



Central
Indian
Landscape
Symposium

Jan 3-6, 2019

Muthwa Community
Resource Center
Melghat Tiger Reserve
Maharashtra

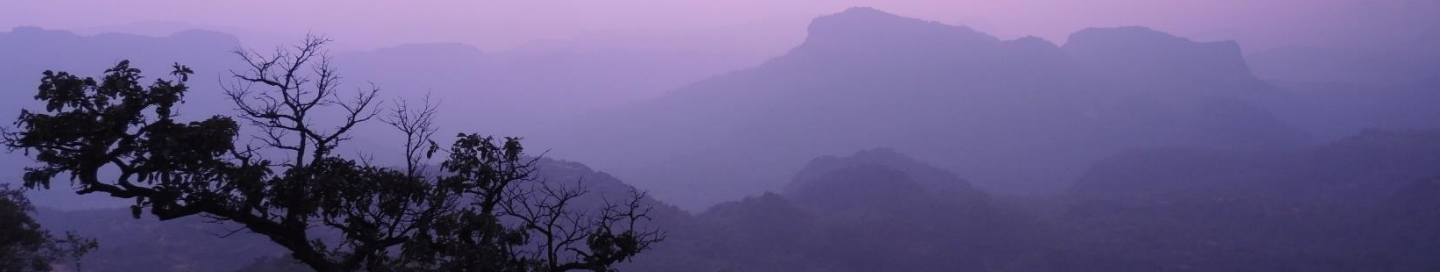
Actionable Science for Conservation, Livelihoods, and Development

Network for Conserving Central India

#CILS3

www.centralindianlandscape.com





Acknowledgements

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Important contacts

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Symposium venue: Muthwa Community Center, Melghat Tiger Reserve



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Dear Symposium Participants,

We are delighted that you are able to participate in the Central India Landscape Symposium. This beautiful and magical landscape encompasses critically important tiger reserves and supports livelihoods for millions of people. The landscape faces many competing objectives, among them conservation, forest resources, agriculture, and infrastructure to meet development goals. Balancing these objectives presents managers of the landscape with difficult trade-offs.

This gathering builds on the first symposium in 2014 at Kanha and the second in 2016 at Pench, M.P. Then, as now, our aim is to provide a forum for researchers, managers and those working in NGOs to interact and think together about the challenging task of managing the many competing objectives in the landscape. Our community has grown since the last symposium and changes in the landscape have proceeded at a rapid pace. Through mutual understanding and dialogue, we hope that this symposium can contribute to science-based conservation and positive outcomes for both wildlife and people.

We look forward to fruitful discussions, collaborations, and friendships, forged by our shared aspirations for the long-term health and well-being of both wildlife and people living in this incredible landscape.

Dr. Ruth DeFries
Chair, Organizing Committee
Professor, Columbia University





PROGRAM

THURSDAY, JANUARY 3

(Participants please note: the program is light on this day so you can self book afternoon safaris on <http://magicalmelghat.com/>)

3:00 – 6:00 PM

Registration

7:00 – 9:30 PM

Reception and welcome dinner

FRIDAY, JANUARY 4

7:30 – 8:30 AM

Breakfast

9:00 – 9:30 AM

Welcome address and introductory remarks
Ruth DeFries, Columbia University, Chair of CILS
Organizing Committee

9:30 – 12:00 PM

Session I: History and Future of Melghat
Chair: Kishor Rithe, Director, Satpuda Foundation

12:00 – 1:30 PM

Lunch





PROGRAM

FRIDAY, JANUARY 4

1:30 – 2:30 PM

Session 2: Forests and Water

Chair: Dr. Jagdish Krishnaswamy

Dr. Jagdish Krishnaswamy: Securing India's water security: the role of forests

Dr. Benjamin Clark (presented by Ruth DeFries): COP21 forest cover impact on water supply within the central Indian landscape

2:30 – 3:30 PM

Session 3: OneHealth

Chairs: Dr. Prachi Thatte & Dr. Abi Tamim Vanak

Archana Sharma: A case for multi-functional and integrated landscape approaches: Findings from our study in the Ratapani Wildlife Sanctuary

Dr. Ashish Satav: Integrated approach to reduce death and malnutrition of tribal of Melghat

Kushagra Gupta: Tiger Conservation through Public Health

Dr. Abi Tamim Vanak: A OneHealth approach to understanding rabies dynamics in India - Lessons for conservation





PROGRAM

FRIDAY, JANUARY 4

- 3:30 – 4:00 PM Tea/coffee break
- 4:00 – 5:00 PM **Actionable Science:**
Breakout groups on Sessions 2 and 3
- 5:00 – 6:00 PM Plenary report back and priority actions
from Sessions 2 and 3
- 6:00 – 7:00 PM **Poster session and data-shack questionnaire**
- 7:30 – 9:30 pm Dinner

SATURDAY, JANUARY 5

- 7:30 – 8:30 AM Breakfast
- 9:00 – 10:00 AM Plenary keynote: **Dr. Gary Tabor**
Founder and Executive Director
Center for Large Landscape Conservation
- “Connecting People, Place and Ecological Processes
through Large Scale Conservation”





PROGRAM

SATURDAY, JANUARY 5

10:00 – 11:00 AM

Session 4: Changing Livelihoods in the Landscape

Chair: Amrita Neelakantan

Venkat Ramanujam: Changing Adivasi livelihoods in Baiga Chak, eastern Madhya Pradesh

Vidya Venkatesh: Alternate Conservation

Amrita Neelakantan: Resettlement impacts on conservation and food security: a case study from Kanha National Park Landscape

Vinod Pandey: Rozgar Dhaba - a rural tea stall based solution for conservation

11:00 – 11:30 AM

Tea/Coffee break





PROGRAM

SATURDAY, JANUARY 5

11:30 AM – 12:30 PM	Session 5: Human Wildlife Conflict Chairs: Dr. Sandeep Sharma and Dr. Pranav Chanchani Aniruddha Dhamorikar & Sachin Anpat: Insights into human-carnivore conflicts from a long-term livestock compensation programme in the Kanha-Pench corridor Dr. Milind Watve: Pilot implementation of an alternative to crop damage compensation Dr. Bilal Habib: Moving in Anthropocene: Large carnivores in human dominated landscapes
12:30 – 1:30 PM	Lunch
1:30 – 2:30 PM	Actionable Science: Breakout groups on Sessions 4 and 5
2:30 – 3:30 PM	Plenary report back and priority actions from sessions 4 and 5
3:30 – 6:00 PM	Field trip (Group Photo)
6:00 – 7:00 PM	Poster session
7:30 – 9:00 PM	Dinner





PROGRAM

SUNDAY, JANUARY 6

7:30 – 8:30 AM	Breakfast
9:00 – 10:00 AM	Session 6: Infrastructure in Central India Chairs: Dr. Trishna Dutta & Milind Pariwakam Ninad Mungi: Invasive plants follow human footprints Prachi Thatte: Differential impact of human footprint on connectivity of multiple wide ranging species in Central India Dr. Trishna Dutta: Targeting restoration sites to improve connectivity in a tiger conservation landscape in India Milind Pariwakam: Whose right of way?
10:00 – 11:00 AM	Actionable Science: Group discussion and priority actions for session 6
11:00 – 11:30 AM	Break
11:30 AM – 12:30 PM	Group discussion and next steps
12:30 – 1:30 PM	Closing plenary by WWF-India
1:30 – 3:00 PM	Lunch and departure





“Connecting People, Place and Ecological Processes through Large Scale Conservation”

Dr. Gary M. Tabor is an ecologist and wildlife veterinarian based in Bozeman, Montana. In 2007, Gary founded the Center for Large Landscape Conservation to help people and institutions make better conservation decisions at the scales nature function. Gary has worked on behalf of large landscape conservation internationally for over 35 years with 12 years combined experience in Africa, South America and Australia and 12 years as a leader within the U.S. philanthropic community beginning with the Geraldine R. Dodge Foundation, the Henry P. Kendall Foundation, and finally the Yellowstone to Yukon Program Director for the Wilburforce Foundation.

Gary’s conservation achievements include the establishment of Kibale National Park in Uganda; establishment of the World Bank’s Mugahinga/Bwindi/Impenetrable Forest Mountain Gorilla Conservation Trust; co-founding the Yellowstone to Yukon Conservation Initiative; pioneering the field of Conservation Medicine; co-founding Patagonia Company’s Freedom to Roam wildlife corridor campaign; co-founding the Network for Landscape Conservation and the Roundtable of the Crown of the Continent – three-time winner of the climate adaptation award by the US National Fish, Wildlife and Plants Climate Adaptation Strategy.

Gary has three university appointments as Senior Conservation Fellow at the University of Montana, as Board of Advisor for the Global Health Initiative at the University of Wisconsin School of Medicine and as Adjunct Associate Professor, Division of Biological Sciences at the University of Queensland. Gary is a recipient of the Australian American Fulbright Professional Scholar award in Climate Change and is also the winner of the Henry Luce Scholar Award. Gary serves as Chair of IUCN World Commission on Protected Areas’ Connectivity Conservation Specialist Group.





About The Central Indian Highlands

The Central Indian Highlands consists of a continuous landscape in Central India across the states of Madhya Pradesh, Chattisgarh, Maharashtra and Andhra Pradesh where tropical deciduous forests form a major land cover. This landscape includes several protected areas (Kanha, Satpuda, Pench, Melghat, Tadoba and Achanakmar) and forest corridors that are essential for wildlife movement and genetic continuity across the landscape. The Central Indian Highlands are particularly important for tiger (*Panthera tigris*) populations (they support 17% of the country's tiger population), as well as populations of leopard (*Panthera pardus*), sloth bear (*Melursus ursinus*), gaur (*Bos gaurus*), and swamp deer (*Cervus duvacelli*).

The landscape also serves as the headwaters to several rivers, including the River Narmada, which is one of seven major rivers in India, and is essential for meeting the irrigation, industrial and urban needs of the region. The forests in this landscape support local livelihoods: 60% of the income of local people in non-protected areas is based on these forests. Important forest products include fodder for cattle, tendu (*Diospyros melanoxylon*), mahua (*Madhuca indica*), awla (*Phyllanthus emblica*) and other ingredients essential for the herbal medicine industry.

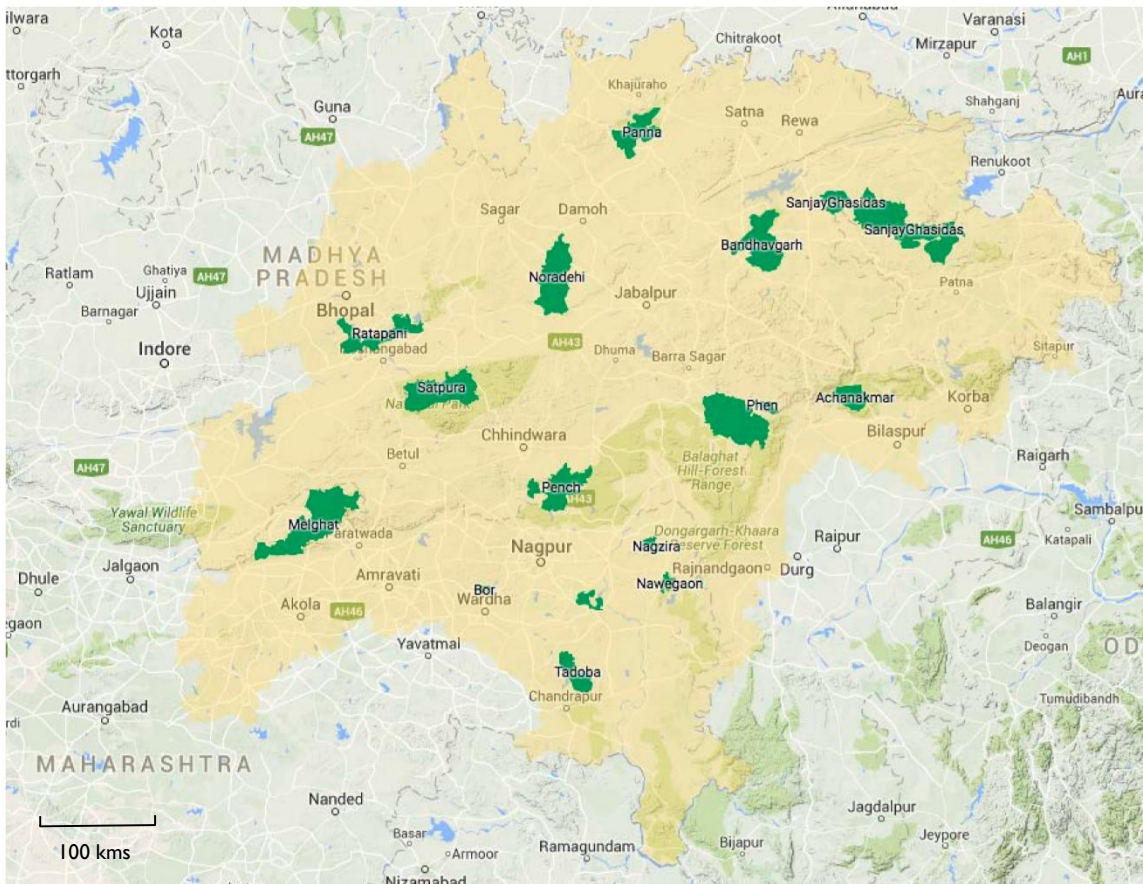
The people of this landscape live and support themselves through a range of activities, including agriculture, forest produce collection, tourism and urban activities. This landscape has been the focus of recent development which includes introduction of new crops and development of new roads, rails, mines, tourism and other infrastructure. Simultaneously, studies on larger processes such as climate change suggest that this region will be highly vulnerable to climate change, and higher temperatures and altered precipitation may disrupt the existing environmental and economic system.

Science-based management of the landscape is needed to achieve a balance among multiple objectives in the present and the rapidly changing future, including improving the well-being of local communities; conserving habitat for wildlife; protecting watersheds; tourism; and accommodating development needs for improved infrastructure.





About The Central Indian Highlands



Map of the Central Indian Landscape





Network for Conserving Central India (NCCI)

Join Us!

Website: conservingcentralindia.org

Email group: conservingcentralindia@gmail.com

Twitter: [conserving_ci](https://twitter.com/conserving_ci)

Facebook group: facebook.com/groups/348559185245287

The Network for Conserving Central India is a group of researchers, NGOs and managers dedicated to conserving biodiversity, improving livelihoods, and fostering sustainable development in the landscapes of the Central Indian Highlands through the application of science.

Our network formed as an outcome of the Kanha-Pench Landscape Symposium (KPLS) held in February 2014, out of the desire to establish a more direct method for communicating news and resources relevant to management and conservation in the Central Indian Landscape.

We encourage you to join us so that we continue to stay connected. We are also looking for members who wish to help us expand our reach and innovate new ways to keep in touch, connect as a group and actively contribute to the sustainability of our landscape. Please contact one of the CILS Organizers if you are interested in playing a larger role in the group!



Advisory Committee

Mr. Dharendra Bhargav, CCF Balaghat Circle, Madhya Pradesh

Mr. Ravikiran Govekar, Field Director Pench Tiger Reserve

Dr.Y.V. Jhala, Scientist, Wildlife Institute of India

Dr. Nishikant Kale, President, Nature Conservation Society, Amravati

Mr. Narendra Kumar, Retd PCCF MP.

Mr. Sunil Limaye, Addl.PCCF(Wildlife), Maharashtra

Mr.A.K. Misra, PCCF(Wildlife) Maharashtra

Mr. R. Sreenivasa Murthy, Member Secretary, MP Biodiversity Board

Mr. H.S. Pabla, Forest Department (Madhya Pradesh), retired

Mr. Praveen Pardeshi, Principal Secretary Chief Minister's Office, Maharashtra

Mr. Srinivasa Reddy(IFS), Chief Conservator of Forest (CCF) Wildlife and Field Director Melghat Tiger Reserve

Mr. Ravi Singh, Secretary General and CEO, World Wild Fund for Nature - India

Dr. Ruth DeFries, Professor, Columbia University

Mr. Kishor Rithe, President, Satpuda Foundation





Organizing Committee

Chair:

Dr. Ruth DeFries, Faculty, Department of Ecology, Evolution and Environmental Biology (E3B), Columbia University

Local Partner: Satpuda Foundation

Kishor Rithe, President, Satpuda Foundation

Mandar Pingle, Satpuda Foundation

Coordinator:

Amrita Neelakantan, E3B, Columbia University

Members:

Dr. Meghna Agarwala, Assistant Professor, Ashoka University

Dr. Pranav Chanchani, Coordinator – Tiger Conservation, WWF-India

Dr. Trishna Dutta, Postdoctoral Scientist, Goettingen University, Germany

Dr. Pinki Mondal, Assistant Professor, University of Delaware

Dr. Sandeep Sharma, Scientist, Goettingen University, Germany

Prachi Thatte, Postdoctorate fellow, National Centre for Biological Sciences

Vidya Venkatesh, Director, Last Wilderness Foundation





Session 2: Forests for Water (Talks :Abstracts)

Chair: Dr. Jagdish Krishnaswamy

(Ashoka Trust for Research in Ecology and the Environment (ATREE))

Dr. Jagdish Krishnaswamy (Ashoka Trust for Research in Ecology and the Environment (ATREE))

Securing India's water security: the role of forests

India's remnant natural forests and associated ecosystems continue to be diverted for development. To elicit support for their conservation from civil society and the political establishment there is an urgent need to build up a science and evidence based case that goes beyond biodiversity, carbon services and forest based livelihoods. Hydrologic and hydro-climatic services of forests in India is potentially a powerful narrative but the lack of quantitative studies within India or even a careful synthesis of existing knowledge from similar tropical and sub-tropical regions across the globe constrained the science-policy interface for forest management in India. In addition, ongoing and future impacts of climate change on forests also needs to be considered besides the crucial role of forests in securing India's water security in a changing climate. I draw upon relevant studies from India and other regions to build a case for the potential role of India's forests, including in the Central Indian Highlands to climate change resilience and water security of India.

Dr. Benjamin Clark (presented by Dr. Ruth DeFries) (Columbia University)

COP21 forest cover impact on water supply within the central Indian landscape

India has pledged to increase forest cover to approximately 33% as part of its COP21 commitments. Cropland will need to be reforested to achieve this goal. The Central Indian Highlands (CIH) has seen increased groundwater abstraction for irrigation over the last decade, with gains in agricultural production. The CIH would require forest cover to increase by two to five times, depending on the river basin, to achieve 33% forest cover. Because land cover can have a significant impact on the hydrology at the landscape scale, increasing tree cover within the CIH could enhance groundwater recharge needed to support the increase in dry season irrigation. Reforestation would likewise increase evapotranspiration summarized by the infiltration-evapotranspiration trade-off hypothesis, with the balance between the increase in infiltration and evapotranspiration determining the sustainability of the water table under increased irrigation. To determine the outcome of increased forest cover on the hydrology of the CIH, infiltration tests at 118 sites within the CIH show that land cover has a significant impact with forest cover having the highest (5.48×10^{-4} cm s⁻¹) infiltration and croplands having a significantly lower infiltration rate of 3.23×10^{-4} cm s⁻¹. Simulation modeling using the Spatial Processes in Hydrology model to compare scenarios of current forest cover to 30% forest cover in each basin reveal that groundwater recharge would increase by 88.4 mm while evapotranspiration would increase by 25.9 mm over the entire CIH. The river flow regime would further be transformed with less flow during the monsoon season but with increased flow during the dry parts of the year. Under the 30% forest cover scenario, while there would be a loss of between 14% to 28% of agricultural land, there would be between 127% to 259% groundwater recharge of the water requirements for a second irrigated growing season. Additional groundwater availability would increase water supply and food production and have a positive impact to ameliorate the uncertainties of climate change.





Session 3: OneHealth (Talks :Abstracts)

Chairs: Prachi Thatte & Dr. Abi Tamim Vanak

(National Centre for Biological Sciences & ATREE respectively)

Archana Sharma (Trustee, ARANYA Lok Nyas)

A case for multi-functional and integrated landscape approaches: Findings from our study in the Ratapani Wildlife Sanctuary

Forests contribute to food security and nutrition. Unlike traditional food crops wild foods are resilient to extreme weather events, which can wipe out. Forests in central India have been playing complementary roles to conventional agriculture. A large number of people still rely on the food from forests and trees to supplement their diet. Forests importance as a source of firewood is essential to enable people to consume the calories found in conventional food crops. Majority of rural population in this landscape use this renewable fuel source for heating and cooking. Forests are also a crucial habitat for key pollinators of many food crops. Without forests' ecosystem service provided by birds and insects would be diminished, increasing food security concerns. Another benefit lies in forests' ability to add diversity to the food production system. The paper presents findings from our study in the Ratapani Wildlife Sanctuary regarding forests role in alleviating hunger and improving nutrition in addition to its key role in mitigating the effects of climate change. And the need for managing landscapes as an integrated production system rather than the conventional view that places agriculture, wildlife conservation and forestry in opposition to each other.

Dr. Ashish Satav (President, MAHAN)

Integrated approach to reduce death and malnutrition of tribal of Melghat

Kushagra Gupta (Conservation Officer, Satpuda Foundation)

Tiger Conservation through Public Health

Dr. Abi Tamim Vanak (ATREE, Bangalore and DBT/Wellcome Trust India Alliance, Hyderabad)

A OneHealth approach to understanding rabies dynamics in India - Lessons for conservation

Rabies is a wholly preventable zoonotic disease that kills ~20,000 people/annum in India. The failure to control rabies in India is mainly due to a lack of knowledge about rabies dynamics in free-ranging dogs and poor disease surveillance. We use a triangulation approach of field research, laboratory analysis and model simulations to understand rabies transmission dynamics among multiple hosts along the urban-rural landscape. We used a combination of field surveys and laboratory analysis for population dynamics, sero-epidemiology, and movement ecology. This approach allows us to determine minimum prevalence rates of rabies in dogs and other carnivores, the potential for contact and spillover/spillback, the importance of dog demography and vaccination in preventing rabies outbreaks and a better understanding of the dynamics of rabies spread across a diverse rural-urban gradient. I will discuss how this approach is generalisable to understanding disease dynamics in wildlife and the importance of systematic surveillance for mitigating emerging conservation as well as broader public health challenges in the 21st century.





Session 4: Changing Livelihoods (Talks :Abstracts)

Chair:Amrita Neelakantan (Columbia University)

Venkat Ramanujam (PhD Scholar, ATREE)

Changing Adivasi livelihoods in Baiga Chak, eastern Madhya Pradesh

Indigenous communities across the world are often confronted by development narratives that trivialize their connection to the land and advocate integration into an urban-centric market economy. However, despite their overall marginal status the indigenous Baigas and Gonds of a forested upland region called Baiga Chak in eastern Madhya Pradesh demonstrate creative engagement in negotiating the present and anticipating the future. The paper is based on twenty-one months of ethnographic fieldwork in Saraidadar Village (pseudonym) located in Dindori District, Madhya Pradesh. I argue that the Baigas and Gonds have inventively drawn upon newly available resources from state and non-government organizations since the late-1990s to embark upon an indigenous process of agricultural intensification that retains their organic cultivation practices while simultaneously rendering upland agriculture relatively more sustainable. In the process, they have transitioned to a favourable situation of improved food security from a grim period of food shortages twenty years ago. The encouraging turn in their existence is accompanied by precariousness; nonetheless they exert relatively greater autonomy over their daily lives in engaging with markets and harnessing state provisioning. The findings from Saraidadar challenge the typecasting of indigenous people as either unchanging primitives or ecologically noble savages. The presentation will explore the conditions under which indigenous communities may demonstrate engagement and innovation in an environment of rapid socio-economic and ecological change. The study contributes to an appreciation of development interventions - with due sensitivity to the unpredictability of their outcomes - that can enhance indigenous peoples' autonomy, and augment environmental sustainability.

Vidya Venkatesh (Director, Last Wilderness Foundation)

Alternate Conservation

Conventionally, conservation refers to the protection of our wilderness spaces and the denizens living within. However, at the heart/core of the conservation sphere are people who are unique, unconventional and hold the key to conservation success i.e.: the communities living around our wilderness spaces and the skill sets they possess. It is to this effect, that we at Last Wilderness Foundation are working towards channelizing the skill sets of these community members by exploring alternative sources of livelihood alongside them and strengthen conservation - the alternate conservation.





Session 4: Changing Livelihoods (Talks :Abstracts)

Chair:Amrita Neelakantan (Columbia University)

Amrita Neelakantan (Columbia University)

Resettlement impacts on conservation and food security: a case study from Kanha National Park Landscape

Conservation efforts have moved millions of people out of protected areas around the world since the 1970s, yet empirical data on their well-being after resettlement is sparse. Here, we examine the food security of approximately 600 households' post-resettlement from Kanha National Park (KNP) in central India between 2009 and 2014. We compare food security of resettled households with comparable non-resettled households through 1733 and 1786 surveys respectively, conducted over three seasons within one year. Resettled households follow the same geographic pattern of household density as non-resettled households in terms of distance from built-up areas and markets. Results indicate that resettled households are comparable to their non-resettled neighbors in food consumption scores (FCSs) with very few reports of moderate or severe hunger across all our surveyed households. However, food insecurity is high in the landscape, with over 80% of households reporting poor or borderline FCSs. Additionally, in the monsoon season FCSs drop and resettled households use coping strategies more frequently than their non-resettled neighbors. Non-resettled households that have multiple crops per year were positively associated with FCSs, but resettled households FCSs were not associated significantly with multiple cropping. Accruing assets, diversifying incomes from non-labour avenues, increasing and maintaining village level food resources would alleviate food insecurity for resettled households. We conclude that resettlement does not create inequalities between resettled and non-resettled households in terms of distance to markets and food consumption in the KNP landscape.

Vinod Pandey (Co-Founder, Rozgar Dhaba)

Rozgar Dhaba - a rural tea stall based solution for conservation

Simple solution for conservation is, people should have employment opportunities. Rozgar Dhaba is one such solution, which could help people living in forest to have better livelihood opportunities. Rozgar Dhaba is a 'tea stall' in rural India, which sales different varieties of hygienic tea a to rural population and also act as a center for exchange of information on livelihood/employment opportunities in local geography. It collects information from local vendors or employers for local jobs and also collects information from job seekers who are looking for jobs and display/disseminate the gathered information. Rozgar Dhaba works as catalyst for providing information. People need to pay only for tea and information is free of cost to villagers. This in turn gives revenue to sustain Rozgar Dhaba. Rozgar Dhaba idea could work in villages because:

- It has uncalled gathering everyday (so you have both information provider and seeker at one place)
- People pay for tea (develops sustainability of model)
- Share information, but get unrecorded (could get recoded in structured way)
- Common point of contact (everyone in village loves tea, even in hot summer)
- Place for People from every section of society (same tea for everyone, removes caste barriers also)



Session 5: Human-Wildlife Conflict (Talks :Abstracts)

Chairs: Dr. Sandeep Sharma & Dr. Pranav Chanchani
(Scientist, Goettingen University & WWF-India respectively)

Aniruddha Dhamorikar & Sachin Anpat (WWF-India)

Insights into human-carnivore conflicts from a long-term livestock compensation programme in the Kanha-Pench corridor

Livestock depredation is considered a major driver of retaliation against wild carnivores. Under WWF-India's Interim Relief Scheme (IRS), a small monetary sum is immediately provided to livestock owners following a depredation event to enhance tolerance for large carnivores. Between 2010 and 2018, our team attended 1941 cases of kill incidences by wild carnivores in the Kanha-Pench corridor area comprising the buffer zones of Kanha and Pench tiger reserves, and the non-protected areas of Balaghat and Seoni circle. Tigers and leopards accounted for 44% and 53% of depredation events, while the remaining 3% was attributed to wild dogs and hyena. We present a preliminary analysis of the scale, intensity, spatio-temporal trends and economic costs of livestock depredation. Specifically, we explore the significance of kill locations vis-à-vis the regional density of livestock and the proximity of kill locations to villages. Finally, we present some indicators that may be used to assess the efficacy of this conflict mitigation strategy in the future.



Session 5: Human-Wildlife Conflict (Talks :Abstracts)

Chairs: Dr. Sandeep Sharma & Dr. Pranav Chanchani
(Scientist, Goettingen University & WWF-India respectively)

Dr. Milind Watve (Professor, Indian Institute of Science Education and Research (IISER) Pune)

Pilot implementation of an alternative to crop damage compensation

Crop damage by wild herbivores is an increasing concern and although law enables compensation for the damage, the implementation protocols are impractical and farmers are largely unhappy about it. We suggested a community operated alternative support scheme in which rather than compensating individual farmers for damage, they are rewarded for the agricultural productivity in spite of the risk. The reward is calculated based on the average loss in grain yield per unit area over an agricultural belt with comparable risk which is paid in proportion to an individual farmer's productivity. The scheme is under pilot scale implementation in two villages in Tadoba Andhari Tiger Reserve, the first year of which is complete. The results show that in anticipation of the reward in proportion to the productivity, farmers' motivation to cultivate and protect the crop increased. The frequency of use of solar fences increased and so did net produce per unit area. The farmers found the protocol easier to implement and displayed cooperation and initiative to implement. They took substantial efforts to understand the behavioural and mathematical principles underlying the scheme. Although the implementation was supported by an NGO, they showed readiness to learn the technical skills, management and self organization required to run the protocol independently. Continuation of the pilot trial will reveal whether the increased efforts and productivity is sustained and the scheme can effectively resolve an important issue in human wildlife conflict.

Dr. Bilal Habib (Scientist, Wildlife Institute of India)

Moving in Anthropocene: Large carnivores in human dominated landscapes

Large carnivore conservation is complex and remains a massive challenge across the world. Owing to their wide-ranging habits, large carnivores encounter various anthropogenic pressures which may potentially lead to conflict. Animal movement is linked with individual fitness as it is important for various biological processes. Therefore, studying how large carnivores adapt their movement to dynamic landscape conditions is vital for management and conservation policy. We first quantified the movement parameters of four large carnivores in and outside protected areas in India (tiger, leopard, dhole and wolf). We then tested the effects of human pressures like human density, road density and land use types on the movement of the species across the landscapes. Finally, we examined the configuration of core areas as a strategy to exploit human dominated landscape. Our findings suggest that the mean hourly displacement of 4 large carnivores differed across habitats. Mean displacement of large carnivores varied from 77.58 m/h for leopards to 665.3 m/h for wolves. Tigers outside PAs exhibited higher displacement as compared to tigers inside PAs. All carnivores showed multiple areas of intensive use or cores in their home ranges. The range of the core area sizes was greater for species outside PAs (tiger and wolf) in human altered landscapes. Our study attempts to extend theoretical concepts to applied management problems. This study can be a starting point for rigorous studies on interlinking animal movement and landscape management for large carnivore conservation and policy making in the Anthropocene.





Session 6: Infrastructure (Talks :Abstracts)

Chairs: Dr. Trishna Dutta & Milind Pariwakam

(Postdoctoral Scientist, Goettingen University & Wildlife Conservation Trust)

Ninad Mungi (Research scholar, Wildlife Institute of India)

Invasive plants follow human footprints

While biological invasions are homogenizing global biota, our understanding on the reasons that facilitates invasive species is often inadequate. Particularly in developing countries, where the native ecosystems are degraded due to disturbances brought by developmental projects, may have far pervasive effects on invasive species. In the present study we assess the effect of anthropogenic disturbance on invasive plants in tropical forests of India. We surveyed 2,07,100 km² of Indian forests by sampling 13715, 5x5 km grids each with 1 to 31, 15m radius plots, to record the abundance of high concern invasive plants. At the same scale, we recorded human disturbance in the forest in terms of timber extraction and infrastructure development. We subsequently investigated the effect of climate, edaphic characters and anthropogenic modifications on invasive plants using ordinal regression. We found that invasive plants have differential effect of environmental conditions, but all were significantly facilitated by gradually degrading forests that are burnt and fragmented. Herbaceous invasive plants were significantly facilitated by tree lopping and livestock grazing in the forests. Our results are based on the most extensive ground sampling of invasive plants, known globally. It also suggests that anthropogenic modifications have scale and magnitude dependent impact, where small scale livelihood dependencies imminently facilitate herbaceous invasive plants; infrastructure development facilitated shrubby and woody invasive plants. In the face of immense developmental pressure on the forests of tropical developing countries, our research shows that all scales of anthropogenic modifications are restructuring the native forests by facilitating invasive plants.

Prachi Thatte (Postdoctorate Fellow, National Centre for Biological Sciences)

Differential impact of human footprint on connectivity of multiple wide ranging species in Central India





Session 6: Infrastructure (Talks :Abstracts)

Chairs: Dr. Trishna Dutta & Milind Pariwakam

(Postdoctoral Scientist, Goettingen University & Wildlife Conservation Trust)

Dr. Trishna Dutta (Postdoctoral Scientist, Goettingen University)

Targeting restoration sites to improve connectivity in a tiger conservation landscape in India

Maintaining and restoring connectivity between source populations is essential for the long term viability of wide-ranging species, many of which occur in landscapes that are under pressure to meet increasing infrastructure needs. Identifying barriers in corridors can help inform conservation and infrastructure development agencies so that development objectives can be achieved without compromising conservation goals. Here, we use the tiger landscape in central India as a case study to identify barriers, associate them with existing infrastructure, and quantify the potential improvement by restoring or mitigating barriers. Additionally, we propose an approach to categorize linkages based on their current status within and between Protected Areas (PAs). We used the improvement score (IS) metric to quantify potential improvement by restoring or mitigating each individual barrier. Based on criteria that represent the status of corridors between-PAs and populations within-PAs, we ranked linkages into one of four categories: Cat1_linkages that currently have high quality and potential for tiger connectivity and should be maintained, Cat2W_linkages where focus on habitat and tiger populations may improve connectivity, Cat2B_linkages where focus on reducing barriers between PAs may improve connectivity, and Cat3_linkages where effort is needed to both reduce barriers between PAs and improve tiger populations and habitat within PAs. We associated barriers with infrastructure and present maps to show where restoration or mitigation measures can be targeted to have the highest potential impact. We mapped 567 barriers within 30 linkages in this landscape, of which 265 barriers intersect with infrastructure (694 km of roads, 150 km of railway, 48 reservoirs, 10 mines) and 302 barriers are due to land-use or gaps in forest cover. Eighty-six barriers have both roads and railways. We identified 7 Cat1, 4 Cat2w, 9 Cat2b, and 10 Cat3 linkages. Eighty surface mines and thermal power plants are within 10 km of the least cost paths, and more coal mines are closer to connectivity areas where linkages are narrow and rank poorly on both axes.

This study presents an alternative to management and planning efforts currently employed by conservation practitioners by providing spatial and quantitative results that can help target mitigation and restoration efforts to improve landscape connectivity in central India.

Milind Pariwakam (Wildlife Conservation Trust)

Whose Right of Way?





Posters Abstracts

Ms. Manisha Aashraf, Field Officer, Wildlife Trust Of India

Changing and Sustaining Non Farm Based Livelihood Strategies of Communities in NNTR Connectivity Corridor, Maharashtra, India

The Nagzira Nawegaon Tiger Reserve (NNTR) Corridor measuring 280 sq km forms a crucial link for Tiger dispersal between nine Tiger Reserves in Central India. Interestingly, numerous villages are interspersed within this forest connectivity corridor. With the corridor area included in the NNTR Buffer Zone in 2016, apprehensions aired amidst the villagers that they would get displaced or have to abandon their age old interactions with the forest. The study explores the gradual breaking of these myths vis-a-vis opportunities of sustainable alternative livelihood. Focus Group Discussions were held with 17 women Self Help Groups. Semi structured interviews were conducted with 62 individuals from 15 villages for analyzing their existing income from non farm activities, skills and possession of assets under the Sustainable Livelihood Approach by Department For International Development, UK. Trainings on Sustainable Collection and Value Addition of Non Timber Forest Produce were given to 39 individuals on the ecological implications of sustainable harvesting and market demand, 12 individuals on Soaps and Toiletries and 11 individuals on Cloth and Paper Bag making. In a span of 6 months, NTFP products have contributed 10%, Soaps & Toiletries 11% and Cloth and Paper Bags 8% to their annual non-farm income. Paving new livelihood strategies and market linkages are gradually dismantling the misconception centered on the negative impact of PA. It is for securing this critical wildlife corridor and uplifting the standard of living of the fringe communities, that civil society organizations are intervening.

Dr. Rahul Bhadouria, Post Doctoral Researcher, University of Delhi

Functional diversity and soil attributes along forest-savanna-grassland continuum in India

Savannas are commonly considered as relatively open grassy landscapes with sparse population of trees. In reality, savannas range from sparsely 'treed' grasslands to densely 'treed' woodlands, typically along a gradient of increasing rainfall, with the defining characteristics being that the tree canopy is not closed and the understory is grassy. Worldwide understanding of savannas suggests that they are derived from water scarcity or natural disturbances such as fire and herbivory, resulting to distinctive savanna communities and contains specific species and functional diversity. Based on descriptions of extant vegetation across India, Ratnam et al. (2016) identified mainly three distinct communities of savannas, viz., deciduous broadleaf savannas of Vindhyan Highlands and South India; fine-leaved and spiny savannas of Sariska Tiger Reserve in central India; and pine savannas, in the Himalayan foothills in Dehradun in North India. Savannas in India face several threats. Firstly, savannas have been incompletely described within India and remain locally unrecognized as distinctive ecosystems, and continued to be viewed as degraded forests or seasonally dry tropical forests. The lack of recognition and consequent negligence calls for an early attention of researchers. Secondly, the functional drivers and functional diversity of savannas along with adjacent forests and grassland, in India are poorly understood. Because of this lack of information, it is difficult to prescribe appropriate management. Thirdly, savannas are under serious threat from human activities such as land-use change, fire suppression, atmospheric N and CO₂ increase, leading to decline in plant diversity and supporting wildlife population. Fourthly, biomass dynamics and C-stock of savannas are also the matter of interest by the researchers as it plays major role in global C-cycle and contribute around 30% of global terrestrial net primary productivity, which is poorly quantified in Indian scenario. They often occur with forests and grassland as a mosaic of patches (Jha and Singh 1990). These adjacent systems (forests and grassland) may represent a gradient of various geological and ecological attributes such as (climatic, edaphic and functional diversity gradients) which can be better understood by studying these in a continuum approach to recognize changes at grassroots level (Singh et al. 2017).





Posters Abstracts

Mr. Jayanta Kumar Bora, Junior project fellow, Wildlife Institute of India

Finding suitable habitats for the smallest wild cat of the world

Rusty-spotted cat is the smallest wildcat of world, endemic to India, Nepal, Sri Lanka. It's a rare, arboreal cat having the status Near-Threatened. Little known about its ecology, except opportunistic occurrence records. We investigated habitat use and preference of Rusty-spotted cat in Kanha Tiger Reserve, India, where its presence was hereto unknown. We did intensive camera trap sampling in every 1-2 km² of forest area. Enhanced vegetation index, terrain ruggedness and distance to villages were used in program Maxent to model habitat suitability of rusty-spotted cat. We used Ilev's electivity index to measure habitat preference. Rusty-spotted cats were observed to use and prefer thick canopied forests and rugged terrain over grasslands and open forest habitats. They were found to inhabit at moderately distanced habitats at the edges of inviolate core and human dominated buffer zone. Which likely to be an artifact of the habitat configuration within the reserve, but over-exploitation of forests and disturbance may negatively impact the species. This study provides a broad understanding of the suitable habitats for this cryptic species at a local scale. The philosophy of a tiger reserve is to use the tiger as an umbrella species to protect the biodiversity of the ecosystem. However, often due to lack of information on the habitat needs of other less charismatic sympatric species, tiger reserves are intensively managed to enhance prey and tiger populations. It is important to encourage studies to understand resource needs of other species in a tiger reserve and modify management strategies accordingly.

Ms. Debarati Chakraborty, Ph.D student, University of Kalyani

Our future lies in our traditions: Mati - in search of a sustainable future with traditional artisans of Chattisgarh

Going green is our only route towards a sustainable future. Apart from modern livelihoods, there are several traditional technique based livelihoods, diversification towards which can assist us towards achieving sustainable yet eco-friendly economic growth. The state of Chattisgarh is home to several tribes like Jharas, Ghadwas, Badhais, Murias, and many others. These tribes carry the age-old legacy of making heritage crafts like dokra metal casting, wrought iron crafts, cane, bamboo, rattan, jute based products, bronze ware, wood carvings, godna, Kosa fabrics and so on.

Sadly, these traditional artisans have received very poor attention, economic support and hence many have opted to leave these professions. Through Mati, I aim to bring under the same roof an array of such vibrant products. I have made a website and social media pages dedicated to promoting these products and the artisans with an emphasis on women artists. The site will serve as a repository of such artisans so that they can be easily contacted by other like-minded organizations. Mati has also tied up with online and offline selling platforms. This will further provide opportunities to the artisans to sell their products directly to potential buyers. I further aim to popularise these heritage arts through organizing exhibitions and workshops at mega-cities. Moreover, all of these products are eco-friendly and hence will affect the landscape positively. Thus, Mati will pave the way towards achieving the United Nations designated sustainable development goal (SDG) 8 and 12 by facilitating decent work opportunities and economic development through responsible production.





Posters Abstracts

Mr. Himanshu Chhattani, National Centre for Biological Sciences

Efficacy of genetic samples collected from kill sites to reliably identify predators for conflict management and research

Precise identification of individual predator is critical for both an improved understanding of predation and developing evidence based conflict management strategies. However, generating such information is difficult owing to secretive nature of predators, rarity in witnessing, and identifying individuals during a predation event. Genetic material left by the predator on and near the carcass can often be the only resource for conclusive predator identification and is increasingly being recommended for conflict management. We examined influence of season on 1) availability, 2) DNA yield and, 3) predator species and individual identification success of genetic samples collected at livestock kill sites. We collected 304 salivary swabs, 29 scat and 62 shed hair samples from 113 livestock kill sites where tigers and leopards were implicated as the predator. Sampling was conducted in Kanha Tiger Reserve (a site of high conflict) across dry and wet seasons of 2017. Predator species was successfully identified for 99% kill sites by amplifying 16s mitochondrial region using specific primers. Season and source type did not impact species identification success but did influence DNA yield of saliva and scat samples. Individual identification was done using 126 SNP markers for only tiger positive samples (N=206), belonging to 56 kill sites. Shed hair samples were found to be most successful (82% dry season, 60% wet season) for individual identification, followed by scat (62% dry season, 25% wet season) and saliva samples (49% dry Season, 29% wet season). At least one individual tiger was identified at 70% of tiger kill sites. Our results indicate that genetic samples can be abundantly found at kill sites and are influenced by seasonal variation. By using DNA from multiple sources from a kill site, success and reliability of identifying individual predators can be increased. Genetic samples can therefore be valuable tool conflict management and research.

Ms. Pooja Choksi, Columbia University

Drivers of seasonal migration in central India

Migration for seasonal employment is increasing in countries like India. Central India has seen a rise in migration for unskilled labor in towns and cities. This paper analyses the question of seasonal migration in a hierarchical Bayesian framework to predict the probability of migration given socio-economic and environmental factors.





Posters Abstracts

Mr. Nikhil Dandekar, Field Officer, Wildlife Trust Of India

Resolving Human-Wildlife Conflict by involving Communities – A new approach towards conflict management

Territorial Forest division of Bramhapuri in Chandrapur district is an important forest block connecting Tadoba-Andhari Tiger Reserve with Bor Tiger Reserve in the north-west, Umred-Karhandla Wildlife Sanctuary in the north and the Nagzira-Nawegaon Tiger Reserve (NNTR) in the north-east. Similarly, the Nawegaon-Nagzira corridor in Gondia district is also an important forest block connecting Navegaon National Park and Nagzira Wildlife sanctuary. These are important dispersal corridors for not just the tiger, but several other species including other large carnivores. Along with the animals, Bramhapuri and NNTR corridor have more than 100 villages each of which villagers are highly dependent on forest for their livelihood. This has given rise to man-animal conflict in recent years. Wildlife Trust of India has established Rapid Response Teams in this landscape to address and study such conflict situations. Since May 2017, the teams have been successful in resolving 9 cases of tiger, 5 cases of leopard, 4 cases of sloth bear and one case of northern plains langur conflict situations without actually capturing the animal but instead practicing concepts like safe passage, intensive monitoring, conducting amelioration meetings with villagers, awareness and people participation. Regular monitoring of large carnivores and consistent dialogue with the communities can help resolve conflict and in many cases even stop one from arising, ultimately safeguarding the community as well as the animal.

Ms. Kundan Deval, Research Scholar, Jawaharlal Nehru University

Applying geospatial tools in forested wetland of dry tropical region – a precursor to wetland management Wetlands are considered as lungs of the terrestrial ecosystems, and the adjoining vegetation to these plays important role in sustaining them. Invasion of exotic species in such wetlands lead to serious management issues related to water resource distribution and altering native biodiversity. To overcome these challenges and better management we need detailed and large scale monitoring. The present study focuses on assessment and quantification of spatial distribution of *P. juliflora* and water resources using very high spatial resolution Worldview-2 satellite imagery. Study area is the Keoladeo national park, a protected forested wetland covered by dry deciduous tropical forest. Out of 24 blocks of the park 4 are completely and 3 are partially covered with water. More than 15% area of the park is covered by wetland, around 2% with deep water bodies and more than 10% by the expansion of *P. juliflora*. The vast expansion of *P. juliflora* has lead to decline in water table and biodiversity in the surrounding area. Spatial distribution of *P. juliflora* shows that out of 202 grids, 22 grids have more 50% of the area covered by *P. juliflora* and of these, 4 grids lie in the wetland area that is slowly getting converted to woodland. This study is done in collaboration with state forest department for management of *P. juliflora* and water resources of the region. Such large scale database helps in eradicating the invasive species and ensure enriching extent and quality of the wetland. Findings add to management plan of the protected area.





Posters Abstracts

Mr. Abhijit Dutta, Assistant Director (Conservation) Satpuda Foundation
Tiger Tourism payback to local communities

Dr. Divya Gupta, Post-doctoral Fellow, ATREE

**Adapting to the contemporary democratic decentralization reforms in the forest commons:
A case of collective action for sustainable rural livelihoods in Central India**

Collective action can help people improve the welfare of forest-dwelling communities and help them get out of poverty in several ways: provide local goods and services they would not be able to provide as single individuals, substitute for missing markets or help overcome barriers to participation in markets, and increase their bargaining power to request services from higher level institutions. In India, Community Forest Resource Rights (CFR rights) under the Forest Rights Act, 2006 provide forest-dwelling communities with a unique opportunity to have both access to and substantive control over their forestlands. After the recognition of CFRs, many gram sabhas have started asserting rights over the most important forest resources, i.e. Non-Timber Forest Produce (NTFPs). The question now is how these communities are going to actually organize themselves to fully use their rights to achieve the goal of sustainable livelihood enhancement. In most cases, the gram sabhas are forming coalitions and developing strategies for sustainable harvest of non-timber forest produce and its trade. In this study, using the example of Korchi Mahagram Sabha (Korchi Federation) in Maharashtra, India, we illustrate how different villages are organizing themselves in collective action to facilitate NTFP trade. We share our observation about ways such coalitions are developing plans for maintaining a steady flow of products, preserving an existing market, creating a new market, gaining access to knowledge and professional expertise, and increasing bargaining power. Through our research, we also discuss the number of challenges that such coalitions are facing while operating in the nexus of political pressure, armed conflict, gender and caste discrimination, and ecosystem degradation.

Ms. Parul Gurjar, Research Scholar, Barkatullah University

**Role of riparian zone vegetation in the healthy freshwater ecosystem
vegetation in the healthy freshwater ecosystem**

Riparian zone is the transition between the terrestrial and aquatic ecosystem. This forested area includes large trees, shrubs and dense plants which replenishes the areas and support high biodiversity. It also provides water quality protection, naturally control floods, stabilize stream banks, provide wildlife habitat etc. It also plays major role in providing the ecosystem services and maintains the balance between biotic and abiotic factors. For the determination of River Health, QBR which is a Riparian Quality index based on the visual assessment has been used. The Central Indian River Narmada is the fifth largest river in the country and constituted by forty one principal tributaries. In the present study based on the central part of River Narmada, it has been found that the River health of the sampling site is better where the QBR indexing is better. The ghats and sites that are more disturbed have shown lesser QBR rating. Due to urbanization and various anthropogenic activities these riparian zones are vanishing which is leading to the disturbance in the aquatic ecosystem and its organisms resulting into the threatening life of River.





Posters Abstracts

Mr. Akshay Jain, Researcher, Wildlife Institute of India

Comparison of abundance estimation techniques for ungulate populations

Knowledge of species distribution and abundance is crucial to formulate long-term species conservation strategies. Hence precise estimation of species abundance is important and required for informed policy making. Estimating species abundance is a daunting task due to the species' behavioral and biological attributes. A suitable abundance estimation technique needs to be statistically robust, replicable, and cost-effective. Here in this study I have compared two density estimation techniques to estimate ungulate density. In the current study we aimed to compare two density estimation techniques in Kuno Wildlife Sanctuary, Madhya Pradesh: (a) line transects based distance sampling and (b) camera trap based quadrat sampling. An area of 100 km² was selected as an intensive study area to test these two methods. A total of 39 transects were traversed thrice in the month of April-May 2018 for ungulate estimation. The length of each transect was ~2km and transects were walked in the morning hours to encompass the activity peak of the animals. To conduct camera trap based quadrat sampling method, a total of 47 cameras were deployed randomly (without any prior knowledge of animal distribution) in the field at the centroid of the grid of 2km². Due to time constraints I could use only 19 camera traps data for analysis. Analysis of the line transect data was done in software DISTANCE 7.0 and modeled the detection function mainly for individual densities of chital, sambar, nilgai. Camera trap based quadrat sampling data was analysed in software 'R'. The ungulate density obtained from camera trap based quadrat sampling and line transects were similar for chital, but line transect estimates have much wider 95% confidence interval range than the camera trap estimates. Chital density obtained from the line transect was 16.81 ± 3.65 km² while from camera trap it was 12.60 ± 1.28 Km². Density of sambar was 3.67 ± 0.76 , and nilgai was 1.01 ± 0.34 . Since I have sampled only a small subset of the much larger Kuno WLS, the density estimates should not be considered as a true representation of the ungulate prey in Kuno WLS, the sole objective of the present study was to compare two density estimation methods in a well-studied population. A proper estimation of feral cattle population is essential to assess the competition between feral cattle and wild ungulates which can help to understand the resource utilization and partitioning.

Ms. Suvarna Jain, Conservation Architect, Delhi Urban Art Commission

Lonar as a Cultural Landscape

Geography has been a major determinant in the origin and shaping of place in India. One can see different examples in India with a unique phenomenon of geographical features such as mountains, rivers, trees, animals and forests became places of worship. This Spectacular Geographical location encouraged the belief and a sense of sacred nature resulted for people thus gave birth to the mythological dimension to the place. People of India start interacting with beauty of the landscape as living heritage, culture and landscape. The Cultural Landscape is defined as a geographic area that includes cultural resources and natural resources associated with a historic event, activity, or person. Sometimes cultural landscapes are the result of one person or group of people acting upon the land. Specifically in the case of Lonar an astronomical phenomena has played an important role in shaping the culture, as the beliefs and concepts of cosmological practices and systems of knowledge. The human connections with celestial phenomena can actually become a place of worship created in the landscape.





Posters Abstracts

Ms. Poorva Joshi, Research collaborator, Bioconcepts

Alternative for compensation protocol and creating resource for additional livelihood options in the form of non palatable medicinal crops for central Indian landscape

I am working as a collaborator to IISER Pune for Defries foundation's project for the last 3 years. The main focus of the study is human animal conflict mitigation in buffer areas. I am also in the process of finalizing the manual on Nonpalatable medicinal plants which will act as a resource for effective management for alternative livelihood with an additional benefit for the protection of field from herbivore attack funded by WCT. Herbivore damage to crops is a major issue in human-wildlife conflict. Currently in India, law has provision for compensating the loss of farmers but estimating the loss by small to medium sized herbivores is difficult and the currently employed protocol is impractical. Watve et al (2016) suggested an alternative protocol where farmers self-report their produce and the further processing is automated. The community operated protocol is based on principles of behavioral economics which ensure and reinforce honesty in self-reporting. We are conducting an on-field test of the community operated protocol to ensure that the behavioral economics principles employed in the model work well in reality. This is a real-life implementation with group of farmers in Tadoba. While we have been closely working with Vidarbha development Board, the pilot study needs to be done with real money rewards and we are supported by Defries foundation for this purpose. We completed one year of execution in two villages. Earlier game theory studies have indicated that games with real monetary rewards give more reliable outcomes. In the project the farmers are collecting and recording their own data and organizing the same cooperatively. Implementation with real monetary reward enabled us to evaluate the compensation protocol based on behavioral principles.

Mr. Sumit Kar, Conservation Officer, Satpuda Foundation

Tiger Conservation through Livelihood security





Posters Abstracts

Ms. Dhanusha Kawalkar, Junior Research Biologist, SACON

Estimating tiger occupancy in the Reserve forests of Kalmeshwar- Kondhali Block, Nagpur Forest Division, Maharashtra

India harbors 20% of forestland whereas the state of Maharashtra holds 23% of forest areas as compared to the total area of the state. Out of seven administrative division under the state, Nagpur Division holds majority of forest area of which 70% of the forest is occupied by Reserve forests. The territorial forest areas adjoining to these protected areas although are fragmented and having some indirect anthropogenic pressure are observed to be rich with wildlife flagship species like Tiger *Panthera tigris*. To understand the extended habitat of tigers beyond the existing protected areas this study was carried out to estimate the occupancy in the reserve forests using single season- single specie occupancy (Ψ) model in program PRESENCE 10.9. The entire study area used beats (the lowest level of administration) as defined by the forest department in this area. Spatial occupancy was seen for 16 beats (each approximately 7 sq km in area) across 96 sq km in Kalmeshwar – Kondhali Block, Nagpur Forest Division, Maharashtra, India. Tiger indirect sign survey was first conducted in the selected 34 beats based on past camera trap data, direct sightings and indirect sign (pugmark, scat, scratch or scent marked tree). The camera traps were deployed in the 16 selected beats from 25th May, 2016 to 25th July 2016 was used to collect data and to create encounter histories of the tigers. The presence-absence survey using camera trap shows that tigers were detected and occupied 7 sites out of 16. The naïve tiger occupancy was found out to be 0.492 (0.1325) i.e. 47.232 sq km (12.72) and the probability of detecting a tiger in a beat (≤ 7 sq km), detection probability = 0.1828 (0.05). The overall study indicates that reserve forests like of Kalmeshwar- Kondhali Block provide not just cover but also proves to be a frequently used habitat by tigers and as well by other wildlife. Beat based monitoring in reserve forests will not only encourage wildlife monitoring but also will stimulate tiger conservation at the lowest level of administration.

Ms. Sarika Khanwilkar, Columbia University

Liquified Petroleum Gas (LPG) uptake and its effect on fuelwood collection patterns in the central Indian Highlands Landscape

The availability of Liquified Petroleum Gas (LPG) is increasing with government subsidies and policies that provide LPG in support of rural development in India. LPG can be an important clean cooking fuel alternative in households who normally rely on fuelwood. Switching from traditional to modern cooking fuels is of interest because fuelwood has negative human health impacts associated with indoor air pollution and there are potential environmental benefits to reduced fuelwood extraction. The Central Indian Highlands Landscapes (CIHL) is a global priority tiger landscape with a large proportion of people who use fuelwood and are dependent on the forests for their livelihoods. A household questionnaire was used across 5,000 households within 500 villages across the CIHL to quantify LPG uptake and how that has affected fuelwood collection patterns.

Mr. Sajal Kulkarni, Young Professional, Center for People's Collective Livestock keepers and Protected areas





Posters Abstracts

Mr. Amit Kumar, Ph.D. Scholar, Indian Institute of Forest Management

Effects of Patch Characteristics on Avifaunal Diversity in Fragmented Forest Patches of Vindhya Range

Deforestation and habitat destruction result in biodiversity loss in the natural forests. With increasing fragmentation of natural areas and a dramatic reduction of forest cover in several parts of the world, quantifying the impact of such changes on species richness and community dynamics has been a subject of much concern. Therefore this study intends to assess and characterize the avifaunal biodiversity in fragmented forests. Forest patches between the sizes of 10ha to 700ha were identified in Bhopal forest circle which almost covers the Vindhya Range. Forest patches were classified on the basis of its size and degree of isolation. A sample of 21 forest fragments was selected using proportional sampling. Bird surveys were conducted using point count method at each site thrice. Vegetation surveys were done at each site using circular plots of 10m. Avian species richness of each patch was calculated. Vegetation attributes were also calculated using the collected field data for each forest patch. The results suggest that species richness is positively associated with the size and vegetation diversity of the forest patches. But the distance of patches to the nearest other forest patches had no relationship with species richness of the sampled patch. Canopy closure, litter depth, and tree height had no individual effects on species richness of birds. But these variables can have effects on certain bird species of different feeding guilds. The results suggest us to look into effects of studied variables on different groups of species on the basis of their habitat and feeding guilds. Keywords: Forest patches, the degree of isolation, patch size, vegetation diversity.

Dr. Sharad Kumar, The Corbett Foundation

Community-based Conservation of Wildlife in Central India

Dr. Saroj Kumar, Scientific Officer, IIITM-K

Medicinal potential of *Ensete superbum* (Roxb.) Cheesman in India: A Review

Ensete superbum (Roxb.) Cheesman is an endemic species geographically spread across the Western Ghats, the Aravalli range and northeastern hills of India. *E. superbum* is a multipurpose medicinal plant. Seeds are used to treat diabetes, kidney stone, leucorrhoea, measles etc. In the present communication, authors attempt to highlight the ethno medicinal potential and current distribution status of the species in India. Extensive surveys were carried out among various ethnic communities of Gujarat, Maharashtra, Karnataka and Kerala to gather information on uses of the *E. superbum*. Forty four indigenous communities in thirty locations spread across seven states in India identify *E. superbum* by thirteen vernacular names. Plant parts are utilized by indigenous practitioners for twenty etiological symptoms. Inflorescence and unripe fruits of *E. superbum* are used as vegetables in culturally distinct communities in Tamil Nadu and Arunachal Pradesh. Presently species is facing severe anthropogenic threats for its existence. A necessary step towards conservation is need of the hour.





Posters Abstracts

Mr. Indranil Mondal, Project Scientist, Wildlife Institute of India

Securing refuge patches for tigers in a human-dominated landscape

Tiger dispersal assisted by unhindered movement within the landscape is imperative for tiger conservation and long term survival in the human-dominated landscapes of India. The Eastern Vidarbha Landscape in central India is chiefly characterized by heterogeneous land use patterns, outside inviolate habitats inside protected areas (PAs). Since habitat patches along movement corridors are patchy, it is essential to conserve them for long-term maintenance of habitat connectivity for tigers. We analyzed movement data from six collared tigers in ArcMET 10.2.2v3 and identified pockets in the landscape, outside PAs, where they were spending a considerable amount of time while dispersing or exploring. Potentially similar patches were identified across the landscape using a MaxEnt model of eco-geographical variables extracted from areas actually used by dispersing or exploring tigers as refuge. We identified 1587.88 sq. km. area of refuge patches across the landscape. Securing these parcels of land is of paramount importance to aid tiger habitat connectivity in the study area, as it provides stepping stones in a fragmented human-dominated landscape. 60% of the identified potential refuge patches in the landscape falls in private or publicly owned lands and are outside the direct jurisdiction of the forest administration, requiring a higher quantum of work to secure these patches, necessitating a conservation approach involving multiple stake holders in the landscape.

Dr. Pinki Mondal, Assistant Professor, University of Delaware

A reporting framework for Sustainable Development Goal 15: Multi-scale monitoring of forest degradation using MODIS, Landsat and Sentinel data

Sustainable Development Goal (SDG) indicator 15.1.1 proposes to quantify “Forest area as a proportion of total land area” in order to achieve SDG target 15.1. While area under forest cover can provide useful information regarding discrete changes in forest cover, it does not provide any insight on subtle changes within the broad vegetation class, e.g. forest degradation. Continental or national-level studies, mostly utilizing coarse-scale satellite data, are likely to fail in capturing these changes due to the fine spatial and long temporal characteristics of forest degradation. Yet, these long-term changes affect forest structures, compositions and functions, thus ultimately limiting successful implementation of SDG targets. Using a multi-scale, satellite-based monitoring approach, our goal is to provide an easy- to-implement reporting framework for South Asian forest ecosystems. We systematically analyze freely available remote sensing assets on cloud computing platform (Google Earth Engine) for monitoring degradation and evaluate the potential of multiple satellite data with different spatial resolutions for reporting forest degradation. Taking a broad-brush approach in step 1, we calculate vegetation trends in India using MODIS Normalized Difference Vegetation Index (NDVI) during 2000-2016. We also calculate rainfall trends using CHIRPS rainfall data, and Rain-Use Efficiency (RUE) that shows vegetation trends in the context of rainfall variability. In step 2, we focus on two protected area test cases from India for evaluating the potential of finer-resolution satellite data compared to MODIS, i.e. Landsat 8, and Sentinel-2 data, for capturing forest degradation signals, which will ultimately contribute towards SDG indicators 15.1.1 and 15.1.2.





Posters Abstracts

Mr. Anil Kumar Nair, Manager, Wildlife Trust of India

Collection and Use of Mahua *Madhuca indica* by Communities between Nagzira Nawegaon Tadoba Corridor, Maharashtra.

Non Timber Forest Produce collection in rural landscape is major contributor to the household income post crop harvesting. The two majorly collected ntfp's in Central Indian Landscape are Mahua *Madhuca indica* and Tendu *Diospyros melanoxylon*. The study looked into the extent of collection, collection practices and use of this resource in connectivity corridor between Nagzira Nawegaon Tadoba Tiger Reserves covering 141 respondents. This comparative study was done in two locations Gondia and Brahmapuri division. Brahmapuri has the highest resident Tiger *Panthera tigris* population outside protected area, whereas Gondia don't have permanent presence of the flagship carnivore but have other compatriot's besides herbivores. The study reveals about the presence of mahua in both areas and places these are collected. The average per day collection of mahua is 13kg and majorly collected by women, which is augments for their household earnings and livestock. Almost equal percentage of mahua is collected from forest and agriculture areas at the macro level but at micro level in Brahmapuri, mahua is extensively collected from the forest areas compared to Gondia where majority is collected from the agriculture area, indicating good presence of mahua outside forests of the area. The collection method is still burning majorly in Gondia, indicator of threat to the resident and dispersing wildlife using the corridor. While on the other hand, the resource is sparsely available outside the forest areas in Brahmapuri. Increasing its availability outside forest areas is of utmost importance to reduce future human wildlife conflicts in forests inhabited by tigers.

Mr. Siddhant Nowlakha, Research Fellow, Azim Premji University

Forest Guards: The Frontline Conservationists

Theorising the work environment of forest guards can greatly enrich the governance of protected areas and synthesis between the forest administration and local population. The distressing job conditions at the forest frontlines, the multidimensional relationship between forest guards and locals, and the guards' own location in the community make their role very important for ensuring people's participation in conservation and forest resource protection. Forest guards are one of the least studied professional groups due to the subject's cross-sectional location between the fields of ecology and the social sciences. Any related scholarship is often a subsection of research on forest conservation and forest governance, where reference to forest guards is made only in the context of achieving governance and conservation objectives. This leaves many questions unanswered with respect to their working conditions, occupational risks, integration with local-level politics and economy, real-time interpretation and enforcement of laws, and ethnographic understanding of this profession. In this study, I seek to put forth a preliminary understanding of these aspects with the objective of theorising the fundamental concerns of duty as a forest guard. Some of the conceptual points in this article are built on an exercise to patrol a forest range in Melghat Tiger Reserve (MTR) alongside frontline forest staff.





Posters Abstracts

Mr. Abhik Palit, Project Officer -Human Wildlife Conflict Management and Community Based Conservation, WWF-India

Using Community Institutions as a Medium for Conservation and Development

In the spheres of conservation and development, the word beneficiary has predominantly been used to refer to individuals. This is symptomatic of the very conceptualisation of our activities wherein although we want to work with communities, we end up working with individuals. Community institutions hold immense potential to add value to conservation interventions with forest dwelling communities. Apart from circumventing issues of beneficiary selection, collective participation and collective decision making, the CI approach also facilitates the indirect permeation of indigenous knowledge into our work. However, there are many challenges that beset this approach which a practitioner needs to be mindful of, mostly related to community mobilisation, equity and elite capture. That being said, healthy community institutions which vault these challenges stand at the threshold of unleashing the immense potential of indigenous peoples to work towards the conservation of the habitat they inhabit. On the basis of my field experiences while working with WWF-India in the central Indian landscape (particularly Balaghat), I want to elaborate upon the drawbacks of focusing on individuals and posit an emergent system wherein empowered, participatory community institutions become the nodal agencies for directing conservation and development related activities so as to improve individual beneficiary selection, address equity concerns and lead to the simultaneous flourishing of biodiversity as well the community co-existing alongside it.

Mr. Naveen Pandey, The Corbett Foundation

Livestock Diseases Of Potential Threat Around Tiger Reserves of Bandhavgarh and Kanha

Mr. Bhavesh Patel, Student

Bears and humans

At the time of March when trees of mahua are blooming both man and bear attracted for there juice and sweet petals. This time too much chances of bear attack on human because most forest communities of central India collect the mahua flowers from nearby filed and jungle and this is also the time of bear to serve this delicious food therefore the this time more chances of bear attack. At some time bear are also roaming around villages for different food like maze ,and other edible food and water in hot summer days.





Posters Abstracts

Mr. Ajay Poddar, Satpuda Foundation

Human wildlife conflict mitigation through community conservation initiatives

Mr. Ananya Vasudev R M, Assistant Lecturer, National Institute of Technology Karnataka Surathkal
Ecological Restoration and Rejuvenation of Urban System to Forest Eco System

The growing population has always posed threat to the environment and wildlife. Growing infrastructure, urbanization, industrialization and other developmental activities have suggested that our Development is towards Deterioration. Changing the landscapes where a hill is exploited into a mine, Lake converted into a human settlement has raised many questions. In order to balance this, there is a need to restore and rejuvenate the waste land into a Forest, lake etc. Hence by using the Micropropagation technique we can achieve the Restoration. This study speaks about how to execute this technique and the pros and cons of the technique.

Mr. Rajat Rastogi, Project Fellow, Wildlife Institute of India

The green disease: effects of two invasive plants on plant assemblage and ecosystem functioning in a tropical forest

Invasive species are non-native organisms with established populations that negatively affect ecosystems. Studies, worldwide, have reported that biological invasions lead to simplification in community structure & altered functioning of ecosystems leading to a state of unrest, popularly known as green cancer.

In the present study, we assessed the effects of *Lantana camara* (lantana) and *Pogostemon benghalensis* (pogostemon) on native vegetation and soil nutrient composition in *Shorea robusta* (Sal) forest.

We stratified the Sal forest based on the percent cover of two invasive plants. We sampled native and invasive vegetation from 120 stratified plots and collected 3 soil samples of 150 gm each. Subsequently, we correlated plant species composition with edaphic and climatic parameters using ordination analyses and estimated potential effects of single and multiple invasive species using linear model.

We found that the species composition differed significantly between invaded and uninvaded areas (kruskal stress value – 0.19). We also found a decrease in native plant diversity and richness with increase in lantana ($R^2=0.51$, $p<0.01$) and pogostemon cover ($R^2=0.13$, $p<0.01$). When both invasive plants were present, an increase in soil organic carbon ($\beta=2.12\pm0.45$, $p<0.1$) and soil potassium ($\beta=4376.7\pm638.7$, $p<0.1$), and a decline in soil moisture ($\beta=9.39\pm2.21$, $p<0.01$) was found.

Study results indicate a less diverse plant assemblage with increase in lantana and pogostemon invasion. It also indicates an altered state of soil nutrient composition with increased invasion cover, which may result in altered nutrient cycling and depleting health of the ecosystem.





Posters Abstracts

Mr. Ayan Sadhu, Research Associate, Wildlife Institute of India

Demography of a small, isolated tiger (*Panthera tigris tigris*) population in a semi-arid region of western India

Tiger populations have declined globally due to poaching, prey depletion, and habitat loss. The westernmost tiger population of Ranthambhore in India is typified by bottlenecks, small size, and isolation; problems that plague many large carnivore populations worldwide. Such populations are likely to have depressed demographic parameters and are vulnerable to extinction due to demographic and environmental stochasticity. We used a combination of techniques that included radio telemetry, camera traps, direct observations, and photo documentation to obtain 3492 observations on 97 individually known tigers in Ranthambhore between 2006 and 2014 to estimate demographic parameters. We estimated tiger density from systematic camera trap sampling using spatially explicit capture-recapture (SECR) framework and subsequently compared model inferred density with near actual density. SECR tiger density was same as actual density and recovered from 4.6 (SE 1.19) to 7.5 (SE 1.25) tigers/100km² over the years. Male: female ratio was 0.76 (SE 0.07), and cub: adult tigress ratio at 0.48 (SE 0.12). Average litter size was estimated at 2.24 (SE 0.14). Male recruitment from cub to sub-adult stage (77.8%, SE 2.2) was higher than that of females (62.5%, SE 2.4). But male recruitment rate as breeding adults from the sub-adult stage (72.6%, SE 2.0) was lower than females (86.7%, SE 1.3). Annual survival rates, estimated by known-fate models, of cubs (85.4%, CI95% 80.3–90.5%) were lower than that of juvenile (97.0%, CI95% 95.4–98.7%) and sub-adult (96.4%, CI95% 94.0–98.9%) tigers. Adult male (84.8%, CI95% 80.6–89.2%) and female (88.7%, CI95% 85.3–92.2%) annual survival rates were similar. Human-caused mortality was 47% in cubs and 38% in adults. Mean dispersal age was 33.9 months (SE 0.8), males dispersed further (61 Km, SE 2) than females (12 Km, SE 1.3). Higher age of first reproduction (54.5 months, SE 3.7) with longer inter-birth intervals (29.6 months, SE 3.15) was likely to be an effect of high tiger density. Demographic parameters of Ranthambhore tigers were similar to other tiger populations. With no signs of inbreeding depression there seems to be no eminent need for genetic rescue. The best long-term conservation strategy would be to establish and manage a metapopulation in the Ranthambhore landscape.





Posters Abstracts

Ms. Akanksha Saxena, Senior Research Fellow, Wildlife Institute of India

Off-road ecology: Combining wildlife roadkill and behaviour to understand impacts of roads on wildlife

Roadkill is the most common and conspicuous impact of roads in wildlife, and has implications for connectivity and long-term conservation of wildlife. Information conveyed by wildlife roadkill data is thus critical for informing measures for mitigating roadkill. We found 86 roadkill across birds, mammals and reptiles. Not all roadkill were restricted to road sections near forests (62.79%), and one-fourth were found near agriculture (25.58%). Most roadkill-prone sections coincided with sections with navigable terrain for animal crossing (raised 48.78% and flat roadside topography 34.15%) and high driver visibility (67.57%). Roadkill persistence experiments revealed lowest persistence probability of reptiles (66.7%, $p < 0.001$), and highest for roadkill located at the outermost edge of the road (28.9%, $p = 0.003$). Probability of missing reptile roadkill (0.97) was higher than for mammals (0.29), with high probability of missing roadkill on the opposite lane of road (0.93) during roadkill detectability trials using animal decoys. Differential rates of roadkill can be explained by behavioural responses of animals towards road-related disturbance. Camera trapping near roadsides revealed that capture rates were positively influenced by road proximity for chital and negatively for sambar. The differences in capture rates were significant. Comparisons of activity and traffic patterns showed greater correlation with traffic at increasing distance from road for chital. Gaur and sambar near road were found to be active during low traffic hours. Our study suggests that drawbacks of roadkill data necessitates deliberation of such data in a behavioural framework for a bigger picture of the impacts of roads on wildlife.





Posters Abstracts

Mr. Peeyush Sekhsaria

Learnings from a 1000 Improved Cooking Stoves

As part of the Chattisgarh's creche program, 'Fulwari - Where Children Flower' a improved cooking stove was introduced as part of a larger 'creche improvement' program, first in the 500 creches in Surguja and then using a mix of print, audio-visual and physical training to the rest of the 3000 creches in 85 tribal blocks across the state. Today over a 1000 creches have improved cooking stoves, built by mothers at virtually '0' cost. The Improved Stoves have travelled beyond the creches to people's homes. The proposed talk using audio-visual and data support will talk of the learning's and the factors that have given this program a success which can find application in conservation centric interventions in the Central Indian landscape

Ms. Nita Shashidharan, Ph.D. Student, ATREE

Changing Forest-Agricultural Dynamics and Provisioning Ecosystem Services under Climatic Variability and Institutional Change: A Case of a Tropical Tiger Reserve in India

Protected Areas (PAs) in the tropics are often spaces where both biodiversity conservation and human wellbeing are intertwined concerns. Agriculture and forests are prominent linked land use/land covers in these PAs on which people depend for various ecosystem services (ES). These PAs can be characterized as social-ecological systems (SES). The declarations of land as Protected Areas restrict and regulate the land use/land cover and ecosystem services. Climatic variability and climate change further add to the complexity of change for both forest and agriculture in semi-arid and arid areas. The interacting drivers - climatic variability and PA management influence the system dynamics, derived ecosystem services, and human well-being across space and time. These dynamics of change need to be understood if we are to anticipate change and respond to its consequence in order to address the goal of balancing human needs and conservation. The Sathyamangalam Tiger Reserve (STR) in Tamil Nadu, India, provides a relevant case to examine the above scenario. STR has rain-fed and irrigated agriculture and forest dependence as part of its SES. It is a PA with significant semi-arid regions located in a state ranking high in human development index and socio-economic reforms. STR was under limited state control for some decades until a few years ago and has undergone numerous changes in management regimes over the years. Given this scenario, my research draws from SES and ES theory to understand the response of LULC and ES to the interacting drivers. It further examines the implication of this change for specific tribal communities. I aim to address these questions using a mixed methods approach, mainly remote sensing and GIS, ecological measurements, interviews, and questionnaires. The specific objectives are a) to assess the influence of climatic variability and trends, and changing forest management regimes on forest and agriculture dynamics in the STR b) to examine the spatio-temporal patterns in specific provisioning ES relevant to tribal communities under changing climate and PA management c) to explore the response of selected tribal communities to above changes with respect to ES. This study using the case of a Tiger Reserve and the complex social-ecological system that it entails with large forest-agricultural zones aims to generate knowledge and insights that will have relevance for conservation and livelihoods.





Posters Abstracts

Dr. Prayag Siddalingappa, Wildlife Veterinarian, Ph.D Researcher KVASU-Wildlife Institute of India
Use of Commercial Perfumes in Human Wildlife Conflict Mitigation -A novel tool .

Mr. Beependra Singh, Ph.D Research Scholar, Birla Institute of Technology, Mesra, Ranchi, Jharkhand,
India Assessment of Ecosystem Health: A Case Study of Saranda forest, West Singhbhum District of Jharkhand

In recent time, Ecologists around the world are trying to understand and predict impact of climate change on ecosystem health. Extreme climatic events and human activities are the main reasons for the deterioration of ecosystem health. Productivity of ecosystem plays an important role on the availability and distribution of flora and fauna. Vegetation Health Index (VHI) is a function of climatic variability, topographic complexity, human disturbance, species type and interactions which need to be monitored in space and time. In this study, Moderate Resolution Imaging Spectrometer (MODIS) Enhanced Vegetation Index (EVI) at 16 days temporal resolution was used to derive VHI time series data from 2001 to 2017, to examine the condition of forest health (Vigor) for each individual year, the productivity was calculated by summing up the EVI which is considered to be proxy for vegetation health. Productivity for each year was normalized using all the years' data to derived annual relative VHI, which was then categorized into four classes. It was found that the years 2001, 2008 and 2016 were having the lowest productivity during the last 17 years. This might be due the combined influence of drought and low rainfall. High productivity years might be due to high rainfall and high temperature. The limiting effect of water availability on productivity and effect of rainfall & temperature need further study. The current study provides a quick mechanism for extracting information on spatio-temporal patterns of productivity and ecosystem health to policy makers for efficient ecosystem planning.





Posters Abstracts

Mr. DP Srivastava, Ph.D. Scholar, Wildlife Institute of India

Tigers in the urban landscapes of India? A biosocial conservation research study to assess the factors underlying tiger survival near urban landscape of Bhopal, Madhya Pradesh (proposed study)

Tiger numbers have increased in last years across all tiger habitat countries with the significant growth in India having a home to nearly 65% of all wild tigers in the world. Tiger numbers are gradually rising in India as a result of the focused conservation efforts taking place in various tiger reserves. In spite of this, nearly 26.5% of all tigers in India continue to stay outside protected areas. At the same time, economic development in urban India is also rapid. The rapid human development in urban areas and successful wildlife conservation in the region many times overlap and creates precarious situations for people and wildlife. While the International Tiger conservation forum and National Tiger Conservation Authority (NTCA) of India, advocates focusing on the integrated landscape of protected areas and human-dominated multi-use forests through co-existence approach with Tigers.

Some cities in India have accepted the presence of leopards and have been successful so far but can we extend the same to tiger? The situation in Bhopal offers an opportunity to examine the tiger in urban landscapes and also re-questions our current approach of promoting urban biodiversity and green cities development to conservation planning in urban environments. In the last five years, tigers are frequently sighted in the southern part of Bhopal, the capital city of Madhya Pradesh state of India. The city is part of a corridor forest of the Vindhya hills that connects Ratapani Wildlife Sanctuary. Tiger presence in urban landscapes is weighed-down with risks both to the tiger and people who live in the area. The presence of the tiger may instil fear and trigger panic which can jeopardise the co-existence approach of tiger conservation on a landscape level. So identifying the factors helping in coexistence is important for long-term conservation. If left unaddressed tigers moving through their natural corridors that pass through urban landscapes like Bhopal may eventually become vulnerable to human influences, and tiger conservation efforts may suffer.

Hence the research work based in the urban landscape of Bhopal will examine the case of rapidly developing and progressive Bhopal city in Madhya Pradesh and the several tigers that live around the city and develop an understanding of the factors that enable a large carnivore such as tigers to survive in an urban environment. The study will assess social aspects including the ability and willingness of people to live with the tiger and biological aspects such as insights into the adaptability or behavioural plasticity within tigers to live in urban areas, answering the main research question “Can tigers survive in urban landscapes of India?” The Bio-Social approach will be used to carry out research and tries to provide a scientific answer to the main research question.

The study will try to understand that how tigers are colonising in many areas around Bhopal city and how their potential habitats can be conserved with the green development of the city. Also, the Bhopal landscape plays an important platform which can connect the Central Indian tiger population and the only Western tiger population in the Ranthambore Tiger Reserve. The study will be one of first scientific feasibility assessment to understand the potential of conserving large carnivores such as Tigers near urban landscapes in India and managing city development to support wildlife conservation. This will allow government decision makers and conservation organisation to make informed decisions on what is realistic and what is not realistic to conserve in urban areas for conflict-free neighborhood and long-term conservation initiatives.





Posters Abstracts

Mr. Akshit Suthar, Assistant Ecologist, Gujarat Ecology Society

Assessment of Human-Leopard Conflict in human dominated landscape and mitigation measures: A Case Study from Surat District, Gujarat

Livestock depredation by leopards is one of the key conservation issues in landscapes with limited resources worldwide. Attacks on humans by leopards have been a serious current issue in South Gujarat, India. The present study has used the indirect indices like Census data, compensation given by forest department, rescue between 2011 and 2017 to ascertain conflict intensity in Surat district of South Gujarat. The data revealed presence of 43 individual of leopard in 2016. While, about 84 individuals of leopards were rescued during the period 2011 – 2017 and over 46.42% of total leopards rescued from Mandvi Taluka only. Leopards around human habitation were rescued more in winter season (39.28%), followed by monsoon (36.90%) and summer (23.80%). Out of the attacks on human being only 6 were reported fatal. The livestock depredation of 57 was reported because of easy and most preferred prey. The number of goat depredated was high (54%) as compared to other livestock animals. Using QGIS, the landscape, seasons and times of these attacks were mapped and analyzed. Hotspot areas, high conflict villages and leopard corridors were identified. Based on the landscape modeling it is suggested to conserve the Riparian habitat and more important the corridor of Tapi, Purna, Mindhola, Kim and Auranga rivers through afforestation programme. There is need to spread awareness among the local community on ecology of the leopards and the best practices that needs to be adopted to reduce the human–leopard conflict.

Mr. Hariprasad V M, Research Fellow, Azim Premji University

Ecological impacts and social realities due to night traffic regulation through Bandipur Tiger Reserve, India

The human encroachments in protected areas have escalated over the years and have degraded the natural environment, mainly due to the presence of linear infrastructure intrusions like roads and railway lines. Despite the declaration of forests and ecologically sensitive areas as wildlife sanctuaries and national parks for conserving at higher magnitude, the human infringement has not dwindled. Against this backdrop, the present study tries to find out the ecological and social aspects of night traffic and its regulation imposed in the Bandipur Tiger Reserve of Karnataka. As the Bandipur Tiger Reserve lie next to Tamil Nadu and Kerala state, the road closure at night has become an inter-state issue. The area attracted public attention after night traffic was regulated on the two national highways passing through the park from June 2009 onwards on ecological grounds. The major reasons cited for the night closure of the national highways were sound and light disturbances to nocturnal species, road kill, forest fragmentation and poaching. The night traffic regulation ruling by the High Court of Karnataka that upheld the National Wildlife Action Plan of 2002-2016 still continues in the area. The results reveal that even though the people in the nearby areas have incurred loss in business and difficulty in commutation due to regulation on road transport, the traffic ban does not have greater impact on the society as a whole.





Posters Abstracts

Dr. Mayank Verma & Mr. Satyadeep Nag, Researcher, State forest Research Institute Jabalpur (M.P.)
Scientific Green Development to Resolve the Problems of Pinch Point Barriers in Kanha-Pench Corridor Development is a basic character of evolution. However, if development activity is not nature friendly then its impact on life will be shown detrimental in the upcoming future of earth. We have found genetic evidences regarding a functional status of Kanha-Pench corridor. Demographic expansion is amplifying agriculture extension, over grazing, encroachment in forest land, illicit felling etc., these LULC practices deteriorates the habitat quality of landscape. Strategic planning is necessary at this juncture to mitigate the problems arise with development scenario. Kanha-Pench corridor is also facing disturbance creating by anthropogenic conditions such as biotic pressure, unsustainable harvesting of NWFPs, linear public infrastructure development. Pinch Point barriers were identified under the first step of scientific planning of KP corridor. We had performed Species Distribution Modeling (SDM) by using Maximum Entropy software (MaxEnt v.3.3.3 k) to identify Tiger Conservation Prioritization Area. Identified TCPUs areas were demarcated on georeferenced map. TCPUs are working as cluster of stepping stones to provide sub optimal conditions for tiger survival. Afterward, we find out least cost path between the prioritization units (TCPUs) by using path analysis tool in Arcmap 10.1. On the basis of GIS mapping and ground truthing of results, we became able to confined the highly sensitive sites, where least cost path(LCP) and road or rail network intercept each other. Forest edge, Village distance, village density and population variables were used for developing resistance layer for pinch Point barriers identification by using linkage mapper tools in ArcMap 10.1. These identified sensitive locations are now depicted in georeference map in current presenting poster to help the government policy makers for strategic conservation planning under green development management.

Ms. Priya Warekar, Project Officer (Wildlife), The Corbett Foundation
Backyard fencing for the protection of Tiger Habitat Fences are one of the effective ways to control animal movements, whether livestock or wildlife, and protect gardens and landscaping
The long-term conservation of tiger in the Kanha Tiger Reserve needs management and protection of its habitat in buffer zone, as for long-term conservation of tiger, it is crucial to maintain large intact habitat, but their habitat in buffer areas is increasingly under threat and being destroyed or fragmented from agricultural developments and other anthropogenic activities. A pilot project was implemented in a village named Sarasdol in Samnapur range of the Kanha Tiger Reserve. This project aimed to reduce the dependency of these villagers on the adjacent forested areas to protect the habitat for long-term conservation of tiger as well as other wildlife of the area. A reconnaissance survey was conducted in the village and it was found that that for fencing of 100 feet lawn needs about 500 tree saplings, which shows that the fencing on village level requires approx 52,500 saplings. Such an extensive cutting of tree saplings certainly resulted in degradation of forest. The project supported these villagers by providing fencing material to guard their lawn, which indirectly reduce their visit to forest for sapling collection. During the survey, meetings were held with the locals to discuss the feasibility of this project, and the respondents assured that the project will help in protecting the tiger habitat through this effort.





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SATPUDA

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