Fostering Grass-roots Conservation in India - A Rufford Initiative

The Rufford India Conference, Rajasthan 2017

FOUNDATION FOR ECOLOGICAL RESEARCH ADVOCACY AND LEARNING
THE RUFFORD FOUNDATION
AND
RAJASTHAN FOREST DEPARTMENT

23 to 26 April 2017
Sawai Madhopur, Rajasthan

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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 860 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 held at Sawai Madhopur, Rajasthan between 23rd and 26th April 2017. The four days conference was organised in collaboration with Foundation for Ecological Research, Advocacy and Learning (FERAL) and Forest Department, Rajasthan. This is the third conference that was organized in India for the Rufford grantees, and the second Rufford India conference that was organised in collaboration with FERAL. The previous two conferences were held in New Delhi and Bengaluru in the year 2013.

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 officials from the forest department, which is the nodal agency for wildlife and forest management in India, and learn on ground conservation challenges and opportunities from them. The conference was attended by 32 Rufford grantees working across India. In addition to Rufford grantees we had 20 officials and researchers working with Rajasthan Forest Department. The grant recipients presented their work as oral presentations or as posters. We also introduced a new session where grantees presented their work as short video documentaries and lead a panel discussion.

Dr. Ravinder Singh Bhalla (Sr. Doctoral Fellow, FERAL) welcomed all the participants and the representatives of the Rajasthan Forest Department and The Rufford Foundation. He emphasised on the role played by the RSG in the careers of young researchers and the importance of RSG conference.

Apart from presentations from grant recipients, the conference included talks by Dr. G. V. Reddy, Chief Wildlife Warden, Rajasthan Forest Department, Mr. Valmik Thapar, Ranthambhore Foundation, New Delhi, Dr. Jagdish Krishnaswamy, Convenor and Senior Fellow, Ashoka Trust for Research in Ecology and the Environment (ATREE), Bengaluru, and Dr. Meena Venkataraman, Carnivore Conservation and Research, Mumbai.

Invited Talks

Dr. G. V. Reddy (FD, Rajasthan) spoke about Ranthambhore Tiger Reserve and scientific study of tigers in Rajasthan. He emphasized on the need to consider Ranthambhore as a natural heritage and conserving our rich heritage rather than just tigers. In his talk while explaining the tiger ecology, he spoke about the history of tiger reintroduction and a need for scientific studies for carrying out reintroduction programs. He stressed upon need for balancing the local needs and conservation needs. He pointed out the adverse effects of unregulated ecotourism on conservation and local people. This talk highlighted the three dimensions of conservation – Ecological, Social and Economic dimensions.

Mr. Valmik Thapar (Ranthambhore Foundation) told the story of the 40 years that he has spent with Ranthambhore's wild tigers. He narrated a mesmerising history of Ranthambhore's wild tigers which has seen many ups and downs. He spoke about the efforts of Fateh Sigh in conserving tigers in the early years from 1976 to 1989.

Figure 1. Invited Speakers, Dr. Reddy and Dr. Krishnaswamy giving plenary talks

Figure 2. Invited Speakers, Mr. Valmik Thapar and Dr. Meena Venkataraman giving popular talks

Through the conservation efforts by Fateh Singh, Thapar and the forest department, the park had transformed dramatically with tiger numbers increased from 15 in 1976 to 50 in 1989. However, the crisis years for Ranthambhore started from 1989 and lasted for nearly 20 years until 2008. While there were efforts to reduce dependency on forests by local people by creating alternate livelihood opportunities by Ranthambhore Foundation and the forest department, the tigers were being poached inside the park which was not noticed until 2005, where Ranthambhore had lost half of its tigers, while the neighbouring tiger reserve, Sariska, had lost all its tigers. Ranthambhore suffered further due to the ill-planned translocation of tigers from Ranthambhore to Sariska by forest department. With the efforts from government of Rajasthan and India, the Ranthambhore was able to fight the crisis and now it has more than 60 tigers with high revenue being created by tiger tourism. Ranthambhore foundation and other non-governmental organisations worked in hands with the government while mitigating the crisis of poaching. His talk highlighted the role of non-government organisations in decision making for conserving wildlife in India.

Dr. Jagdish Krishnaswamy (ATREE) in his talk entitled "Water for Nature: Emerging challenges" discussed the challenges that we will be facing under a climate change scenario. He stressed on the effect of varying rainfall conditions on freshwater systems and a need to understanding the relationship between carbon, temperature and water. In particular he spoke about effect of water stress in plants, riparian ecosystems and loss of unique moisture regimes that exist in the tropical forests of India. He also pointed out the need for scientific studies to define ecological flow regimes at local levels while developing water related

policies. He warned about the new demands on water that would exacerbate water stress on ecosystems and landscapes.

Dr. Meena Venkataraman (Carnivore Conservation and Research) delivered a talk entitled *"The life and times of the Asiatic lion of the Gir forest"* where she discussed about her study on Asiatic lions that was initiated and supported by RSGF. Since 2010, Meena has been studying local people's tolerance and attitude towards lions and their conservation in the Greater Gir Landscape (GGL). She stressed on the importance of the continued positive outlook and involvement of local people in the shifting focus of conservation management efforts and continued survival of lions in the landscape. She spoke about the unique features of lion's behavior and ecology and highlighted the resilient adaptations and survival of lions in GGL. She discussed the carnivore conservation problems faced worldwide using Asiatic lions in the Greater Gir landscape as case-study and presented the nature of human-lion interaction, management approaches to resolve conflict and local attitudes.

Presentations by grant recipients

We had 30 presentations by the Rufford grantees, 14 oral presentations, 11 speed talks and poster presentations, and 5 video presentations.

The work of grantees mainly highlighted the important role that The Rufford Foundation has played in its support of conservation projects in India. This third Rufford India conference was restricted to the Rufford grantees who received grants between 2013 and 2016; however, the conference had representations from early career conservationists to conservationists who have received booster grants. The studies ranged from obtaining baseline data on population status, biodiversity assessments and behaviour/ecological studies to awareness, education and outreach programs.

A large number of participants were early career researchers whom RSGF had supported to achieve their goals. Suman Jumani, a conservation researcher, while studying the impact of small hydropower projects on ecology of river systems and socioeconomic status of local people, produced a documentary that aims to highlight the environmental and social consequences that can arise from the unregulated growth of SHPs, and provide compelling evidence to promote suitable policy-level changes. Similarly, Nitya Prakash Mohanty who initiated a study on invasive spotted deer in the islands of Andaman with the support from RSG provides evidence and the impetus for conservation of endemic reptiles in small tropical islands by mitigating the impacts of invasive spotted deer. His documentary titled 'Spots of Concern' encapsulates the findings of his study and is meant to bring to light the need of invasive species management in the Andaman archipelago.

Figure 3. Participants and the invited speakers

RSGF supported **K. Supriya** in pursuing her interest in understanding the interactions between ants and song birds at different elevational gradients in the eastern Himalayas. **Upma Manral**'s work assesses the resource available for local communities at an elevational gradient and she suggests a need for undertaking multipurpose tree species planting under an agro-forestry system in the Himalayas to reduce dependency on natural resources and to conserve forests. **Aritra Kshettry** studied the spatial and temporal trends in the human-elephant conflicts in the northern West Bengal region. He found a high correlation between alcoholism and human casualties. His study indicates that most of the incidences of human casualties may be avoided by adopting better crop protection methods and by making people aware of the best behavioural practices when sharing space with elephants. The work of **Nishant Srinivasaiah** highlights the interstate boundary issues that enhance the human-elephant conflicts in Karnataka and Tamil Nadu states in India. This RSGF supported project aims at collecting and incorporating the basic information on spatio-temporal patterns of elephant distribution, and the dynamics of human-elephant interactions in conflict management plans. **Prakash Chandra Mardaraj** discussed mitigation strategies to reduce the human-sloth bear conflict and stressed on the need for implementation these measures to reduce conflict. **Niyati Patel** presented her work on mapping crop depredation hotspots in Gujarat. Her study provides information to aid managers in identifying potential conflict hotspots which could help focus allocation of conservation efforts and funds directed at conflict prevention and mitigation. **Nikunj Jambu** shared his experiences on working with communities for conservation of birds. **Imran Patel** shared the results of landscape connectivity and habitat use analysis for the Kanha-Pench forest corridor. He

found a high correlation between structural and functional connectivity. His work suggests the immediate need to develop effective mitigation strategies to limit impacts of fragmentation, and prioritize areas to conserve habitat bottlenecks. The impacts of warming on the high elevation grasslands in the Himalayas was presented by **Dharmendra Lamsal** through his experimental plots.

Diti Mookherjee presented her 'Green Rhinos' program with school students of West Bengal. Under this program, school children were led through transformational leadership training that allows them to take action to protect and enhance their natural heritage. So far the program has created 3500 Green Rhinos, and this is an example of how RSGF has helped train a future generation of conservationists in India.

Tarun Nair shared his experiences from Communication, Education and Public Awareness (CEPA) campaign that he undertook for Gharial conservation Betwa, Ken, Tons, Son and Gandak river systems. Through street plays, puppet shows organised in association with local theatre he was able to reach out to a large number of audience, around 15,000 people, from riverside communities, school students, government officials and local conservation groups. His work reflected on what strategies worked locally and what have not worked, and is an example of locally developed approaches to biodiversity management. Dhaval Patel presented his work with conservation of crocodiles living in the village/community ponds. His organization has been involved with creating awareness through education in local people.

Figure 4. Diti Mukherjee presenting her work at the conference

Figure 5. Sanjoy Deb showing the implementation of Early warning system to prevent roadkill

They also initiated a citizen science program “Charotar Crocodile Count”, which involves people from various walks of life to contribute to crocodile conservation. This has generated a good response in terms of awareness among the urbanites. **Shankar Datt** presented his work on biodiversity conservation through community participation. With the RSGF support he developed five Participatory Comprehensive Village Biodiversity Conservation Plans and helped in creating awareness on conservation of biodiversity among local people. Documentary by **Subhransu Bhusan Swain** highlights the importance of public-private-community partnership for conservation of elephant corridors and habitats. He suggests that such a partnership can help in achieving long term conservation of elephants and their habitats.

RSGF has been supportive in developing innovative approaches for wildlife conservation. **Sanjoy Deb** showed the design and implementation of a low-cost ‘Automated Roadkill Prevention’ (ARP) system that has been developed with the support from RSGF. He informed that ARP system will be deployed on a National Highway in Sathyamangalam Tiger Reserve, India soon and this will be first of its kind to be implemented in India which will lead the way to reduce “Roadkill”.

The role of RSGF has been crucial in supporting work on species and ecosystems that are traditionally difficult to fundraise for. The work by **Ashish Thomas** on endangered Indian purple frog helped in identifying threats to this species and prioritizing areas for conservation of this frog. His work also involved awareness and capacity building of local communities to engage them in conservation of this frog. RSGF supported **Ashok Verma** in studying the status of harriers, and understanding the challenges and opportunities for conservation of harriers in Rajasthan. The work by **Pramod Kumar Yadav** provided an overview of economics of harvesting Caterpillar fungus and the dependency of local communities on harvesting of this fungus in the Himalayas. **Mayuresh Ganagal** presented an interesting work on temporal fishing closures for protecting an aggregating population of squaretail groupers in the Lakshadweep archipelago. His work highlights the failure of such a closure implemented without an understanding of the complex life history and mating systems in long-lived benthic fish. He suggests a need for additional efforts to regulate off-spawning harvests to prevent declines or extinction of such species. **Sachin Vijay Chorge** discussed the study on the highly neglected group of animals, beetles. His study provided a baseline data on diversity and abundance of Scarabaeid beetles in the state of Maharashtra. He also discussed the economic benefits of these beetles to local farmers and their importance in the ecosystem.

Some of the RSGF supported studies contributed towards generating important biodiversity information for the landscape. **Abhishek Jamalabad** presented his study on complex interactions between fisheries and cetacean communities in the west coast of India. He documented a direct conflict between cetaceans and the coastal fishery. During his study he had documented 23 sightings of cetaceans otherwise not reported from this region and thus the findings also serve as a baseline for further cetacean research and conservation in these coastal region. **Karan Gopalbhai Rana** studied the status of threatened and endemic species of Angiosperms in the state of Maharashtra. He discussed about the In-situ and Ex-situ sites

that have been identified for the conservation of endemic and threatened Angiosperms in Gujarat. **Girish Punjabi** presented his work on use of occupancy surveys in population estimation of large wild ungulates in Tillari region of Maharashtra. He also assessed the impact of hunting on ungulate population and suggested a need to involve local community for a better management of wild ungulates. **Iravatee Majgaonkar** presented her work on assessing the distribution of three large carnivores outside protected areas in the state of Maharashtra. She found that large carnivores like leopard, wolf and hyena were present in more than 50% of the areas that were dominated by humans. Her work establishes the importance of areas outside the protected areas in conserving the population of large carnivores. **Anirudh Vasava's** work on mapping wolf distribution showed a drastic decline on wolf population in the Kutch area of Gujarat. He used large-scale interview surveys for rapid assessment of wolf conservation status. **Ranjitsinh Devkar** presented his works in assessing Microchiropteran diversity in Gujarath, where he reported 16 species of bats. The educational film by him provides glimpses of natural heritage and provides information on different species of bat and handling and conservation of bats.




Figure 6. Participants got an opportunity to interact with each other and share their experiences

Panel discussion

Suman Jumani and Nitya Prakash Mohanty led a panel discussion on the theme: “Threats to Biodiversity”, which mainly addressed two threats – minihydel projects and invasive species which are often not considered while developing conservation action plans. Dr. Jagdish Krishnaswamy and Mr. Y. K. Sahu were the other panel members in this session. Suman highlighted the issue of minihydel projects that are mushrooming in the Western Ghats and Himalayas in her documentary and stressed on the need for policy level amendments for monitoring and regulation of such hydel projects. Adding to the views presented by Suman, Dr. Krishnaswamy suggested the need for ecological understanding and maintenance of minimal ecological flow regimes for dams and hydel projects. Mr. Sahu pointed out the inevitability of such projects to meet the demands of a growing human population and a need for rational thinking while allocating areas for such projects. Nitya showed the documentary on the effects of invasive deer species on the vegetation and lizard species in the Andaman Islands, and he discussed the methods to mitigate threats by invasive to the biodiversity of islands. Dr. Krishnaswamy and Mr. Sahu presented their views on invasive plants in the mainland India and gave examples of a few invasive species like Prosopis, which has become a threat to biodiversity in many places whereas in a few places has become a major source of economy to the rural people.

Subhransu Bhusan Swain, Nishant Srinivasaiah and Dr. G. V. Reddy were part of the panel discussing the theme: “Human-wildlife conflict”. Nishant spoke about the concept of structural and functional corridors and the importance of maintaining connectivity to reduce the conflict. The panel also emphasized on understanding individual animal behaviours for addressing the conflict issues. Subransu discussed about mitigation measures and their success and failures in avoiding conflict in different landscapes.

Ranjitsinh Devkar, Aditya Roy, Ashok Verma and Tarun Nair were in the panel that discussed the theme: “Species recovery”. Aditya presented documentary video which outlines the threats to critically endangered vultures in India and discussed about the initiatives

undertaken for the recovery of this species. Tarun spoke about crocodile and gharial species recovery plans that were implemented in India.

Figure 6. Panel discussion

Field visit to Ranthambhore Tiger Reserve

Figure 8. Experiencing the wilderness of Ranthambhore Tiger Reserve through the field trip

Appendix I

List of Rufford grantees

Name	Email	RSGF support
K Supriya	ksupriya@uchicago.edu	Travel, food and accommodation
Aditya Roy	feathered.bipeds@gmail.com	Travel, food and accommodation
Aritra Kshettry	kolkatalife@gmail.com	Travel, food and accommodation
Girish Arjun Punjabi	girisharjunpunjabi@gmail.com	Travel, food and accommodation
Prakash Chandra Mardaraj	pmardaraj@gmail.com	Travel, food and accommodation
Pramod Kumar Yadav	pramod.yadav31@gmail.com	Travel, food and accommodation
Shankar Datt	dattshankar@gmail.com	Travel, food and accommodation
Sanjoy Deb	deb_sanjoy@yahoo.com	Travel, food and accommodation
Dharmendra Lamsal	dharmendral@ncbs.res.in	Travel, food and accommodation
Ranjitsinh Devkar	rv.devkar-zoo@msubaroda.ac.in	Travel, food and accommodation
Suman Jumani	sumanjumani@gmail.com	Travel, food and accommodation
Rajat Nayak	rajat@feralindia.org	Travel, food and accommodation
Karan Gopalbhai Rana	karanendemics@gmail.com	Travel, food and accommodation
Iravatee Majgaonkar	iravati.m@gmail.com	Travel, food and accommodation
Dhaval Patel	dsp@vncindia.org	Travel, food and accommodation

Subhransu Bhusan Swain	subhransu1963@yahoo.com	Travel, food and accommodation
Meena Venkataraman	meena.venktraman@gmail.com	Travel, food and accommodation
Anirudh Vasava	aniruddh.vasava@gmail.com	Travel, food and accommodation
Sachin Vijay Chorge	sachinvch@gmail.com	Travel, food and accommodation
Ashok Verma	vermaasok@rediffmail.com	Travel, food and accommodation
Deyatima Ghosh	meetdeyatima@yahoo.com	Travel, food and accommodation
Mayuresh Gangal	msgangal@gmail.com	Travel, food and accommodation
Abhishek Jamalabad	abhishek.jamalabad@gmail.com	Travel, food and accommodation
Imran Patel	imranp901@gmail.com	Travel, food and accommodation
Nishant Srinivasaiah	msnishant@gmail.com	Travel, food and accommodation
Niyati Patel	niyati.patel145@gmail.com	Travel, food and accommodation
Tarun Nair	tarunnair1982@gmail.com	Travel, food and accommodation
Diti Mookherjee	asedkol@gmail.com	Local Travel, food and accommodation
Nikunj Jambu	nikunj.friends.25@gmail.com	Travel, food and accommodation
Ashish Thomas	ashishthomas1610@gmail.com	Travel, food and accommodation
Upma Manral	upmamanral2@gmail.com	Travel, food and accommodation
Nitya Prakash Mohanty	nitya.mohanty@gmail.com	Partial Travel, food and accommodation

Appendix II

Schedule

Rufford India Conference: Fostering Grass-roots Conservation in India - A Rufford Initiative, 2017

23 APRIL, 2017

SESSION	TIME	EVENT	
	12.30 – 14.30	**CHECK IN**	
Post-lunch session	14.30 – 16.00	**REGISTRATION**	
	16.15 – 16.30	**WELCOME ADDRESS** Dr. R. S Bhalla Senior Scientist, Managing Trustee Foundation for Ecological Research, Advocacy and Learning	
	16.30 – 18.00	**VIDEO PRESENTATIONS AND PANEL DISCUSSION**	
		Suman Jumani	Small hydropower projects and their impacts
		Nitya Prakash Mohanty	Spots of Concern
	19.30 – 21.00	**DINNER**	

24 April, 2017

SESSION	TIME	EVENT	
Morning session	08.30–09.00	**REGISTRATION**	
	09.00–10.00	**KEYNOTE ADDRESS** Dr. G. Viswanatha Reddy (IFS) APCCF, Chief Wildlife Warden, Rajasthan Forest Department	
	10.00 – 10.20	**TEA BREAK**	
	10.30 – 13.00	**ORAL PRESENTATIONS**	
		Diti Mookherjee	*Creating Youth Nature Leaders*
		Tarun Nair	*Promoting Gharial Conservation through Communication, Education and Public Awareness*
		Ashish Thomas	*Conservation of the endangered Indian Purple frog through threat identification, area prioritization and community education*
		Aritra Kshettry	*Spatial and temporal trends in human-elephant encounters in north-eastern India*
		Prakash Chandra Mardaraj	*Identifying Key issues for the Conservation of Sloth bear (Melursus ursinus) in Rajnilgiri, Odisha, Eastern India*
		Abhishek Jamalabad	*Fisheries and Coastal Cetacean Interactions*
		Nishant Srinivasaiah	*The Apolitical Elephant: Assessing elephant ranging patterns across a political boundary in a human-dominated landscape, Eastern Ghats, India*
	13.00 – 14.00	**LUNCH**	

24 APRIL, 2017

SESSION	TIME	EVENT	
Post-lunch Session	14.00 – 14.45	**Speed talks**	
		Dhaval Patel	*Conserving Crocodiles in Charotar, Gujarat*
		Samya Basu	*Living with Elephants' - An initiative towards conflict to coexistence*
		Deyatima Ghosh	*Farmers' perception about herpetofauna along an agricultural intensification gradient*
		Niyati Patel	*Mapping crop depredation hot spots in Little Rann of Kutch, Gujarat, Western India*
		Sanjoy Deb	*Design and Implementation of a Multiple Sensor Automated Warning System for Roadkill Prevention*
		Shankar Datt	*Biodiversity Conservation: A Case for Indigenous Community-Centric Buffer Zone Management*
	14.45 – 15.30	**POSTER PRESENTATIONS**	
	15.30 – 16.00	**TEA BREAK + POSTER PRESENTATIONS**	
	16.00 – 17.30	**VIDEO PRESENTATIONS AND PANEL DISCUSSION**	
		Subhransu Bhusan Swain	*Public private & community partnership for elephant conservation, habitat & corridor management*
	17.30 – 18.00	**POPULAR TALK** *Ranthambhore – 1976-2017* Shri Valmik Thapar	
	19.30 – 21.00	**DINNER**	

25 APRIL, 2017

SESSION	TIME	EVENT	
Morning session	08.30 – 09.00	**REGISTRATION**	
	09.00 – 10.00	**PLENARY TALK** Dr. Jagdish Krishnaswamy Senior Fellow Ashoka Trust for Research in Ecology and the Environment (ATREE)	
	10.00 – 10.20	**TEA BREAK**	
	10.30 – 13.00	**ORAL PRESENTATIONS**	
		Nilesh Heda	*How conservation took shape - Almost a decade with Rufford Foundation*
		Ashok Verma	*The status of Harriers in Rajasthan: Opportunities and challenges for conservation*
		K Supriya	*Competition between birds and ants for nesting cavities results in shortage of nesting space at low elevation in eastern Himalayas*
		Girish Arjun Punjabi	*Relative abundance of wild ungulates and patterns of local hunting in Tillari, Western Ghats, India*
		Upma Manral	*Park, People and Cattle: Forest resource availability within a protected area landscape in Western Himalaya*
		Iravatee Majgaonkar	*Assessing the presence of three large carnivores in human-use landscapes of western Maharashtra*
		Pramod Kumar Yadav	*Assessing opportunity and challenges of Ophiocordyceps sinensis harvesting in the Dharchula-Munsiari landscape Himalaya, India*
		Mayuresh Gangal	*Evaluating the effectiveness of a temporal fishing closure in protecting a once-pristine grouper spawning aggregation*
	13.00 – 14.00	**LUNCH**	

25 APRIL, 2017

SESSION	TIME	EVENT	
Post-lunch Session	14.00 – 14.45	**SPEED TALKS**	
		Nikunj Jambu	*Avifaunal conservation through research, awareness and generating alternative livelihood options in Purna Wildlife Sanctuary, Gujarat*
		Anirudh Vasava	*Using local people's knowledge for mapping wolf distribution across Kutch region*
		Imran Patel	*Links in a sink: Examining landscape connectivity and habitat-use by tigers in the Kanha-Pench forest corridor of India*
		Dharmendra Lamsal	*Response of experimental warming on palatable and non-palatable plant species of Sikkim eastern Himalayas*
		Sachin Vijay Chorge	*Diversity and Economic importance of Scarabaeid beetles of Sindhudurg*
		Karan Gopalbhai Rana	*Status of endemic and threatened angiosperms in Gujarat and conservation practices*
	14.45 – 15.30	**POSTER PRESENTATIONS**	
	15.30 – 16.00	**TEA BREAK + POSTER PRESENTATIONS**	
	16.00 – 17.30	**VIDEO PRESENTATIONS AND PANEL DISCUSSION**	
		Aditya Roy	*Conservation of Gyps vultures in Gujarat: an integrated approach of ecology, advocacy and awareness*
		Ranjitsinh Devkar	*An update on conservation efforts of microchiropteran bats and their habitats in central Gujarat*
	17.30 – 18.00	**POPULAR TALK** *The life and times of the Asiatic lion of the Gir forest* Dr. Meena Venkatraman Carnivore Conservation and Research, Mumbai	
	19.30 – 21.00	**DINNER**	

26 April, 2017

SESSION	TIME	EVENT
Morning session	06.00 – 11.30	**FIELD VISIT TO RANTHAMBORE AND INTERACTION WITH FOREST DEPARTMENT OFFICIALS AND STAFF**
	11.30 – 11.45	**CONCLUDING REMARKS** Srinivas Vaidyanathan Senior Fellow Foundation for Ecological Research, Advocacy and Learning
	12.00 – 13.30	**LUNCH**
	13.30 – 14.00	**CHECK OUT**

Appendix III

Abstracts

Small hydropower projects and their impacts

Suman Jumani

Small Hydropower Projects (SHPs) (capacity between 2MW-25MW) are viewed as sources of green energy with minimal or no environmental impacts, and strong social benefits. Hence, SHPs are legally exempted from environment impact assessments, environmental clearances and public hearings in India. Additionally, massive economic incentives are offered to promote their growth.

However, an increasing number of studies are highlighting the serious ecological and social impacts of extensive SHP development.

The documentary film presents an overview of the SHP scenario in India, information on the socio-ecological impacts of SHP proliferation within the Western Ghats, existing policy loopholes and suggestions on the way forward. Broadly, the film aims to highlight the environmental and social consequences that can arise from the unregulated growth of SHPs, and provide compelling evidence to promote suitable policy-level changes.

Spots of Concern: Impact of invasive spotted deer in the Andaman Islands

Nitya Prakash Mohanty

Invasive herbivores are known to be detrimental to native biodiversity and can alter ecosystem processes, by direct and indirect effects. Island systems, with inherently high rates of extinction are particularly susceptible to the impacts of such herbivores. The invasive spotted deer (Axis axis) is a potential threat to native forest floor and semi arboreal lizards in the Andaman Islands. We evaluated the nature and extent of this potential indirect effect on lizards from 2012 to 2014. We sampled for lizard abundance, arthropod abundance and understory vegetative cover on islands with varying intensity of spotted deer use. We inferred that, spotted deer depressed the abundance of forest floor and semi arboreal lizards approximately five fold, by reducing vegetative cover in the understory. The findings reveal a probable indirect effect of spotted deer on reptile abundance mediated by structural changes in the understory vegetation. The study provides evidence and the impetus for conservation of endemic reptiles in small tropical islands by mitigating the impacts of invasive spotted deer.

The documentary titled 'Spots of Concern' encapsulates the findings of this study and is meant to bring to light the need of invasive species management in the Andaman archipelago.

Creating Youth Nature Leaders

Diti Mookherjee

The Green Rhinos Program creates youth nature leaders. It had its beginnings in Diti Mookherjee's active involvement in nature study programs conducted by ASED and other organizations. The "Program to Conserve the Urban Biodiversity of West Bengal with School Students, 2008-2009 and 2010-2011 and its precursor in 2004-2005, funded by RSG laid the foundation of the Program.

It involves a series of interactions with a team of fifty middle school students in each participating school. Through illustrative presentations, field trips guided by environmentalists, nature games and lively discussions, young people are encouraged to appreciate the wonder of nature. They are led through transformational leadership training that allows them to take action to protect and enhance their natural heritage. This is done through field action projects that they create and implement in their respective communities.

The Green Rhinos graduate with a greater sense of empowerment and vision for change in their community. Individual students are part of the program for one year.

Program Outcomes:

- School Projects conducted by Green Rhinos:
- Creating biodiversity registers to record local flora and fauna.
- Studying threatened local fauna.
- Waste management programs.
- Studying specific species like local snakes and birds.
- Studying local bee species and finding ways to bring back bee populations to the local area.

Personal transformation:

- Improved understanding of biodiversity and the need to protect it.
- Increased desire to protect nature.
- Responsible engagement with nature.
- Increased ability to engage and collaborate with others.
- Increased ability to think independently and think innovatively in their everyday life.

Promoting Gharial Conservation through Communication, Education and Public Awareness
Tarun Nair

In an effort to assess the status of gharials (*Gavialis gangeticus*) in the Ganges Basin, my team and I surveyed the Betwa, Ken, Tons, Son and Gandak Rivers in 2013 and 2014. Having identified the conservation potential for the species in the Son and Gandak, we undertook a Communication, Education and Public Awareness (CEPA) campaign along these rivers in July and August 2014.

In association with local theatre groups, we organised street plays, puppet shows, short documentary screenings, and impromptu quizzes in riverside schools and villages, and also distributed bi-lingual outreach material (posters and calendars) to riverside residents. With a total audience of around 15,000 people across 70 sessions, these programmes reached out to a sizable section of our target groups. These events were also well covered in the regional press, further increasing the reach of the campaign.

This effort allowed us to interact with a large number of people from riverside communities, school students, government officials and local conservation groups. We believe that this is a significant first step towards securing local support for gharial conservation in these regions and is vital to our continued work in these areas. This has also given us a good understanding of the scale of operations required for similar efforts in the future.

Here, I will share some experiences from our CEPA campaign, and reflect on what worked and what may have not.

Conservation of the endangered Indian Purple frog through threat identification, area prioritization and community education

Ashish Thomas

Nasikabatrachus sahyadrensis, a unique, endemic and endangered amphibian species of the Western Ghats of India faces a number of natural and anthropogenic threats that include consumption by indigenous communities, habitat loss due to human settlements, construction of dams, roads kills and erratic monsoon patterns. My study conducted as part of Rufford small grant project focuses on three important aspects, a) to identify direct and indirect anthropogenic threats faced by Purple frog populations in different localities, b) prioritization of habitat areas for effective planning and implementation of conservation efforts, and c) engaging local communities in conserving the species through capacity building and increasing awareness. Field surveys were conducted in 15 selected locations where anthropogenic threats were identified and locality specific list of threats was prepared. These threats were used to prepare a threat-index based on ranking and scoring approach.

The threat index was transfigured on a GIS platform to prioritize the habitat locations for conservation of *Nasikabatrachus sahyadrensis*. Community engagement activities involved visiting 66 families in eight tribal settlement areas, delivering lectures in six schools and three nature camps and training thirteen forest guards. These efforts have helped in generating an overall awareness and empathy among local people towards Purple frog, leading to decrease in number of harvesting events at some places. The impact of such changes on tadpole population needs to be further investigated. Nevertheless, this highlights the importance of species-specific model of conservation for rare and endangered amphibian fauna, with greater emphasis on local community participation and capacity building.

Spatial and temporal trends in human-elephant encounters in north-eastern India

Aritra Kshettry

Conserving elephants in a densely populated country like India is particularly difficult since protected forests account for less than 5 % of the land area and more than 80% of the elephant range is presently shared with people, which leads to frequent interface between people and elephants. Conservation efforts are seriously undermined when people face adverse impacts due to presence of wildlife, hence such conservation conflicts need to be understood and resolved. We studied human casualties due to elephants in a high conflict region of northern West Bengal to understand spatial and temporal trends in human injuries and fatalities that occurred between January 2009 and December 2016. One hundred and six people died in the 2500 km2 study area and 196 people were injured by elephants in this period. Most of the incidents occurred in the monsoon between June and August and again during November and December. In order to identify the reasons behind the high number of human casualties, we sampled ~100 cases where people were involved in encounters with elephants by interviewing family members using semi-structured questionnaires. Majority (65%) of the incidents occur when people are trying to chase away elephants from the crop fields or human habitations. Alcoholism is rampant in the region and in majority of the cases investigated, the victim was drunk. We find that more than 70% of the victims were tribal in origin, a community where alcohol consumption is also extremely common. The location of the incidents appear to be nonrandom and clustered near routes which are used by elephants to move between forest patches.

Our results also indicate that most of the incidences of human casualties may be avoided by adopting better crop protection methods and by making people aware of the best behavioural practices when sharing space with elephants.

Identifying Key issues for the Conservation of Sloth bear (*Melursus ursinus*) in Rajnilgiri, Odisha, Eastern India.

Prakash Chandra Mardaraj

All over the world, human activities are severely impacting the habitat of all the eight species of bears, and in recent decades, all species have undergone dramatic decline in number and distribution. The sloth bear (*Melursus ursinus*) population is highly threatened an on decline in managed forest and from outside PAs. The Sloth bear habitat in and around Nilgiri wildlife range is severely destroying by human interferences. In search of food, bears frequently invaded human habitation and cultivation areas. Consequently, human-bear conflicts to an alarming level. A total number of 182 human attacks (including 4 deaths) occurred between June 2002 and May 2015. Four sloth bears were killed by the villagers in retaliation during this period. Between the year 2005 to 2009 more than 100 quarries were running in the Range this was the period when maximum human mauling cases (60%, n=111) were reported. This was the period when sloth bears showed an unusual feeding behaviour in Nilgiri Range. Bears were destroying chicken pens and coops and were also hunting goats and feeding on it 31 such cases were reported in 2009 and 2010 from the fringe villages. The increase in predatory behavior of sloth bear is really a clue of increasing in human sloth bear conflict in the Range. There are also some other factors influencing the conflict situation like NTFP of bear interest. Thus, this has commenced a competition of food resources between sloth bear and human. In addition to these extensive cattle grazing, illegal encroachments are the major reasons. Long term conservation of sloth bear in this area is only possible if mitigation policies of human-sloth bear conflicts are implemented. Mitigation strategies to reduce the conflict have been suggested.

Fisheries and Coastal Cetacean Interactions

Abhishek Jamalabad

Direct interactions between cetaceans and fisheries, specifically the commercial purse seine fishery, had been reported anecdotally from the waters off Karwar. This project aimed to explore and document these interactions systematically and in a scientifically usable manner. Via boat-based field surveys, it was found that 40.66% of the surveyed fishing sessions involved interactions with humpback dolphins, all of these being in the form of the dolphins depredating catch from nets and in the process damaging the nets. Other aspects of these depredation events were also studied, such as the spatial distribution of events over the surveyed fishing range, seasonal variations in the frequency of depredation, fish catch species that depredation was most often associated with, and the frequencies with which different dolphin age classes engaged in depredation. Interviews with fishermen were also conducted, and the results provided deeper insights into these interaction incidents and how fishermen perceive and deal with them.

Their traditional knowledge of cetaceans and their own observations over the years were also documented. Three opportunistic distant-offshore surveys were also undertaken, producing records of species previously unreported off this coastline. As an additional activity, we started a community-based cetacean reporting initiative, with local fishermen as participants. The data collected via this ongoing exercise so far comprises 23 sightings of cetaceans otherwise not reported from this region, and many of these records are accompanied by photographic proof. The findings of this project thus also serve as a baseline for further cetacean research and conservation in this region.

The Apolitical Elephant: Assessing elephant ranging patterns across a political boundary in a human-dominated landscape, Eastern Ghats, India

Nishant Srinivasaiah

In many habitat countries including India, where elephants range across state/administrative borders, each state department, forest or administration, is concerned in mitigating conflict only within their jurisdiction. With little inter-state consultation or cooperation to manage elephants at the landscape level, both, the local people and elephants, wedged between state politics and ad hoc mitigation strategies, suffer the brunt of conflict through loss of life and property. More implicitly, such improper management strategies alter the regular ranging pattern of elephants, often severely disrupting their social organisation, and leading to the spread of conflict to newer areas.

This project seeks to address the critical issues of elephant conservation and management in a human-dominated landscape along the inter-state boundary of two southern Indian states, Karnataka and Tamil Nadu that witness severe levels of human-elephant conflict. The collection of baseline information on spatio-temporal patterns of elephant distribution, the extent and range of human-elephant conflict and an assessment of the perception of local people towards elephants and mitigation measures used, at the landscape scale, would significantly add to our understanding of the dynamics of human-elephant interactions. Incorporation of such basic information in conflict mitigation plans should be the first step towards informed conservation of this increasingly endangered species.

Conserving Crocodiles in Charotar, Gujarat

Dhaval Patel

An excellent mugger crocodile (Crocodylus palustris) population (160-220) survives in the ponds of the Charotar region. Interestingly, these are village/community ponds and none of them fall under protected area, and are. VNC has been working to monitor and protect this crocodile population and encourage harmonious human-crocodiles relations. VNC significantly contributes to educate public and build capacity of college students and wildlife managers for crocodile conservation. A study on human-crocodile relation by VNC revealed that over 70 percent of surveyed respondents had positive attitude towards crocodiles and showed willingness in crocodile conservation. However, increase in crocodile numbers has in turn increased the humans-crocodile interactions. Some of which results in panic and rise in negative attitude. Extensive education programs are being carried out to create awareness, and to teach ways of living alongside crocodiles. VNC was able to reach 30 school, 5000 students and 300 teachers, who benefitted from this educational program. VNC also create awareness through meetings with village groups and distributing educational materials. More than 10,000 educational posters have been distributed in the area. VNC also runs a citizen science program “Charotar Crocodile Count”, to involve people from various walks of life to contribute to crocodile conservation. This has generated a good response in terms of awareness among the urbanites. This opportunity is also used to provide training in monitoring crocodile and their habitat. VNC’s efforts have brought a positive attitude in villagers, who have presented themselves as an example, where people with proper precautions and change in attitudes can peacefully live alongside crocodiles.

Farmers' perception about herpetofauna along an agricultural intensification gradient

Deyatima Ghosh

Decline in biological diversity due to loss of habitat is a major conservation concern. In this context, conservation beyond protected areas is pressingly important as 95% of world's terrestrial environment involves managed agricultural and forest ecosystems and human settlements where wildlife co-exists with human. According to an IUCN report (2010), 70% of 10,707 terrestrially threatened animal species have become endangered due to habitat transformation and 48% of this threatened fauna belong to herpetofauna. The present study emphasizes on different facets of co-existence of herpetofauna with the farming community in Balasore district, Odisha. A questionnaire survey was conducted using a modified DELPHI technique to bring out the perception of farming community about herpetofauna along an agricultural intensification gradient. A total of 300 farmers from 20 villages participated in the survey. Results clearly show variation in the knowledge about herpetofauana along the gradient. Various sites belonging to a specific intensification node clustered together. The study also reveals moderate degree of awareness among the farmers about the effect of agricultural intensification on herpetofauna and their role in agroecosystem. These results can be collated for designing further studies and implementing any future conservation plans involving the farming communities of these regions.

Mapping crop depredation hot spots in Little Rann of Kutch, Gujarat, Western India

Niyati Patel

Knowledge of the distribution of human-wildlife conflict is fundamental to understanding the mechanisms underlying it and to identifying opportunities for its mitigation. A rise in herbivore population and agricultural expansion over the last three decades has led to increasing crop depredation in the Little Rann of Kutch (LRK). Mitigating crop loss to wildlife is important for conservation efforts in the landscape of Kutch, where people and wildlife co-occur outside protected areas. However, the lack of rigorously collected spatial data poses a challenge to management efforts to minimize loss and mitigate conflicts. We used semi structured interviews of farmers living around LRK in western India, to understand the spatial patterns of conflict, in terms of their occurrence and distribution. The information collected revealed that the risk of damage to crops increased with proximity to the boundary of LRK. Substantial losses of crops were reported throughout the study area. The crop raiding species included India wild ass (*Equus hemionus khur*), blue bull (*Boselaphus tragocamelus*) and wild pigs (*Sus scrofa*). Wild pigs were considered the most problematic species throughout the study area. Crop raiding by Wild ass, a near threatened species, decreased with distance from LRK boundary. Spatial mapping of conflicts was prepared using GIS tools. Our study provides information to aid managers in identifying potential conflict hotspots. This could help focus allocation of conservation efforts and funds directed at conflict prevention and mitigation.

Design and Implementation of a Multiple Sensor Automated Warning System for Roadkill Prevention

Sanjoy Deb

The Roadkill prevention is a rapidly expanding area of research across the world where conservationists are working hard to understand the wild animal behavior and scientists and technologists are trying to find a way to avoid such fatal incidents. In such context, under present research a low-cost 'Automated Roadkill Prevention' (ARP) system has been be indigenously designed, developed and successfully tested. The first prototype of the ARPS system will be deployed for few hundred meter stretch on National Highway 209 in Sathyamangalam Tiger Reserve, Tamil

Nadu, India very soon after getting official permission. The ARP system is a low cost wireless multiple sensors based network system which detects animal activities on or near forest roadways especially at night time and generates a subsequent alarm to the passing vehicles. A single unit of ARP which is composed of three laser-sensor pairs (at different height those will from invisible fence), two PIR sensors (to detect animal presence), one power interfacing unit, one ZigBee transceiver module and these whole set will be precisely copied on the other side of the road and will form a single ARP system unit. Multiple ARP system units have to be connected in a chain to cover a certain length of forest roadway and will be powered with mini solar panel. When implemented, ARP system will be first of its kind to be implemented in our country which will lead the way to reduce a bloody human animal conflict scenario, "Roadkill".

Biodiversity Conservation: A Case for Indigenous Community-Centric Buffer Zone Management

Shankar Datt

Although conservation word is getting more popular nowadays, generally the situation of biodiversity conservation on the ground is poor! People's active participation towards conservation is declining. The traditional knowledge, community-based institutions and volunteer activities are being replaced with alien concepts; short-lived institutions and paid work. I believe conservation of biodiversity is not possible without an active participation of the local communities. I could transform my thoughts into action through Rufford foundation's small grant in 2015-16; we developed five Participatory Comprehensive Village Biodiversity Conservation Plans and trained 20 local volunteers to implement the proposed plans. It was a great learning experience and a good start of the idea. During the programme, we observed many conservation issues including deforestation, mining, poaching etc. In addition, we also identified four species namely Barberis Aristata, Tor Putitora, Elephas Maximus and Alectoris Chukar which are under threat and need serious conservation action. However, the situation of Tor Putitora (golden fish) is really poor, uncontrolled and illegal fishing activities (i.e. blasting and electric current) takes place in the river. Therefore we decided to keep specific focus to conserve the fish and raise awareness and resources to conserve the rest three identified threatened species.

Through the overall approach, we want to increase awareness on biodiversity conservation, for this we have incorporated a constructive capacity building approach to help the locals. We believe that our inclusive approach will really go a long way in developing a culture aimed towards conservation of the biodiversity and local natural resources.

Public Private & community Partnership for Elephant conservation, Habitat & corridor management

Subhransu Bhusan Swain

Since 2009 Paribartan team initiated elephant and their habitat/corridor management activities adopting prime approach public –private and community partnership for conservation of elephant and their habitat/Telkoi- Pallahara Elephant corridor. The programme is continuing and for that Rufford Foundation, UK extended funding support. The project focused to strengthen Tribal/forest dependent community's conservation initiatives and management capabilities with transfer of technology, community-based crop protection strategy including improving their skills to deal with human-elephant conflicts in turn they will mobilize community as strong advocates for elephant conservation. Strengthen communities with logistical support, improve the attitudes of people living near habitat/elephant corridor toward one of co-existence, regeneration, protection of degraded

habitat /corridor through active plantation of native, elephant-friendly vegetation. The core activities are - blend of conventional and scientific approach of the project with specific purposes resting on promoting- Accountability, Responsiveness & Participation & Ownership of community, furthering towards a viable partnership between the state & community entity for mitigating man and elephant conflict. This apart effort of Paribartan team is on to sustain the initiated activities with a long term perspective for the elephant, habitat/corridor management and reduction of Man - Elephant conflicts.

The status of Harriers in Rajasthan: Opportunities and challenges for conservation

Ashok Verma

Rajasthan boasts of 5 harrier species, all migratory to the country. During 2014 -2015, five grasslands were surveyed in the state viz. Keoladeo National Park (in the east), Sorsan Community Reserve (in the southeast), Ranthambhore National Park (in the southeast), Tal Chhapar Wildlife Sanctuary (in the North West) and Desert National Park (in the extreme west). The objectives of the study included collecting information on the population status using roosts, and to investigate significance of their both pre and actual roost habitats and to identify survival threats for them in winter quarters. Roost sites are not only signifying the importance of grasslands for harriers but also are easy access to harrier counts. The paper focuses on the opportunities and challenges for harriers in Rajasthan State.

Competition between birds and ants for nesting cavities results in shortage of nesting space at low elevation in eastern Himalayas

K Supriya

Songbirds show a mid-elevational peak in eastern Himalayas, i.e. species diversity is highest at about 2000m. By contrast, ant abundance declines steeply with elevation such that ants are essentially absent from the mid-elevations. To investigate the potential effect of ants on nesting behavior of birds, we put up 139 nest boxes at low elevation at about 200m in 2015 and 2016. We also put up 30 nest boxes at an elevation of 1200m in 2016. 62 of the nest boxes at the low elevations were occupied by a single bird species, the white-rumped Shama (*Copsychus malabaricus*) and 19 of these nest boxes were occupied by ant colonies following a nesting attempt by birds. Ants also occupied 6 of the nest boxes unused by birds. Neither birds nor ants used any of the nest boxes at 1000m. The high rate of occupancy of nest boxes at low elevations coupled with the absence of nest box use at mid-elevations suggests that ants and birds might be competing for nesting cavities at low elevations. Greater availability of nest cavities at mid-elevations may be one of the factors contributing towards the mid-elevational peak of birds in eastern Himalayas.

Relative abundance of wild ungulates and patterns of local hunting in Tillari, Western Ghats, India

Girish Arjun Punjabi

Tropical forest ungulates are threatened due to a multitude of factors, one of the most serious being hunting for bushmeat, especially outside protected areas. Yet, monitoring low-density ungulate populations outside protected areas is difficult using conventional methods, even though such assessments form benchmarks for improved management. This project assessed the relative abundance of large and medium-sized ungulates in the northern Western Ghats, India. We used an abundance-occupancy modeling approach to assess group density of large wild ungulates in the Tillari bioregion, an important conservation area of c. 350 sq.km, which is a vital link connecting

forests in three states (Maharashtra, Goa, and Karnataka). We also evaluated local hunting patterns through questionnaire surveys with local hunters, villagers, and forest department staff to assess the impact of hunting on ungulates. This information would be useful to better protect this fragile region through local community support, trust-building activities, and improved management.

Park, People and Cattle: Forest resource availability within a protected area landscape in Western Himalaya

Upma Manral

The Himalayan forests play a multifaceted role in achieving Sustainable Development Goals in the region by balancing conservation and economic growth and interlinked development issues. With few livelihood options available, these form an essential life support system for local communities. As a result, even the protected area landscapes are not devoid of anthropogenic pressure, as people extract resources for sustenance and livelihood. The aim of this study was to assess the availability of major forest resources in Kedarnath Wildlife Sanctuary Landscape along an elevational gradient. In forests, vegetation characteristics were enumerated by laying 10 and 5 m radii plots for trees and regenerating individuals, at 200 m interval. Within the villages, transects were laid along the trails and agricultural areas to enumerate fodder species and biomass availability. Villages inside the Sanctuary and at higher elevation had higher livestock numbers/households and extracted more fodder from forests as compared to villages at a distance from the Sanctuary. Density and biomass of fodder trees in forest did not vary significantly along elevation; however forest area accessible to villagers varied, with villages at higher elevation having access to larger forest area. Low elevation villages had poor access to forests and had highest density and biomass of multipurpose trees within agro-forestry systems. With projected climate change and current rate of environmental degradation, Himalayan ecosystems require immediate conservation attention. Thus, there is a need for alternatives such as plantation of multipurpose tree species in agro-forestry landscape to promote forest conservation.

Assessing the presence of three large carnivores in human-use landscapes of western Maharashtra

Iravatee Majgaonkar

In a country like India, where large carnivores and humans share space widely, conservation efforts are yet, often centered only on protected areas with research on large carnivores also being focused largely within them. In order to assess the distribution of three large carnivore's viz., the leopard, wolf and hyaena over a landscape of around 90000 sq. km., we used expert interviews in an occupancy framework across seven districts of western Maharashtra. We conducted a total of 1576 key informant surveys with Forest department field staff from 94 administrative ranges. After ensuring correct identification via photographs and descriptions, respondents were individually interviewed for their sightings of all three carnivores (with location details) from their jurisdiction for the period 2014 – 2015. Hyena was detected from a large proportion of the study area (Ψ naïve =0.61) followed by the wolf (Ψ naïve = 0.58) and the leopard (Ψ naïve = 0.51).With further analysis, we expect to understand which ecological factors are associated with varying probabilities of occurrence for all three carnivores and how each one's distributions overlaps or separates in human-use areas. The patterns of the occurrence of two Schedule I species (wolf and leopard) and one Schedule III species (hyena) outside protected areas in Maharashtra is expected to shed light not only on the existence of shared spaces but also on their potential to host carnivore populations. This broadly implies that wildlife management goals, which often view wild animals as those belonging to fixed landscapes should be more inclusive of human-use areas and its people, for their conservation.

Assessing opportunity and challenges of Ophiocordyceps sinensis harvesting in the Dharchula-Munsiari landscape Himalaya, India

Pramod Kumar Yadav

Caterpillar fungus (*Ophiocordyceps sinensis*) is a flagship species of the Himalaya and world's most expensive natural medicinal resources, almost like gold. In the Dharchula-Munsiari landscape, it is inhabited mostly in ioslated patches of alpine grass lands (elevation from 3,500 to 4,500 msl) of Gori, Darma, Vyas and Kali valleys. Data for the study was collected through questionnaire surveys, Participatory Rural Appraisal and Rapid Rural Appraisal methods. Despite increase in price and demand of caterpillar fungus, results show harvest at local level is decreasing and on the other hand number of harvesters has increased. Ultimately, increasing trade induced over-harvesting seems almost certainly responsible for declining populations. The study results reveal that over harvesting and decreasing population of the caterpillar fungus are leading the species towards extinction from natural habitat of its occurrences. Caterpillar fungus plays a significant role in economy of communities who are living inside the landscape. Thus, the caterpillar fungus harvest-boom is facilitating the integration of rural upper Himalayan households into regional, national and international economic cycles by providing the necessary product and cash in exchange for sharing in this commodity trade. With the gradual increases in the market value of the species, the dependency of local communities is becoming more prominent on the income generated through its collection, whose livelihoods were earlier based on pastoral and agricultural activities. There is a significant growth in the economy empowerment of villagers and in contrast some negative environmental and social impacts are also pertaining day by day since last decade.

Evaluating the effectiveness of a temporal fishing closure in protecting a once-pristine grouper spawning aggregation.

Mayuresh Gangal

Temporal fishing restrictions are one of the most widely proposed interventions across the tropics for sustainably harvesting reef fish stocks. This strategy assumes that protecting critical spawning periods is the best way to neutralise effects of overfishing. We had the unique opportunity of testing the effectiveness of temporal fishing closure for protecting an aggregating population of squaretail groupers in the Lakshadweep archipelago. We surveyed peak aggregation densities between 2011-2017, before and after the onset of a commercial reef fishery in 2013. Despite a high compliance towards a temporary fishing closure established since 2014 to protect the spawning aggregation, we documented an 80% decline in aggregating grouper densities. Particularly, smaller size-classes (< 45cm) showed a 90% decline. Demographic and behavioural shifts were linked to this size- selective, hook-and-line fishery for groupers. Given the protogynous nature of the squaretail grouper, this size selective fisheries resulted in a shift in population size and sex-ratio. In pristine conditions, this species employs mating strategies linked to body size –pair-spawning strategy is associated with large females and a shoal-spawning strategy with small females. The decline of small females (<45cm) at the aggregation site has resulted in a loss of the shoal-spawning strategy from this population. Our results show that merely protecting spawning periods of long-lived benthic fish with complex life histories and mating systems may be insufficient to ensure their sustainability. Without additional efforts to regulate off-spawning harvests, such species may be inevitably susceptible to declines or extinction.

Avifaunal conservation through research, awareness and generating alternative livelihood options in Purna Wildlife Sanctuary, Gujarat

Nikunj Jambu

Purna Wildlife Sanctuary (PWS) lies at the border of Gujarat, on the northernmost portion of Biome-10 the Western Ghats. PWS harbors more than 150 species of birds, many of which are endemic to the Western Ghats. In PWS, hunting has been an integral part of the cultural milieu. However, for the past four to five decades it has been known that a reduction in the ungulate population has caused a shift in the hunting practices of the local community, primarily toward avifauna of passerines and galliformes (Trivedi 2006).

The project aimed for avifaunal conservation of PWS using three tools, viz: research, awareness and generating alternative livelihood options. Initially, a questionnaire survey was carried out which gave insight on the socioeconomic status, people's perception on avifauna and extent of hunting in the area. A baseline data of current avifaunal diversity was estimated using proper scientific methods. More than 180 species of birds were recorded by walking 23 random transects in the sanctuary. A total of 223 households were interviewed during the duration of project. Hunting is practiced in a least 105 households of the 223 households surveyed. This is only by admission. We also conceptualized and organized an event, the Dangs Bird Festival, with funding from the North Dang division of the Forest Department. The festival was a runaway success, with 60 participants and volunteers in attendance.

Using local people's knowledge for mapping wolf distribution across Kutch region

Anirudh Vasava

Large carnivores face high risks of anthropogenic extinction owing to their larger body mass and associated life history traits. The use of robust occurrence data to define distributional limits and make evidence-based management decisions for threatened carnivore species is often limited by data availability for wide ranging and elusive species, especially in remote environments. Most of the Indian wolf (*Canis lupus pallipes*) populations survive in isolated pockets outside protected areas in India. This situation makes them vulnerable to persecution and habitat destruction. In India's increasingly disturbed landscape, long-term persistence of wolves may depend on their ability to occupy these disturbed and traditional land uses areas. Yet reliable data depicting the nature and extent of changes in wolf population is sparse, primarily due to logistical problems and difficulties in obtaining reliable information at large spatial scales. We used local people's interview in Kutch to generate status and distributional data for Indian wolf, and identify critical wolf areas. Responses from these interviews indicated a significant decline in wolf distribution. There is a significant decline in detectability as well, which suggests a decline in their abundance. This information is critical to wolf conservation planning in Gujarat. Also we demonstrate that large-scale interview surveys used provide potential for rapid conservation status assessments of species across large spatial scales, particularly when population densities are low and other survey methods are expensive or difficult to implement.

Links in a sink: Examining landscape connectivity and habitat-use by tigers in the Kanha-Pench forest corridor of India

Mahi Puri and Imran Patel

While close to 20% of India's land cover is forests, less than 4% is protected. The tiger reserves, Kanha and Pench, support two of the largest tiger populations in the country, and the forests

connecting them are crucial for tiger dispersal. However, linear intrusions and anthropogenic disturbances have led to severe habitat degradation and fragmentation, with the potential to separate these populations. The objective of this study was to characterize connectivity in the Kanha-Pench forest corridor based on land cover resistance to tiger movement and identify factors associated with patterns of habitat-use. Analyses was based on data collected by indirect sign surveys conducted over a 4-month period. Landscape connectivity was assessed by generating a resistance map based on costs associated with different land cover types, using prior knowledge of tiger ecology. Tiger habitat occupancy was characterized using single-season occupancy models, accounting for imperfect detection. Tigers were found to use 43% of the landscape, with livestock density negatively influencing habitat-use. Fragmentation indices such as patch aggregation positively influenced tiger habitat-use, while edge density had a negative effect. Lastly, the predicted corridor showed high correlation (69%) with actual habitat-use by tigers. The high correlation between structural and functional connectivity is indicative of the importance of landscape features in facilitating tiger movement. These results demonstrate the importance of the identified corridor for maintaining long-term tiger metapopulation dynamics in central India. Furthermore, they signify the immediate need to develop effective mitigation strategies to limit impacts of fragmentation, and prioritize areas to conserve habitat bottlenecks.

Response of experimental warming on palatable and non-palatable plant species of Sikkim eastern Himalayas

Dharmendra Lamsal

The Himalayas are experiencing warming rates higher than the global average This could have catastrophic impacts on the ecology of alpine grasslands, that support several human communities including nomadic yak herders and livestock. In recent times, a decline in forage availability is being reported from the region, and anthropogenic activities such as overgrazing and over-harvesting are implicated as potential causes. However, in arid meadows and shrub-lands of the Tibetan Plateau, warming rather than over-grazing, has been shown to be an important driver of rangeland degradation. Whether warming can similarly drive declines in palatable plant availability and productivity in more mesic systems characteristic of the Eastern Himalaya is currently unknown. Here we propose leveraging an existing experimental warming study using Open top chambers (OTCs) we have established in Sikkim Eastern Himalayas to experimentally document climate change consequences on the status, biodiversity and productivity of palatable plant species of these critical rangelands. Our Experiments span an altitudinal gradient from 3000m to 5000m, and will additionally provide insights into altitudinal variation in warming effects on rangeland quality, with implications for our understanding of future seasonal movement patterns of native herbivores and livestock.

Diversity and Economic importance of Scarabaeid beetles of Sindhudurg

Sachin Vijay Chorge

The study on Scarabaeid (Family: Scarabaeidae) was conducted in five talukas (Kudal, Sawantwadi, Malvan, Devgad and Vaibhavwadi) of Sindhudurg district in Maharashtra. The study has given the basic idea of the Scarabaeid beetle diversity and their abundance with respect to different regions and the agricultural practices. Total 25 species from 16 genus and 5 subfamilies are found in study regions. In this study it is observed that common species from family namely Rutelinae, Melolonthinae, Citoniinae and Dynastinae are quite abundant. Major groups Rutelinae and Melolonthinae are highly concentrated in areas where more or less chemical farming is practiced. The Kudal region has higher species diversity whereas lowest numbers of species are recorded in Vaibhavwadi. The *Oryctes rhinoceros* has 10% population composition which is considered as major

pest on *Cocos nucifera* which is economically important crop in this region. This species is observed to be highly active in dung pits and able to convert raw or partially decayed organic matter in simple form giving it an exclusive importance in agro-economy. In the second phase of the study more emphasis is given on thorough screening of Scarabaeid species and study of *Oryctes rhinoceros* in Kudal region. Public awareness programmes were conducted to sensitize farmers and students about importance of dung beetles and sustainable agriculture.

Status of endemic and threatened angiosperms in Gujarat and conservation practices

Karan Gopalbhai Rana

Conservation emphasis has now shifted from single species to whole habitat and ecosystem. Lack of recent documentation is one of the main reasons for the endemic data to be minimal. The present study is first of its kind that encompasses all endemic plants occurring in Gujarat, based on floristic works, PhD thesis, research articles, checklists, and herbaria database. Flora of Gujarat mentions 2555 plants of which 197 are Indian endemics (142 dicots and 55 monocots). Fabaceae family has maximum number of endemics (32 taxa) followed by Poaceae (27 taxa) and Acanthaceae (21 taxa). An analysis of the life-form types indicates that the endemic herbs (64%) dominate the study area, followed by shrubs (12%), trees (11%), climbers (6%), understorey shrubs (5%) and climbing shrubs (2%). Most of the endemics are concerted at southern Gujarat (Dangs, Valsad and Narmada), followed by central Gujarat (Panchmahal and Chhota Udepur), then Saurashtra (Junagadh) and Kachchh, subsequently northern Gujarat (Sabarkantha). For awareness, the research findings had been presented at the '26th Annual Conference of Indian Association for Angiosperm Taxonomy' held at Shivaji University, Maharashtra, in November 2016. Also, a news article has been published in Sunday Times of India, Ahmedabad, on December 11, 2016. For In-situ conservation a refugia has been identified on the hilly track from Gadad to Don, Dangs district, having a good concentration of endemics and other species of rare occurrence. While, for Ex-situ conservation a rehabilitation centre has been created at Ahwa, Dangs district for propagation of endemic and threatened plants.

Conservation of Gyps vultures in Gujarat: an integrated approach of ecology, advocacy and awareness

Aditya Roy

Gujarat is one of the strong holds for endangered Gyps Vultures and we have been able to pin point most important areas for their conservation through our past two RSG projects. The work of rigorous state-wide monitoring of breeding Gyps populations, awareness among various target groups and advocacy with stakeholders has been of great importance for conservation of these species in Gujarat. We have been working in this direction in central Gujarat since 2011 and RSGF has proven a great help. Through the help of two RSGs we have been able to do a multi-disciplinary and multi stakeholder research and conservation work in Central Gujarat area for safeguarding the critically endangered white rumped vulture population of this region. We have also created a state of the art awareness film on vulture crisis and their ecology using the support from RSGF. We have also been able to generate a very good network of committed local individuals in all these areas. We have collected liver & Kidney samples from 49 dead vultures and 500 liver samples of domestic ungulates from various carcass dumps all over Gujarat. Toxicological analysis of these samples shows some very interesting results including continuous use of diclofenac and presence of high concentrations of DDT and other organochlorine pesticides in vulture tissues.

An update on conservation efforts of microchiropteran bats and their habitats in central Gujarat.

Ranjitsinh Devkar

Microchiropteran bat habitats consisting of mines, caves and archaeological sites located in Jambughoda Wildlife Sanctuary (JWLS), Pavagadh-Champaner UNESCO world heritage site near Vadodara, Central Gujarat were monitored and studied under 1st and 2nd Rufford's small grants. The deserted mines in JWLS has an interconnecting network of tunnels of varying sizes and shapes that transverse through the hills. They form areas with varying temperature zones suitable for roosting, hibernation or maternity areas. Valuable data has been generated till date on the species composition, seasonal variations in population, breeding biology, feeding preferences and evening emergence for *Megaderma lyra lyra* and *Rhinopoma microphyllum kinneri.* Overall, 16 species of microchiropterans have been listed from the study area wherein, majority of the records are an addition to the existing checklist of the region. Exhaustive number of bat awareness campaigns were conducted in rural and urban areas of Central Gujarat for school students, tourists, occasional visitors, tribals and local inhabitants. Training program for graduate students of Zoology and forest officials were also conducted. This included compilation and distribution of an educational booklet (in English and vernacular languages) and other content generated through Ruffords small Grant. Inclusion of bats in conservation plan of Jambughoda wildlife sanctuary and preparation of an educational film on bats were major achievements and outcomes of my Rufford's small Grant.

The life and times of the Asiatic lion of the Gir forest

Meena Venkataraman

Carnivore Conservation and Research, Mumbai Lions (*Panthera leo*) are the only social cats that presently exist as two sub-species in sub-Saharan Africa and India respectively. The only free-ranging population of the Asiatic lions (P l persica) survives in the Gir forest, Gujarat, India and has been assigned "Endangered" status under the IUCN Red List of Threatened species. Asiatic lion conservation history is a very well documented and a much appreciated model of successful endangered species management effort of the country. With the steady increase in population and records of increasing dispersal of lions in the Greater Gir Landscape (GGL) has come the appreciation of conservation issues related to human-lion interface issues in the agro-pastoral landscape outside the protected area (PA) boundary.

Beyond the PA boundary, human-carnivore conflict impacts both people and the concerned carnivore species. On the one hand, carnivore species face the threat of retaliatory killing, accidents and poaching when they wander farther away from the protected area boundary. One the other, carnivores cause financial losses to people via livestock killing and also pose a threat to human life. This situation leads to significant social and cultural changes resulting in transformation in conservation ethics and outlook.

Since 2010, through a study initiated and supported by Rufford Grants Foundation (RSGF), I have been studying local people's tolerance and attitude towards lions and their conservation in the GGL. I have been able to deeply understand the importance of the continued positive outlook and involvement of local people in the shifting focus of conservation management efforts and continued survival of lions in the landscape.

Having studied this lion population for over 15 years, through my talk, I would like to present the unique features of its behavior and ecology and thereby highlight the resilient adaptations and

survival of lions in this unique landscape. Using Asiatic lions in the Greater Gir landscape as case-study representing worldwide carnivore conservation problems, I would be presenting the nature of human-lion interaction, management approaches to resolve conflict and local attitudes.

Appendix IV
Suggestion from the participants

Some of the participants suggested inclusion of certain workshops in the future conferences. Some of the suggested workshops include Basic GIS, Preparing Maps, Statistical concepts and workshop on writing proposals.

Another important suggestion we received was not to include poster sessions, instead to have more speed talks, which could be a photo showcase/ photographic speed-talks which could give a better sense of the work that grantees have done during their projects.

Other suggestions were to have conferences in venues which are simple and not very fancy, to have more field visits in areas where the conference is held.

These suggestions could help to better plan and execute future Rufford conferences and tailor them to meet participants' conservation needs.

Fostering Grass-roots Conservation in India - A Rufford Initiative

The Rufford India Conference, Rajasthan 2017

Report prepared by Rajat Ramakant Nayak, Foundation for Ecological Research Advocacy and Learning, Tamil Nadu, India.

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