioural context of the vocalisations produced by *S. plumbea*.

Using this information, we hope to understand how changing habitats and increasing underwater ambient noise levels possibly affect communication and the acoustic behaviour of *S. plumbea*.

Assessing the role of herbivorous reef fishing in controlling algal growth on post-disturbed reefs of the Andaman Islands, India

Tanmay Wagh

With the increase in the frequency of global coral bleaching events, the role of ecological processes that mediate reef recovery have become imperative in understanding reef ecosystem dynamics and sustainable management. Herbivory is a key top-down process that plays a crucial role in reef recovery by limiting the growth of algal communities that inhibit coral recruitment and growth and clearing the substrate for new coral recruits to settle and thrive. The aim of the present study was to evaluate the impact of herbivory on algal communities on the recovering reefs of the Andaman Islands, India post the mass bleaching event of 2016. We analyzed herbivore species richness and abundance, benthic community composition and the bite rates of foraging herbivores at ten reef areas around the islands.

The presence of herbivores was identified as one of the principal reasons in preventing a benthic community shift from a coral dominated system to a one dominated by late successional macroalgal species. The results revealed a clear relation between the strength of herbivory and the abundance of macroalgae, and reiterate the importance of understanding herbivore-algal dynamics and their role in enhancing reef resilience in the face of global climate change and anthropogenic stresses.

Conservation of Indian horseshoe crab and protection of its breeding ground through community participation

Siddhartha Pati

It is well known that education facilitated by using smart tools plays an important role in Nature conservation and specifically of important species. Horseshoe crab, privileged to mystified life-cycles, long-range migrations, and universal myths, provide a powerful source of inspiration in creating such tools. Association for Biodiversity Conservation and Research (ABC), founded in 2016, has the main objectives of studying and protecting Indian Horseshoe crabs and other valuable species found in Odisha, North East India. The establishment of the ABC plays pivotal role in the protection of Horseshoe crab and their nesting habitats at the local level. Though several partners, various institutions and associations carry out scientific research, collect data and record sightings and stranding along its coasts but co-operation and co-ordination among these institutions, agencies are extremely important tool to reach fundamental scientific and educational goals. Effort has been taken by the ABC on promoting public awareness among 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 fulfill the Society's 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, ABC has also executed series of painting and quiz competition to the school children along the coastal areas of Balasore district on the theme of "Know me and Save me", with the aim to sensitize the young generation and school children. ABC has planned to start a satellite tracking project with the help of other agencies, like Rufford Foundation, UK, WWF-India, MBZ Species conservation group, UAE in future

Keywords: ABC; Horseshoe crab; Conservation

Spiny tailed lizard and its changing habitat.

Caleb Daniel Gnanaolivu

In different desert scrublands of Rajasthan, an exotic desert shrub *Prosopis juliflora*, was introduced about 100 years ago, and now has invaded a large proportion of the Thar landscape. Among invasive plants; grazing pressure and agricultural practices also pose a major threats to the native fauna of the area, especially to Spiny tailed lizards (*Saraa hardwickii*). This agamid, listed as vulnerable and a schedule II species, is the only herbivorous lizard species in India, warranting a need for immediate efforts to address this threat in order to conserve them.

It is necessary to understand the role that *P. juliflora* and other anthropological pressures plays in the lizard's ecology, to aid better management strategies. We hypothesize that habitat structure and resource availability along the disturbance gradient may directly affect population density, diet nutrition availability and activity patterns of these lizards. We used standard field-ecology protocol, as well as current ecological tools, to examine these effects and present a surprisingly counter intuitive result that sheds an informative light on the adaptability of the lizard.

Integrative taxonomic approach to estimate the diversity of freshwater snails in India

Maitreya Sil

Species are the basic unit not only for studies aimed at understanding the ecology and evolution of a group but also for conservation efforts. Estimation of the actual species diversity of a region gives us a better understanding of the ecosystem functions and estimation of conservation importance of that region. Thus, it helps us conserve the constituent species of that habitat as well as the habitat itself. Traditional taxonomic methods often fall short of estimating the true diversity of species. Here we applied integrative taxonomic method to estimate the true species diversity of freshwater snails of families Ampullariidae and Viviparidae. In recent years many cryptic species have been delineated using integrative taxonomic approach which previously were described as one single species. We have used molecular data to identify many putative species within the already described species. We are going to use morphological data and species distribution modelling to corroborate the initial findings. We also found out that many of these cryptic lineages are not widespread as the already described species, which might warrant an assessment of the threats they face. Additionally, we have found records of a few species not described from India before.

Birds beyond borders: hornbill population, nesting and conservation in contiguous rainforests and adjoining plantation landscape in Anamalai Hills, India

Pooja Pawar

My study aimed to estimate hornbill population, their relative monthly abundances and also assess the role of fruiting Ficus on their occurrence. I checked 120 known hornbill nests to assess their nesting status. Eleven line transect surveys (2-4km length) were carried out once a month between January 2017 and April 2018 to estimate hornbill densities. Seven transects were in tropical wet evergreen forests of the Anamalai Tiger Reserve (total effort=209.8km) and four transects were in shade-coffee plantations/forest fragments in the Valparai Plateau (total effort =152km). Fruiting phenology of Ficus trees (N=149) within 10m on either side of each transect was monitored from May 2017 to April 2018. The overall Great Hornbill density in the ATR is 4 (SE:0.46) birds/sq km and in Valparai plateau is 3 (SE:0.62) birds/sq km. Malabar Grey Hornbill densities in ATR and Valparai plateau are 20 (SE:2.39) and 10 (SE:1.47) birds/sq km, respectively. We monitored 149 trees of 13 Ficus species on phenology transects. 50 GH, 66 MGH and 4 Malabar Pied Hornbill nests were checked. 62% of GH and MGH nests were occupied. All 4 known MPH nests are still in use. Statistical analyses will explore a) seasonal variation in and correlation between hornbill abundances and fruiting Ficus, b) hornbill nest characteristics and c) spatial distribution patterns of hornbill nests across the study area. The study highlights the conservation value of the production landscape. It would help in better understanding adaptability of hornbills to human-modified areas and long-term conservation

A search for the White-bellied heron in north-east India.

Megha Rao

The white-bellied heron (WBH) is a data deficient, Critically Endangered species. Currently restricted to Bhutan, India and Myanmar, its range is constantly declining with only one confirmed population from India, in Arunachal Pradesh. Our objective was to conduct a systematic survey to gather data about the distribution of the WBH using an occupancy framework model along with key informant surveys.

Field surveys were carried out across 7 major river basins in Arunachal Pradesh and 75 sites were sampled between October 2017 and March 2018. We sampled along rivers using an occupancy framework. Within each drainage, a stretch of 2km was identified as a site, further divided into surveys of 100m each, along which, every riverine bird species, number of individuals and its activity was recorded. Along with this, we recorded the following covariates: habitat along the river, elevation,

river width, flow rate, substrate type and anthropogenic pressures, which will be used to model the occupancy of these birds.

Of the 75 sites sampled, the WBH was observed only in the Namdapha Tiger Reserve (NTR). Of a total of 7 sites sampled inside the NTR, the Heron was observed in 3 sites. The WBH was absent in all other surveys. Across all sites spanning 93.4 km, 3098 individuals belonging to 66 riverine bird species and 20 families were observed. The lack of sightings of the WBH is of grave concern and this study tries to shed light into the reasons behind it's glaring absence. Analysis is underway for the data collected.

Birds' eye view of the Darjeeling tea-forest landscape: What lies beneath?

Annesha Chowdhury

The Darjeeling tea-forest landscape is interspersed between protected areas such as the Singhalila National Park, the Senchel and Mahananda Wildlife Sanctuaries and moist deciduous reserve forests. Lying within a 600m -2100m elevation range, this landscape falls within an combination of management practices via the adoption or exclusion of various sustainable agricultural standards such as Organic, Rainforest Alliance, Fair Trade or conventional and ownership i.e. large estates and small tea growers. A part of our study aims to assess avifauna of Darjeeling with respect to different management regimes and ownership. We use data collected through point counts conducted across 11 study sites within the Darjeeling tea-forest landscape summer and 13 sites post-monsoon at different distances from the forest from two time periods i.e pre-monsoon and post-monsoon in 2016. Non parametric tests such as alpha and beta diversity indices and diversity t tests were conducted to compare between different treatments such as avifaunal feeding guild relative abundances and diversities in large tea estates vs. small tea growers, estates that are Organic certified vs. estates that are not certified Organic and estates that were Rainforest Alliance (RA) vs. estates not certified Rainforest Alliance (not RA) to assess if there was a difference in result between the two. In this presentation I will discuss the results of the avifaunal assessments conducted in 2016.

Catching-up with catastrophe: socio-ecological changes in marine systems in the Andaman and Nicobar Islands

Vardhan Patankar

Coral reefs are treasure troves of the world's seas. No other ecosystem on Earth is as valued for their aesthetics and biodiversity as coral reefs. However, currently, they are facing severe threats due to the impacts of global climate change. Reefs of the Andaman and Nicobar Islands are no exception. A series of catastrophic disturbances (including repeated mass bleaching and a tsunami) have impacted these reefs. In this talk, I will describe my journey of documenting the impacts of catastrophes on coral reefs, documenting the unique traditional marine management system in the Nicobar archipelago and setting-up a long-term reef resilience protocol in the Andaman Islands. I will then present specific studies carried out in the Islands that ranges from dugongs to butterfly fish. Finally, I will talk about the process of coral bleaching and reef recovery set the context for coral reef research in the Andaman & Nicobar Islands.

Fishing for solutions in marine conservation

Divya Karnad

Overfishing has pushed marine species to the tipping point, risking the extinction of oceanic species across the world. Ultimately the choices made by the fishermen are dictated by the market, and depend on the selective demand for certain types of seafood. Is it possible to influence the market by nudging people's behaviour, so that many small nudges ultimately lead to a huge improvement in marine health? This is the question that drives the initiative called In Season Fish, a sustainable seafood initiative that is working to connect fishermen and seafood consumers. This talk will discuss

the question of interrogating standard explanations, such as overfishing, in an attempt to find innovative conservation solutions.

Human-animal Cohabitation

Atul Borkar

Increasingly we are beginning to realize that in a country of a billion people, effective wildlife conservation requires a good knowledge of the human dimension. This aspect is rarely taught to us conservation practitioners and students but is extremely important for effective conservation outcomes. Across the globe we see various animals sharing spaces with humans. Animals are forced to adapt and survive in human-modified landscapes; some of them have been very successful. We need to adapt to live alongside them and take responsibility to help them survive if we wish to conserve the biodiversity. Peaceful human-animal cohabitation is going to be very crucial for conservation success in years to come. This popular talk will provide deep insights into this exciting topic and will explore 1. Reasons why humans and wildlife share spaces; 2. Understanding human and animal dimension in a cohabitation scenario; 3.How we need to identify and engage with important stakeholders in order to achieve positive conservation outcome. The talk will also throw light on how each of us can contribute to improve the conservation scenario.

Fostering Grass-roots Conservation in India - A Rufford Initiative

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