

# Rufford India Conference Bengaluru 2013

Date: 15 and 16 November, 2013

Venue: National Centre for Biological Sciences  
Bengaluru, India.



## **THE RUFFORD INDIA CONFERENCE, BENGALURU, 2013.**

The Rufford India Conference, Bengaluru was held between 15 and 16 November 2013 at the National Centre for Biological Sciences. The two day conference was jointly organised by Foundation for Ecological Research, Advocacy and Learning (FERAL), Pondicherry, National Centre for Biological Sciences (NCBS), Bengaluru and Researchers for Wildlife Conservation (RWC), Bengaluru with support from the Rufford Foundation. The Rufford Small Grants Program (RSGP) has played a crucial role in the field of nature conservation in the developing countries worldwide. It has supported over 290 research and conservation projects in India. The primary objective of this meeting was to explore different aspects of conservation and action research and building conservation capacity at local, regional, and global levels. It also provided an opportunity to the grant recipients to meet and interact. The grant recipients presented their work either as oral presentations or as posters.

**Dr. Ajith Kumar**, (Director, Postgraduate Program in Wildlife Biology and Conservation, NCBS, WCS-India Program) welcomed all the participants and the representatives of the RSGF. He stressed on the importance of the conference and the role played by RSGF in the careers of young researchers.

Apart from oral and poster presentations from grant recipients, the conference included talks by Dr. Krushnamegh Kunte, Dr. Kavita Isvaran, Mr. Nishant M.S., Dr. Samrat Mondol and Mr. Manish Chandi. Short workshops were conducted by Dr. H.N. Kumara, Mr. Vijay Mohan Raj, Mr. Balachandra Hedge, Dr. Ravinder Singh Bhalla, Mr. Srinivas Vaidyanathan and Dr. Arjun Sivasundar.

### **Invited Talks**

India being one of the countries with high biodiversity and human resource has very few long term monitoring programs like the ones seen in other countries like USA and the UK. This point was stressed by **Dr. Krushnamegh Kunte** (NCBS) in his talk titled “*Long term Biodiversity monitoring for ecological and conservation research in India*”. The need for long term data in making policy level changes and decisions was highlighted during the talk. In addition, he gave examples of the long term monitoring programs carried out by Drs. Peter Grant and Rosemary Grant (Princeton University) on Darwin’s finches in the Galapagos islands, Dr. John Hoogland (University of Maryland) and his 40 years of monitoring prairie dog populations in North

America and Dr. Daniel Jenzen (University of Pennsylvania), who has been working on skipper butterflies in South America for over 30 years. He pointed out that findings from such long term projects can change one's understanding of the biodiversity around us and how citizen science programs can help bridge the gap. He hopes, the work of these scientists inspire young Indian scientists in initiating long term biodiversity monitoring projects.

**Dr. Kavita Isvaran** (Indian Institute of Science, Bengaluru), delivered a talk titled “ *The links between behavioural flexibility and ecology: blackbuck within and across populations*” where she discussed the findings from her long term study and monitoring of blackbuck populations in Velavader National Park, Gujarat and Tal Chappar Wildlife Sanctuary, Rajasthan. Isvaran spoke about the unique and the rare mating system called lekking exhibited by the blackbuck populations, where many males aggregate defending small territories in order to attract and mate with females. She also discussed on how not only the ecology can have an effect on the behaviour of the blackbuck but it can also happen vice versa with the behaviour of the blackbuck affecting the ecology of the place, as discovered in one of her studies. The blackbuck males facilitate the dispersal of the seeds of the invasive plant *Prosopis juliflora* thus, accelerating the process of converting grasslands into woodlands reducing the area of the grassland habitat that is preferred by the blackbuck.

**Mr. Nishant M.S.** (National Institute of Advanced Studies, Bengaluru) in his talk on the Asian elephants and their conflict with humans discussed the decision making behaviour in elephants. In his study on human –elephant conflict in Bannerghatta National Park, Bengaluru, Nishant experimented on using his understanding of elephant behaviour in reducing conflict, especially crop raiding in the villages adjoining the national park.

**Dr. Samrat Mondol** (Centre for Cellular and Molecular Platforms, Bengaluru), discussed his recent work relating to the hybridization between the two sub-species of African elephants, the forest elephant and the savannah elephant. Mondol carried out a genetic study by sampling DNA from ivory seized by the customs officials to examine and assign the areas from which the elephant was poached. In the process of this study he discovered that there existed hybridization between the forest elephant and the savannah elephants in some areas of central Africa. A more detailed investigation revealed that these hybrid elephant individuals occurred in areas that have been in conflict or war zones in the past decade or more. This talk highlighted the impact, war had had on the social and population structure of the African elephants.

**Mr. Manish Chandi** (Nature Conservation Foundation, Mysuru) spoke on involving participation of local communities to solve and achieve long term conservation goals instead of considering them as a problem to be dealt with. Drawing from his experiences of working in the Andaman and Nicobar islands, Chandi, discussed the importance of self-criticism, openness to new ideas, sharing knowledge and experiences and relationship building with the local communities as the key to conserve wildlife in human dominated landscapes.

### **Workshops**

**Dr. H.N. Kumara** (Salim Ali Centre for Ornithology and Natural History), **Mr. Vijay Mohan Raj** (IFS, Karnataka Forest Department) and **Mr. Balachandra Hedge** (Sahyadri Wildlife and Forest. Conservation Trust, Nilkund) conducted a workshop titled “*Communicating research findings to decision/policy makers effectively and accurately*”. The aim of the workshop was to help young conservation biologists understand the different ways in which a research project can help influence management and policy level decisions. The resource persons shared with the participants some of their experiences.

Kumara spoke on the importance of publishing and communicating one’s study results to stakeholders and politicians as it plays a major role in making decisions and changes at the policy level. He further explained this in detail using case studies. Kumara’s extensive wolf surveys in Karnataka lead to setting up of a Hyena-Wolf Sanctuary in Chincholi, Gulbarga district. His study on the Lion Tail Macaque (LTM) in Uttara Kannada district of Karnataka revealed that collection of *Garcinia gummi-gutta*, an important source of food for the LTM, is one of the major threats to the species. A report based on this study, led the forest department to re-assess the population and conservation status of LTMs in the area.

Mr. Vijay Mohan Raj, shared with the participants, the perception most forest department officials have on researchers and their work and Mr. Balachandra Hedge spoke on the necessity of advocacy among the local people for conservation of wildlife.

**Dr. Ravinder S. Bhalla** (FERAL), Mr. Srinivas Vaidyanathan (FERAL) and Arjun Sivasundar (NCBS) conducted a workshop titled “*Goal oriented project planning*”, where he spoke about the importance of identifying the objectives and the stake holders before designing a research project. Participants were split into two teams with an exercise on log-frame analysis of a research project addressing human –nature conflict issues.

## **Oral presentations by grant recipients**

**Juliet Vanitarani** presented the results of her study on the conservation of bats in Agesthiyar Hill ranges of Western Ghats in Tamil Nadu. Her study has helped in the discovery of a new population of the Salim Ali fruit bat (*Latidens salimali*), named after the legendary ornithologist Salim Ali. The Indian Wildlife (Protection) Act, 1972, however has categorised fruit bats as vermin due to the damage they cause to fruit orchards she says. Vanitarani spoke about the threats many bat species face due to loss of habitat and anthropogenic disturbances. She also mentioned the efforts taken by her team to create awareness for bat conservation among people living inside and around the study area.

**Arun Kanagavel** shared the results of his project on two endangered turtle species, the Cochin Forest Cane Turtle (*Vijayachelys silvatica*) and the Travancore Tortoise (*Indotestudo travancorica*) in the forests of Western Ghats. With their distribution restricted to the states of Karnataka, Kerala and Tamil Nadu, these species are rare and hard to encounter. The Cochin Forest Cane Turtle is protected under the Indian Wildlife Protection Act 1972 categorised as a Schedule 1 species provided with maximum protection. The Travancore Tortoise which is relatively more abundant than the forest cane turtle is categorised under Schedule 4. Kanagavel's study highlights the threats faced by these two species as they often poached by the indigenous tribes for consumption and are also affected by forests fires that frequent the area during the dry summer months. He also mentioned that even though the two species are poached in very high numbers when compared to other taxa, complaints and cases filed against poaching are mostly for larger animal species.

**Vinayaka Kanivebagilu** presented his study on the diversity and distribution of microlichens in Western Ghats. There are over 1130 species of microlichens that are known to be endemic to Western Ghats. Lichens are very sensitive to climate change and their surroundings and hence the forests they are found in must be conserved, said Vinayaka. Microlichens grow on varied types of substrates and during the study they were found to be more in number in areas like in the semi-evergreen forests than compared to the deciduous forest patches.

**Tarun Nair** presented his ongoing study on the unique crocodylian “Gharial (*Gavialis gangeticus*)” in the Chambal River and its tributaries the Kosi, Sone, Ken and Gandak. The gharial populations in Chambal, Corbett National Park and Katarniagha Wildlife Sanctuary on the Nepal border are the strong holds for the gharials and their populations are being monitored.

However their status outside these PAs is not known. Nair, conducted field and questionnaire based surveys to assess the population of gharials in the Ken and Sone rivers where captive bred gharials have been released previously. The part of Ken River where the survey was carried out has been declared as a gharial sanctuary. However, Nair found during his surveys that the area dominated by rocky terrain and presence of very few sandy stretches was not ideal for the gharials. In addition, the many barrages built on the river restrict the water flow into the river. Based on the results of his study, Nair recommends no further reintroduction of gharials in the area but instead suggests the park authorities concentrate on protecting the otter and mahseer species that are found in the area. The Sone River was found to be ideal for the gharials unlike the Ken and signs of the presence of an active breeding population of gharials were discovered. However, this population too faces threats from sand mining and low water flow. Nair will be using his Rufford grants to conduct surveys in other tributaries of Chambal. He hopes this study helps in identifying more gharial populations and bringing about policy level changes related to reintroduction and maintaining a minimum level of water flow in all the rivers.

**Bandana Aul** conducted extensive surveys in the Andaman and Nicobar Islands of India to know the different kinds of bat species present in the area. In the process of this survey the Nicobar flying fox (*Pteropus faunulus*), an endemic to central Nicobar island group was rediscovered after nearly 100 years. In addition to this, it was also discovered that though leaf nose bats were common to both the Andaman and Nicobar group of Islands, the horseshoe bats were exclusively found in the Andaman Islands. She highlighted the threats bats face due to hunting by the indigenous tribes, conversion of forests into monoculture plantations and lack of legal protection.

**Cheryl Nath** presented her study titled” *Evaluating the potential for integrating conservation with farming of native trees on private lands in the Western Ghats* “, where she discussed the strategies that involve rural communities, farmers and coffee planters in biodiversity conservation by encouraging them to grow native species of trees on their properties.

**Tarantovich Maxim** spoke about the conservation status and the threats faced by the European roller (*Coracias garrulus*) in Belarus, due to habitat loss and loss of mature forest patches required for nesting. He said that the loss of old forest areas and high use of pesticides in agriculture had resulted in a shortage of nesting areas for the bird (cavity nesters) and has lead to the reduction of food resources required by the nestlings and has also increased predation by

martens. As a part of the study, nest boxes and plastic bands around trees were installed to reduce predation of nestlings by marten and this has been successful in increasing the breeding success of the European roller population in the area by 75%. Maxim and his team have also been successful in getting the area declared as a European Roller reserve zone.

**Prerna Agarwal** shared her experience and results of her study on the flora of the Kas plateaus that are characteristic to the northern Western Ghats in Maharashtra. Each year the Kas plateaus witnesses mass flowering of many *Impatiens* spp. in the months of June-July, just after the monsoon rains. These blooms are short lived and attract over 350,000 tourists during their peak blooming season. Agarwal, assessed the impact of unregulated tourism in the area by setting up experimental plots where she tested the impact of trampling on the plants. She found that ephemeral flush vegetation was the most affected. Grass species in some plots sprouted back but the non-grass species did not. Agarwal along with the forest department officials is now working on setting guidelines for visitors to abide to. She also presented the initiatives she has taken up in collaboration with the forest department for waste management in the area and for developing an eco-tourism setup, as a means of income generation among the locals in the villages neighbouring the Kas plateau. She also has conducted workshops to create awareness both among the locals and the visitors on the uniqueness of the area.

**Abhishek Harihar** presented his work on tiger distribution in the protected areas of Rajaji and Corbett National Parks. India, one of the 13 Tiger range countries with 70% of the world's tiger population aims to double its tiger numbers by 2022 says Abhishek. His study aimed to test whether landscape connectivity existed across the Terai landscape which has around 14 protected areas. For convenience, Abhishek divided his study area into two blocks which had very poor connectivity between them. The results from his surveys for both presence of tigers and its prey, indicate that protected areas with no human settlements within them supported higher tiger numbers than the ones with human settlements and anthropogenic activities within them. Also by extrapolating this result, he has been able to predict the carrying capacity of the tiger habitats. He has compared the number of tigers that are present in the two blocks using camera trap data. This systematic approach of setting realistic population targets and prioritizing spatially-explicit recovery strategies would aid in developing effective landscape conservation plans towards achieving global tiger conservation targets.

**Madhuri Ramesh** presented her study on the spiny tail lizards that inhabit the Thar Desert in

Rajasthan. Madhuri's study shows that these lizards that burrow in the sand dunes prefer areas with vegetation cover and are found in high densities in Jaisalmer district. The irrigation and habitat management projects that aim to green the desert habitat pose a great threat to this desert adapted species says Madhuri.

**Allwin Jesudasan** spoke about his work assessing Integrated Conservation Development Projects (ICDP) in the Tiger Reserves. ICDP's were first introduced in the 1990's and with their implementation in Kalakkad Mundanthurai Tiger Reserve (KMTR) and Periyar Tiger Reserve considered being successful, it was proposed that they be implemented in the other tiger reserves across the country as well. ICDP's aim to reduce the dependency of the communities living in and around tiger reserves by providing them with low interest loans and creating a separate bio reserves outside the protected areas. Attitude and perception surveys conducted by Allwin, suggest that the attitude of the communities towards the protected areas and its wildlife have not changed even though individually people have been benefitted. His data also indicates that though the ICDP have been successful in achieving their conservation goals to some extent by providing financial help to the communities, it has failed in many other aspects like in creating alternate biomass for community consumption, influencing the household incomes of the families and absence of community participation.

**Tara Lawrence** presented her study that focussed on assessing the ecological status and management perspectives of coastal fisheries on the east coast of India. She surveyed ~ 100 km along the coastline of Pondicherry and Villupuram and Cuddalore districts in Tamil Nadu for a five year period with data collected from over 8000 boats and by interviewing the fishermen. Her study results on species diversity, richness and abundance indicates a decline and also highlights the need to update the current management strategies to emphasize on conserving and managing the existing resource base. She also calls for increased participation of the stakeholders in making policy level decisions.

**Nisarg Prakash** presented the preliminary results of his on-going study on otters in the Cauvery River. The Cauvery River is known to have a good population of both the small clawed otter (*Aonyx cinerea*) and the smooth coated otter (*Lutrogale perspicillata*). However their status outside the protected river stretches is ambiguous. Nisarg's occupancy surveys suggest that the small clawed otters which prefer small streams and feed on crustaceans are restricted in their distribution to shallower and narrower stretches of the river near its origin in Kodagu district in



Western Ghats, whereas the smooth coated otters that predominately feed on fish were found to occur in reservoirs and in areas with high water flow along the Cauvery river. His interviews with fishermen in the area suggest a decline in the river's fish stock and increased conflict with otters, as they damage fishing nets. Though poaching of otters for their pelts is still a concern, dynamite fishing in the area poses a serious threat to the otters says Nisarg. Nisarg also plans to initiate a monitoring system involving fishermen, to report otter sightings and conflict incidents.

**Rajat Nayak** spoke about his study at the Great Himalayan National Park, where he looked at whether restrictions on cattle grazing in the area had resulted in bringing about changes in the plant community in terms of species richness and abundance. The results of his study show that, grazing intensity determines the abundance of the plant species in the area. The absence of grazing in some areas has resulted in low densities of annual plants with an increase in the number of perennial plants growing in the area whereas, over grazing in areas outside the PA had made the ground completely bare. Nayak suggests rotational grazing in pastures outside the national park to avoid over-grazing of a single patch and to develop mechanisms which simulate the same effect like that of traditional grazing within the national park to stall the density increase of perennial plants over the annuals.

**Mayuresh Gangal** in his talk titled "*Assessing impact of fisheries on target fish populations of the southern coast of Maharashtra*" discussed the declining trend in the marine fish population and the effects of using different fishing methods like drag netting and trawling on them. By assessing fish catch and estimating the age structure of commonly caught fish species, Gangal and his team have discovered that species like the False Trevally (*Lactarius lactarius*), many not follow the general assumption that fish along the western coast of India breed in the monsoon, a theory based on which the current restrictions on fishing are applied. In addition, the results of the study also suggests that drag netting, a traditional method of fishing, considered to be more sustainable, caught higher proportion of juveniles than compared to that from trawling, which is considered as an unsustainable fishing method. Apart from highlighting the lacunae in current understanding and management of fisheries in the region, the study stressed on the need for long term demographic monitoring of coastal fish species.

### **Poster Presentations**

M. O. Anand, Prakash Bhandari, Mahima Jaini, Tara Lawrence (Gayathri Selvaraj and Kumaran S.), Divya Panicker and Navendu Page presented posters describing their work.



**A VERY HAPPY GROUP:** participants and invited speakers



**FOOD FOR THOUGHT:** Participants at one of the workshops



**Participants at one of the plenary talks**



**Tarantovich Maxim, a participant from Belarus presenting his work on conservation of European Roller.**

## Appendix I

### RUFFORD INDIA CONFERENCE, BENGALURU, 2013: Conference Schedule

Schedule: Day one. November 15, 2013				
SESSION	EVENT	SPEAKER/ RESOURCE PERSONS	TITLE	Time
<i>Morning session</i>	<b>REGISTRATION</b>			08.30 – 09.15
	Welcome speech	Dr. Ajith Kumar	-	09.15 – 09.30
	Plenary talk Speaker:	Dr. Krushnamegh Kunte	Long-term Biodiversity Monitoring for Ecological and Conservation Research in India.	09.30 – 10.30
	Oral presentations	Juliet Vanitharani	Conservation status of bats in the Agesthiyar Hill Range in the Western Ghats, India, with particular reference to Salim Ali's fruit bat ( <i>Latidens salimali</i> ).	10.30 – 10.45
		Arun Kanagavel	To eat or not to: The case of two threatened chelonians endemic to the Western Ghats, India.	10.45 – 11.00
		Vinayak Kanivebagilu	Diversity & Distribution of Tropical Macrolichens in Shettihalli Wildlife Sanctuary, Western Ghats, Southern India.	11.00 – 11.15
		Tarun Nair	Assessing the conservation status of the Gharial in the Ken and Son Rivers.	11.15 – 11.30
	<b>TEA BREAK</b>			11.30 – 11.45
	Oral presentations	Bandana Aul	Community participation: Key to effective long term conservation: Case study in Kamorta Island, Nicobar Group, India.	11.45 – 12.00
		Cheryl Nath	Evaluating the potential for integrating conservation with farming of native trees on private lands in the Western Ghats.	12.00 – 12.15
		Tarantovich Maxim	Revelation of viability and furtherance of conditions which will help population and range expansion of Roller in Belarus.	12.15 – 12.30
		Prerna Agarwal	Assessing the Ecological Impact of Tourism and Developing Ecotourism through Stakeholder Participation for Conservation of Kas Plateau, Maharashtra, India.	12.30 – 12.45
	<b>LUNCH</b>			12.45 – 14.00

<i>Post-lunch Session</i>	Poster presentations	M.O. Anand	Understanding the Drivers of Losses in Carbon Storage Ecosystem Services Provided by Tropical Forest Fragments in India's Western Ghats.	14.00 – 15.00
		Prakash Bhandari	Sustainable Utilisation based Conservation of NTFPs through Community Institutions in Chamba HP.	
		Mahima Jaini	Socio-ecological surveys and community-based catch monitoring of Lakshadweep's live-bait pole and line tuna fishery.	
		Tara Lawrence, Gayathri Selvaraj and Kumaran S.	Implications of gear selectivity on catch diversity, trophic structure and size in fisheries along a part of the Coromandel Coast	
		Divya Panicker	Developing with dolphins: Behavioural variations in Indo-pacific humpback dolphins across a major, minor and intermediate port along the southwest coast of India	
		Navendu Page	Assessing the conservation status of endemic woody plants of the Western Ghats.	
<b>TEA BREAK</b>				15.00 – 15.15
Workshop	Dr. H.N. Kumara, Mr. Balachandra Hegde and Mr. Vijay Mohan Raj	Communicating research findings to decision makers/policy makers effectively and accurately.	15.15 – 17.00	
Popular talk	Nishant M. S.	New Wine in an Old Bottle: A Behavioral Approach to Studying Human-Elephant Conflict in India	17.00 – 17.30	
<b>DINNER</b>				19.00 – 21.00

<b>Schedule: Day two. November 16, 2013</b>				
SESSION	EVENT	SPEAKER/ RESOURCE PERSONS	TITLE	Time
<i>Morning session</i>	<b>REGISTRATION</b>			08.30 – 09.30
	Plenary talk	Dr. Kavita Isvaran	The links between behavioural flexibility and ecology: blackbuck within and across populations	09.30 – 10.30
	Oral Presentations	Abhishek Harihar	Identifying realistic recovery targets and conservation actions for tigers in a human-dominated landscape using spatially-explicit densities of wild prey and their determinants.	10.30 – 10.45
		Madhuri Ramesh	Status and distribution of the Indian spiny-tailed lizard <i>Uromastyx hardwickii</i> , in the Thar desert.	10.45 – 11.00
		Allwin Jesudasan	Can Integrated Conservation Development Projects find win-win solutions? Evidence from a Tiger Reserve in India.	11.00 – 11.15
		Tara Lawrence	Ecological status and management perspectives of coastal fisheries of Pondicherry, Cuddalore and Villupuram.	11.15 – 11.30
	<b>TEA BREAK</b>			11.30 – 11.45
	Oral Presentations	Nisarg Prakash	Monitoring Otter Populations and Combating Poaching through Stakeholder Participation.	11.45 – 12.00
		Rajat Nayak	Protection from grazing changes vegetation composition in the western Himalayas.	12.00 – 12.15
		Mayuresh Gangal	Assessing impact of fisheries on target fish populations of the southern coast of Maharashtra.	12.15 – 12.30
	Popular Talk	Samrat Mondol	New insights into population structure and hybridization of forest and savanna African elephants.	12.30 – 13.00
	<b>LUNCH</b>			
<i>Post-lunch session</i>	Workshop	Dr. Arjun Sivasundar and Dr. R.S. Bhalla	<i>Goal oriented project planning</i>	14.00 – 15.00
	<b>TEA BREAK</b>			15.00 – 15.15
	Workshop <i>..Continued</i>	Dr. Arjun Sivasundar and Dr. R.S. Bhalla	<i>Goal oriented project planning</i>	15.15 – 16.15
	Popular talk	Manish Chandi	Effecting conservation through engagement and involvement	16.15 – 16.45
	Concluding remarks	Ravinder Singh Bhalla		16.45 – 17.00

## Appendix II

### ABSTRACTS

#### Oral presentations

#### **Conservation status of bats in the Agesthiyar Hill Range in the Western Ghats, India, with particular reference to Salim Ali's fruit bat (*Latidens salimali*).**

Juliet Vanitharani

Although Tamil Nadu has a diverse bat fauna, bats rarely feature in conservation protocols in the region. This is partly due to more charismatic species often taking priority, and a lack of knowledge regarding the importance of bat populations in the restoration and enrichment of ecosystems. Both fruit and insect eating bats provide a raft of ecosystem services such as pollination, seed dispersal and insect control; important factors in both forest and agricultural regions. Protected areas (PA's) are often bordered by agricultural land and as such, robust bat populations in PA's would also benefit local agriculture, both small scale and commercial. However, a lack of knowledge often sees bats regarded as pests by farmers and fruit bats are listed as 'Vermin' by the Indian government. This poses a threat to local populations of all bat species.

Through the grant the first survey on the bats of the Agesthiyar Hill Range was established (2000). Agesthiyamali biosphere reserve is situated within an area of outstanding biodiversity interest – WWF Global Ecoregion No 20: 'South Western Ghats Moist Forests.' Now progressing the study as well as conservation programmes north up to Nilgiri Biosphere reserve with the special aim on bat diversity survey through bat acoustics. With the impact assessment data made the status of Salim Ali's fruit bat (*Critically Endangered Threatened bat IUCN Red List Criteria Version 3.1*) as a schedule I species under Indian wildlife Protection Act 1972 (*Revision made by Ministry of Environment and Forest on September 30, 2002*). *Latidens salimalii* is endemic to South India and has only recently (February, 2002) been discovered by the author in the Agasthiyamalai hill range. Identified some of the cave roosts and suggested Tamil Nadu Forest Department (*Author being the present State Biodiversity Board Member*) as key sites for bat conservation within the hill range. Project is still going on through assessing, the existing threats and promotes the concept of bat conservation, emphasising the role of bats as keystone species within the ecosystem. Creating awareness through workshops and media to

local tribes, public, foot hill area students and policy makers with the impact assessment data on bats as key stone species and also the best bio-indicators of the ecosystem.

### **To eat or not to: The case of two threatened chelonians endemic to the Western Ghats, India.**

Arun Kanagavel

The Cochin Forest Cane Turtle (*Vijayachelys silvatica*) and Travancore Tortoise (*Indotestudo travancorica*) are the two chelonians range-restricted to the southern Western Ghats in India, which are listed as Endangered and Vulnerable respectively, in the IUCN Redlist. With support from the Rufford Foundation the project “Assessing the Population and Threats to Forest-Dwelling Chelonians in the Southern Western Ghats” was undertaken which used a combination of field and interview surveys. Three live *V. silvatica* and 38 *I. travancorica* were encountered during the field surveys and had an overall density of 0.006 and 0.03 individuals per hectare. Nine carapaces were found: seven the result of human consumption; one trapped in a pit; and another consumed by a wild animal. In addition to field surveys, household surveys in 26 indigenous and non-indigenous human settlements resulted in the observation of one *V. silvatica* and 38 *I. travancorica* including a carapace. Roads were surveyed to assess the threat they posed to chelonians, resulting in the observation of two *I. travancorica* road kills.

From the local ecological knowledge surveys we determined the status, threats and consumption of the two chelonians. Fire was the major perceived threat to these species, followed by human consumption. Chelonian consumption was existent among both indigenous and non-indigenous communities, but was higher among the former. Indigenous communities had been historically utilizing these species for their protein requirements, which also forms a part of their culture and tradition. *Indotestudo travancorica* was exploited to a larger extent than *Vijayachelys silvatica*. Both the species were used as a cure for piles and asthma, to increase body strength and were largely captured during collection of minor forest produce and fire management activities. These chelonians were also sold to local hotels and served to customers known on a personal basis with minimal transfer to urban areas.

Conservation action needs to be prioritised towards *I. travancorica*, by upgrading its IUCN threat status. The aspect of chelonian consumption would need to be discussed by key



stakeholders to arrive at a consensus-driven species conservation plan making sure the traditional rights of the indigenous communities are retained.

### **Diversity & Distribution of Tropical Macrolichens in Shettihalli Wildlife Sanctuary, Western Ghats, Southern India.**

Vinayak Kanivebagilu

A total of 58 species of lichens were documented from the present study area, which is located between 14° 05' N to 75° 19' E longitude with wide range of ecosystem diversity at Shettihalli wildlife sanctuary, Shimoga district of Karnataka, India. We surveyed a total area of 396 sq km which yields 19 genera of lichens from 12 families. Some important Lichen species of the areas are *Ramalina spp.*, *Usnea spp.*, *Heteroderma spp.*, *Parmotrema spp.* etc. Corticolous lichens were found to be dominated in abundance, represented by 86.2%. Foliose lichen forms were represented by 44 species and fruticose by 14 species. The present investigations showed that the deciduous forests support a good macrolichen community's diversity then the semi-evergreen forests in nearby area. The study also highlights the record of two new species to Karnataka. They are *Usnea picta (J.Steiner) Mot.* *Parmotrema praesorediosum (Nyl.) Hale.* An interesting observation made in the area is that fruticose lichens were restricted to branches of the tree and main trunk was dominated by foliose lichens. Important host trees which support the growth and distribution of lichens in the area are *Tectona grandis*, *Terminalia spp.*, *Adina cordifolia*, *Hopea spp.*, and *Xylia xylocarpa*.

### **Assessing the conservation status of the Gharial in the Ken and Son Rivers.**

Tarun Nair

The gharial populations in Chambal, Corbett National Park and Katarniagha Wildlife Sanctuary on the Nepal border are the strong holds for the gharials and their populations are being monitored. However their status outside these PAs is not known. We conducted field and questionnaire based surveys to assess the population of gharials in the Ken and Sone rivers where captive bred gharials have been released previously. The part of Ken River where the survey was carried out has been declared as a gharial sanctuary. However, I found that the area was dominated by rocky terrain and very few sandy stretches were available, which is was not ideal for the gharials. In addition, the many barrages built on the river restrict the water flow into

the river. Based on the results, I recommend no further reintroduction of gharials in the area but instead the park authorities should concentrate on protecting the otter and mahseer species that are found in the area. The Sone River was found to be ideal for the gharials unlike the Ken and signs of the presence of an active breeding population of gharials were discovered. However, this population too faces threats from sand mining and low water flow. I will be using the Rufford grants to conduct surveys in other tributaries of Chambal. This study will help in identifying more gharial populations and bringing about policy level changes related to reintroduction and maintaining a minimum level of water flow in all the rivers.

**Community participation: Key to effective long term conservation: Case study in Kamorta Island, Nicobar Group, India.**

Bandana Aul

The Nicobar flying fox (*Pteropus faunulus*) is an endemic species of flying fox, restricted only to the Central Nicobar Group of Island. It is the only solitary roosting Pteropus in India. Prior to our survey in 2002-2005 the species was recorded from Kamorta Island and was originally described from Car Nicobar Island (Type locality) in 1912 by G S Miller. Today it is locally extinct from its type locality primarily due to hunting and habitat loss. The inclusion of the species on paper in a higher schedule under the W (P) A, 1972 wouldn't be enough to save this rare and threatened species as the same act under sec 56 impart special hunting rights to the indigenous people of the Nicobar Islands. We initiated the first ever community participation to include the hunting communities as well as village heads to protect the species foraging areas and ban hunting in the same. Our effort took shape when a voluntary ban was imposed by the village heads on Kamorta Island. The same endeavour needs to be spread all through the range of the species. Further ecological studies are being initiated to determine habitat requirements of this rare species.

**Evaluating the potential for integrating conservation with farming of native trees on private lands in the Western Ghats.**

Cheryl Nath

Biodiversity conservation often is viewed as an alien concept by rural stakeholders in the Western Ghats, whose daily lives are immersed in biodiverse surroundings. Unpredictable rainfall and drought, attacks by wild animals, failing crop yields or prices, and pest and disease

impacts are the primary concerns of rural agriculture-based societies, which increasingly force them to favour the intensive monocultural practices promoted by prevailing market forces and economic policies. Survival and development concerns thus precede conservation in rural areas. Although biodiversity loss needs to be reduced to the extent possible in the Western Ghats, it is becoming apparent that top-down protectionist conservation policies promoted in the 1980s and 90s may no longer be effective in the modern context.

We therefore explore alternative strategies for conservation that account for existing market forces and realities, in order to enable rural agrarian communities to promote biodiversity conservation voluntarily, while addressing their livelihood concerns. The presentation will focus on the multiple roles of trees in providing raw materials for rural life, and assess whether local people can sustainably access and benefit from native tree resources economically without depleting this renewable resource base. The role and limitations of existing Government policies are also examined in the interest of enabling rural communities to participate as conservation partners.

### **Revelation of viability and furtherance of conditions which will help population and range expansion of Roller in Belarus.**

Tarantovich Maxim

The Roller (*Coracias garrulus*) was rather numerous and common species in Belarus till the 1970's. Its number was estimated from 10 till 30 thousand pairs. The rapid, almost catastrophic decrease of the Roller numbers started in early 1970's. Cutting down of old forests, deforestation and wide use of insecticides in agriculture were the main reasons of population decline for this species. The present population of the Roller in Belarus is 30-50 pairs.

Census works in potential breeding sites of the Roller was carried out in breeding season 2012 and 2013. As a result 9 breeding pairs of the Roller were found. Nests of Rollers were placed in holes of pine (*Pinus sylvestris*) (n=6), oak (*Quercus robur*) (n=2) and one case of occupation of nest boxes installed specially for Rollers was noted. All the trees with Rollers nest hollows have been protected by plastic rings against Marten (*Martes martes*). The nest-hollows were mechanically cleaned and the data of chicks' depredation were collected. There were no cases of predation in the protected hollows and 100% of hatched chicks successfully flew from hollows. The breeding success was 75.0% (n=9) in breeding season 2012 and 2013. This is significantly

higher values of breeding success in the previous 5 years of observation, which was 52.7% (n=11). Only the size of clutches and the number of fertilized eggs were limiting factors of the breeding success during the 2 breeding seasons. The Roller chicks (n=23) were ringed with metal and colored plastic rings.

Belarus forestry enterprises and birdwatchers received information about the Roller in Belarus, as well as how to make and where to put the nest boxes for this species.

Regional Executive Committee has decided to create local reserve “Gronovo” for protecting nesting area for the Roller.

### **Assessing the Ecological Impact of Tourism and Developing Ecotourism through Stakeholder Participation for Conservation of Kas Plateau, Maharashtra, India.**

Prerna Agarwal

Declared as a World Natural Heritage Site (UNESCO 2012), and popularly called as the ‘Valley of flowers of the Sahyadris’- Kaas plateau is currently facing a severe threat from mass and unregulated tourism. This rocky plateau, situated in Satara district of Maharashtra in the northern Western Ghats, witnesses mass-blooming of flowers between September-October every year. Wide media coverage of the mass blooming phenomenon, proximity to mega-cities such as Mumbai and Pune, and easy accessibility has made Kaas a popular tourist attraction. Visitor activities inadvertently affect the habitat, some of which include plucking of flowers, high levels of vegetation trampling, and littering. The present study was undertaken to understand the impacts of tourist activities on the plateau, assess stakeholder opinions and develop an ecologically-friendly way of tourism on Kaas plateau. The study focused at three levels of assessments- ecological, social, and management. Quantitative ecological surveys included vegetation plots in trampled and non-trampled sites to assess the impact of tourist trampling. Stakeholder interviews, tourist density mapping, solid waste quantification, capacity building workshops for locals and forest personnel, and awareness drives were part of the social and management objectives. The results for each of the objectives will be presented. The information collected through this pilot study will be useful to prepare guidelines for an ecotourism model for Kaas plateau.

## **Identifying realistic recovery targets and conservation actions for tigers in a human-dominated landscape using spatially-explicit densities of wild prey and their determinants.**

Abhishek Harihar

Setting realistic population targets and identifying actions for site and landscape-level recovery plans are critical for achieving the global target of doubling wild-tiger numbers by 2022. Here, I estimate the spatially-explicit densities of wild ungulate prey across a gradient of disturbances in two disjunct tiger habitat blocks (THBs) covering 5,212 km<sup>2</sup>, to evaluate landscape-wide conditions for tigers and identify opportunities and specific actions for recovery. Data generated from 96 line transects in 15 systematically selected geographic cells (166 km<sup>2</sup>) was used to estimate spatially-explicit densities of six wild ungulate prey species at a fine scale (1km<sup>2</sup>). Employing density surface models that accounted for imperfect detection and covariates influencing species abundance, I derived species-specific estimates within three major forest-land management categories (inviolate protected areas (PA), PAs with settlements and multiple-use forests). By scaling estimated prey densities using an established relationship, I predicted the carrying capacity for tigers within each THB. Spatially-explicit densities of the six wild ungulates were governed by species-specific responses to natural-habitat and anthropogenic covariates. Inviolate PAs supported the highest densities compared to PAs with settlements and multiple-use forests, and specifically benefited the principal tiger prey species (chital *Axis axis* and sambar *Rusa unicolor*). PAs, where resettlement of pastoralist Gujjars is underway, represent potential prey and tiger recovery sites. Although managing prey in multiple-use forests is challenging, increased emphasis on protection is required as these areas connect existing breeding cores. Finally, based on the estimated prey densities, I recommend a realistic population target of 82 (62-106) and 299 (225-377) tigers in THB I and THB II, respectively. This systematic approach of setting realistic population targets and prioritizing spatially-explicit recovery strategies would aid in developing effective landscape conservation plans towards achieving global tiger conservation targets.

## **Status and distribution of the Indian spiny-tailed lizard *Uromastyx hardwickii*, in the Thar desert**

Madhuri Ramesh

Uromastyx lizards are a herbivorous group restricted to the hot deserts of the Old World. Of these, the Indian spiny-tailed lizard *Uromastyx hardwickii* is found in the Great Indian Desert shared by India and Pakistan. Though listed as a threatened species in need of protection, there have been no systematic surveys to assess their status and the most detailed account of their natural history is about a century old. Therefore, I undertook a 6-months' survey of the Thar Desert, covering 5 districts, to locate colonies and estimate abundance of *U. hardwickii*, identify habitat associations and major threats. Jaisalmer district had the largest number of colonies and highest densities – lizards were found mostly on thalar plains with very short herb/grass cover. Most of the colonies are found outside the Desert National Park and hence major threats are land use changes driven by irrigated agriculture and ecotourism.

## **Can Integrated Conservation Development Projects find win-win solutions? Evidence from a Tiger Reserve in India.**

Allwin Jesudasan

Integrating conservation and development goals has been a dominant strategy in the past decade to achieve win-win solutions. Despite the limited success of such projects, they continue to be implemented around the world in different forms. One such Integrated Conservation and Development Program (ICDP) was launched in Kalakad Mundanthurai Tiger Reserve (KMTR), India in 1994. The program intended to reduce forest dependency of villagers by giving low interest loans to people directly dependant on forests and by creating biomass reserves outside the Protected Area (PA). We evaluated the KMTR-ICDP with a multi-disciplinary approach to learn from its experience and to aid conservation planners take informed decisions on future ICDPs. Results from a long term fuel-wood collectors' census, supported by remote sensing show that there has been increase in forest cover and a reduction in dependence of villagers on forests since the ICDP. Further, propensity score matching analysis suggests that, if the ICDP had not given loans, the household income of the beneficiaries would not have been significantly different. Besides, the alternate biomass resource created by the ICDP outside the PA was rarely being utilized by the intended beneficiaries. Yet, villagers attribute the reduction in forest-

dependence to loans given by the ICDP which were given under the condition that villagers will stop venturing into the forest for fuel-wood or grazing. Although not entirely successful, programs such as the one in KMTR, which encourage alternate livelihood options outside the PA, may still be able to find win-win solution.

### **Ecological status and management perspectives of coastal fisheries of Pondicherry, Cuddalore and Villupuram.**

Tara Lawrence

Fisheries management in India presents a complex suite of problems on account of resource diversity and the fishing communities involved. Plenty of efforts have been directed at managing fishing capacities and promoting community based management but even less or almost none focus on the resource itself. With this most basic yet crucial information lacking, management remains misguided, driven by the perception that a multi species, multi gear fishery is too complex to be managed.

The objective of our study was to establish a baseline of where fishing occurs, what the resource really is and what each fishing trip is associated with. A stretch of about 100 km along the Coromandel Coast bordering the state of Pondicherry, and the districts of Villupuram and Cuddalore of Tamil Nadu was surveyed over a span of five years in varying periods of time. Over 8000 boats were surveyed and catch from all craft type was sampled while interviews were conducted when fishermen were sorting their catch. Diversity, abundance and richness indices were calculated. Mean trophic level and mean maximum length was also calculated to understand where the catch is at and what level is presently being harvested. Results indicate low diversity and abundance across the study area with a mean trophic level of 3.54 and mean maximum length of 30.932 cm. Our data also shows a stark disconnect between ground reality and existing fisheries laws and policies with reference to gear used, mesh regulations and off limit zones for the mechanized craft. There are spatial overlaps in where different craft fish and the use of different gear in the study area. The top down state fishing management regulations are largely ignored. The study shows that fisheries management strategies need to be revisited with a greater emphasis on conserving and managing the existing resource base. Primary stakeholders from the sector need to be involved in framing and enforcing these regulations if compliance is to be hoped for and to move towards more sustainable fisheries on this coast.

## **Monitoring Otter Populations and Combating Poaching through Stakeholder Participation.**

Nisarg Prakash

Otters are ambassadors of wetland ecosystems. In India, species such as the smooth-coated otter and small-clawed otter often occur along rivers and water bodies in human-dominated landscapes, particularly near protected areas. Being top predators in the aquatic environment, they have been severely affected by loss of riparian habitats to agriculture and other anthropogenic activities like sand mining, construction of hydroelectric projects and dynamite fishing. The 780 km long Cauvery is one of the major rivers of peninsular India, flowing from the Western Ghats to the Bay of Bengal, important for otters and for millions of people dependent on it for agriculture, fishing, water supply, and industries. To document and monitor otter populations within and outside protected areas along the River Cauvery, we carried out raft-based surveys along 125 km of the river, and social perception and otter – fisher conflict interviews surveys among 160 respondents in over 85 villages along 250 km of the river. Preliminary results include the detection of otter signs in 100 locations (in 125 km covered during raft-based survey), nearly 10 otter sightings and multiple camera trap photographs, including those of small-clawed otters at a location far lower than previously reported, and spatial mapping of occurrence of various threats along the river. We are also working with local stakeholders to develop monitoring methods and resources (including mobile phone software), and are continuing to engage with the Fisheries Department and angling clubs to sensitise them on the role otters play in the ecosystem. This project was specifically designed to identify stretches outside conventional PA network which still host populations of otters. In addition, we plan to identify threats to otters, incidents of otter poaching in the entire landscape, and conflict with fisher folk and their perceptions towards otters.

## **Protection from grazing changes vegetation composition in the western Himalayas.**

Rajat Nayak

Grazing by livestock is one of the most prevalent and oldest forms of human interventions experienced by most of the terrestrial ecosystems. Several ecosystems are believed to have reshaped by grazing by large ungulates. However, over the last few decades, there is an increasing concern about the detrimental effects of over-grazing by livestock on biodiversity and



ecosystem processes. This has resulted in grazing restrictions in many of the protected areas across the world. In most of the cases, such restrictions are based on perceptions and their effectiveness is limited by a lack of knowledge on grazing-vegetation relationships. We investigated the effects of recent restrictions and changes in livestock grazing practices on ground vegetation characteristics in the Western Himalayan landscape, which has a very long history of livestock grazing. We found that the richness and diversity of ground vegetation community at high altitude pastures was determined mainly by elevation and area of the pasture. However, at the level of plant functional groups, the richness and abundance of annual species of plants was greater in grazed sites compared to grazing-restricted sites. An increase in annual species also contributed to an increase in heterogeneity in grazed sites. This suggests a shift in vegetation composition from completely perennial dominated to a system with both annual and perennial plants under grazing. We observed a higher percentage of bare ground in very intensely grazed sites, which suggests a need to halt the occurrence of over-grazing and develop mechanisms to reduce grazing pressure on a single site. In order to conserve the existing biodiversity and to support both wildlife and livestock it is of immediate need to understand grazing-vegetation dynamics and to develop appropriate management practices in the Western Himalayan landscape.

### **Assessing impact of fisheries on target fish populations of the southern coast of Maharashtra.**

Mayuresh Gangal

Fisheries are considered as the main cause for the collapse of marine food webs and a decline in the abundance of marine fishes. This has threatened not only the marine ecosystem but also food security and livelihoods of people depending on it. Long term demographic monitoring of fish populations is thus very crucial to determine the impact of fisheries on marine ecosystems and future management intervention.

Our study provided a starting point in demographic monitoring of commercially important fish species along the coastal districts of Ratnagiri and Sindhudurg, in Maharashtra, India. We accompanied fishermen on their fishing trips and recorded fish catch in each fishing effort. Ten percent of the individuals of each fish species caught were then randomly selected to estimate age structure. These fish were also photographed for identification and for measurement using

the software ImageJ. Each fish was then assigned as immature or mature based on established length-age relationships to estimate proportions of immature caught.

Data analysis from two years of demographic monitoring revealed couple of important phenomena. Firstly, some of the commercially important species like *Lactarius lactarius* have shown higher proportion of immature in non-monsoon seasons. This record is contradictory to the general assumption that most fish in western coast of India breed in the monsoon, which is the basis for fishing restrictions in this particular season. Secondly, the data suggests that drag netting, a traditional deemed sustainable method of fishing, has consistently caught higher proportion of juveniles compared to trawling, which is considered as an unsustainable fishing method.

Our study has thus highlighted lacunae in current understanding and management of fisheries in the region and a need for long term demographic monitoring of coastal fishes. With current multi gear, multi season monitoring approach, we aim to formulate ecologically meaningful management recommendations in future.

## **Poster Presentations**

### **Understanding the Drivers of Losses in Carbon Storage Ecosystem Services Provided by Tropical Forest Fragments in India's Western Ghats.**

M.O. Anand

Tropical forests are among the largest terrestrial reservoirs of carbon, and play an important role in regulating global climate. However, as a result of historic and ongoing deforestation, carbon storage in this biome is increasingly dependent on forests that are fragmented, with considerable uncertainty about how such disturbance alters carbon storage potential and cycling. We explored various aspects of the carbon storage in forest fragments, which are protected as sacred groves in the Kodagu District of India's Western Ghats.

First, we estimated carbon storage per hectare within 13 forest fragments and compared these to nine nearby sites that were not fragmented. This comparison was based on precise estimates of tree basal area, tree height and species wood densities across 71 plots. We demonstrated that altered stand structure, tree allometry and species composition combined to reduce carbon storage in fragments by nearly 40%.

Second, we explored the likely mechanisms linking species turnover in fragments to carbon losses, by relating leaf, stem and reproductive traits of species to environmental and landscape gradients in an analytical framework based on species functional traits. Our preliminary results indicate that the filtering of tree communities in fragments in favour of small-seeded, softwood species has both direct and indirect negative consequences for the carbon storage potential of these fragments.

Finally, we analysed remotely-sensed Landsat images to explore trends in aboveground carbon at larger spatial and temporal scales. Preliminary results show that fragments experienced the greatest declines in above ground biomass over the last decade, in contrast to contiguous forests which increased and coffee plantations which stayed constant. Our interview surveys with these fragments' custodians – members of Village Temple Committees – throw light on the social and economic changes acting alongside economic drivers to threaten forest biomass and conservation value of these fragments.

## **Sustainable Utilisation based Conservation of NTFPs through Community Institutions in Chamba HP.**

Prakash Bhandari

Heavy dependence of communities living in difficult terrains of the high Himalayan villages on the collection of Non Timber Forest Produce for sale has resulted in the depletion of many of these NTFPs, specifically rare herbs. The key factor has been the commercial scale of the activity, the unsystematic nature of collection, which in turn has jeopardised local livelihoods and impoverished biodiversity. Today, 22 of the 45 commercially traded NTFPs of the HP state are on the red data list of IUCN. Efforts by State Forest Department are limited to raising these herbs on private lands. This is ineffective in a state where less than 10% of total area is under private ownership. Any effort to conserve these NTFPs cannot be centralised and on private land but rather requires local involvement to build consensus within a cluster of villages for management of common property forest lands, through village level institution.

In our initiative, centred on this principle, the major activities were selection of suitable villages for NTFP initiative in one block of Chamba district, followed by exposure visits, demographic and resource base inventorying, village meetings and discussions with women and other marginalised members. The next step was formulation of management plans and village committees with functional norms. In addition to this continuous dialogue was maintained with the State Forest department to approve and implement these management plans.

Through this initiative regeneration work has been carried out in an area of 8 hectare in 9 villages. 10 training programmes were conducted on Nursery Development and 2 NTFP nurseries were developed for the regeneration of the following species: *Valeriana jatamnasi*, *Aconitum hetrophyllum*, *Picrorhiza kurrooa* and *Jurinea macrophyllum*.

The project was dependent on the Divisional forest department for implementation of management plans and recognition of village institutions. The frequent transfers (change) of forest officials became a limiting factor in maintaining a continuous dialogue with department. Another challenge faced was extraction of the newly found NTFP, Nag Chatri (*Trillidium govianum*), which had no previous history of extraction and was extracted at an unprecedented scale from the wild. This changed the community priority and it remains to be seen how the community will chart out its future path of NTFP management.

## **Socio-ecological surveys and community-based catch monitoring of Lakshadweep's live-bait pole and line tuna fishery.**

Mahima Jaini

Lakshadweep's economic mainstay, the live-bait pole and line tuna fishery utilizes small planktivorous fish from island lagoons and reefs to harvest oceanic skipjack tuna (*Katsuwonus pelamis*). This oceanic tuna harvest method helps divert fishing pressure off the sensitive coral reefs, but changes in tuna and baitfish supply, coupled with increasing demands for reef fish may alter this scenario. Our project aims to assess the status of baitfish populations, understand the dynamics of the live-bait tuna fishery and initiate a community-based catch monitoring program. We focused our efforts on four islands with increasing levels of fishing pressure; Kadmat, Kavaratti, Agatti and Minicoy. Tuna fishermen preferentially use clupeids along with small planktivorous caesionids, apogonids, serranids, pomacentrids and atherinids as live-bait. On the reef we sampled baitfish using 60-minute random swims and in the lagoons we conducted 50 m timed transects and point counts. Highest densities of reef baitfish were found in Kavaratti, and a weak association between fishing pressure and baitfish abundance was observed for the study islands. Interviews with fishermen and managers have revealed declines in tuna catch and size, and increases in fishing effort. There was little to no concern regarding baitfish abundances. Factors most often cited as contributing to tuna declines include changes in currents, particularly after the tsunami, increased external fishing pressure, and tuna tagging. Fishermen agreed to the lack of accurate departmental catch records and were supportive of a community-based catch monitoring program. Focus group meetings have helped identify parameters of interest to the fishing community; including tuna catch volume and size, baitfish use, fuel usage, external fishing pressure, use of fish aggregating devices and basic environmental metrics. We are currently developing the catch monitoring notebooks and hope to initiate the program in January while continuing with our baitfish surveys and fishermen interviews.

## **Implications of gear selectivity on catch diversity, trophic structure and size in fisheries along a part of the Coromandel Coast**

Tara Lawrence, Gayathri Selvaraj and Kumaran S.

Selectivity and catch composition among various gears employed, such as seines, trawls, lines, gillnets and lift-nets were estimated in this study conducted along the coast of Pondicherry,

Villupuram and Cuddalore. Fishermen across the study area were interviewed with structured questionnaires and the catch was photographed for identification, measurements and counts. Fish were purchased for morphometry and meristics to validate the identification and also for length weight analysis. Length frequency data for the most commonly sighted fish species was also collated. Results indicate low diversity, richness and abundance as well as a mean trophic level of 3.54 and mean maximum length of 30.932 cm. The low diversity in conjunction with small size of fish caught indicates overlaps in the selectivity of gear used. The lack of selectivity in the various gears indicates that continued fishing practices could prove unsustainable in the long run implying the need for a more holistic management framework placing the resource in the broader perspective of the environment.

### **Developing with dolphins: Behavioural variations in Indo-pacific humpback dolphins across a major, minor and intermediate port along the southwest coast of India.**

Divya Panicker

Estuaries support multiple human needs and are currently witnessing rapid and unplanned developments thus posing threats to associated large marine fauna such as Indo-pacific humpback dolphins *Sousa chinensis*. In our study, we assess the influence of varying levels of anthropogenic and environmental factors on behaviour of dolphins using a major (M), minor (m) and Intermediate (I) estuarine port as reflected in their space use and time activity budgets. This study was conducted in 3 estuaries, Kochi, Munambam and Ashtamudi during 2012-13 using a grid-based approach. Shore based scan sampling was used to assess dolphin presence, behavior, vessel traffic and fishing intensity for 432 hrs (n=2597). Dolphin locations were plotted in GIS using reticle method. Ecological parameters such as salinity, pH, turbidity, depth, prey availability and distribution were assessed using quantitative techniques and interview surveys. Dolphins occurred at levels higher than expected in I, lower in M and as expected in m. Within the major port, we determined the ecological and anthropogenic factors affecting the space use of dolphins using classification and regression tree. Salinity and fishing intensity were found to have a significant impact on dolphin occurrence within M. Predominant activity in all 3 estuaries was foraging (M: 56%, I: 58%, m: 77%). Dolphins in M spent more time travelling (29%) as compared to m and I and displayed no milling. Milling was highest in I suggesting this area is suitable for resting and feeding. Dolphins seem to be behaviorally responding to changes in their habitat on a spatio-temporal scale by varying their activity budgets and space use in order to

continue to persist and survive in these estuaries (high resource areas). Reduced access, however, to such high resource areas and decreased usage of the same by dolphins can threaten their survival and have serious conservation implications.

### **Assessing the conservation status of endemic woody plants of the Western Ghats.**

Navendu Page

More than 60% of the woody plants recorded from evergreen forests of the Western Ghats (WG) are endemic to this narrow and severely fragmented strip of forests. Most of these species are yet to be assigned a conservation status or have been assigned a status based on inadequate information and therefore needs updating. Carrying out species assessments and assigning conservation status is important for prioritizing species for conservation. However lack of sufficient information on distribution and threats to these species have proved a major impediment in carrying out reliable evaluations in an objective way. The aim of this study was to - i. Generate a comprehensive database of the distribution and population status of endemic woody plants of the WG; ii. To carry out species assessments and assign IUCN threat status to the endemic woody plants of the WG.

Based on primary field surveys covering the entire latitudinal extent of the evergreen forests of the WG, and using two other large scale plot based species inventories, we put together an exhaustive dataset on species occurrence and abundance of endemic woody plants. We used species distribution modeling as a tool to estimate species range sizes as well as its population size. Based on the criteria proposed by IUCN, we used these estimates to assign red list categories.

We developed, for the first time, a comprehensive database on distribution, population and conservation status for more than 200 species of endemic woody plants. The approach which has been used for the first time in an Indian scenario makes the species evaluations much more objective and transparent as compared to the conventional approaches. The data generated from this study will serve as a benchmark for monitoring future changes in range size and population status of endemic woody plants.

## **Popular talks**

### **New insights into population structure and hybridization of forest and savanna African elephants.**

Dr. Samrat Mondol

The African elephant consists of two subspecies: forest elephants (*Loxodonta africana cyclotis*) and savanna elephants (*L. a. africana*). It is currently estimated that 30,000 to 50,000 elephants are being poached annually for their ivory and meat and habitat loss and fragmentation is also having a major impact on both subspecies. Strong morphological and genetic differences occur between these subspecies and, until now, reports of hybridization have been rare. I will present genetic data and results to show latest population structure patterns across Africa and active hybridization between these two species at two zones. Our analyses show, for the first time, that the hybrids are fertile and hybridization is bidirectional, involving males and females from each subspecies. Both regions experienced strong asymmetric poaching pressure in forest relative to savanna habitats, suggesting that poaching may have influenced hybrid prevalence of this keystone species.

### **New Wine in an Old Bottle: A Behavioral Approach to Studying Human-Elephant Conflict in India**

Nishant M.S.

The Asian elephant, revered and worshiped from centuries, has become an integral part of our culture and is loved by one and all as the gentle giant. Over the last three decades, however, this image of the elephant has changed, especially among people living alongside these giants. Today, elephants are being branded as raiders and rogues and are feared by people. This change in the perception of an elephant from a deity to a marauder has largely been due to a striking increase in human-elephant conflict. In this talk I will try to highlight the potential of behavioral studies on elephants, in addition to the other approaches commonly used to reduce conflict in Asia, to aid in human-elephant conflict mitigation. I will be drawing from my own experience of working with elephants in a fragmented and human-dominated landscape in Southern India.



## **Effecting conservation through engagement and involvement**

Manish Chandi

Considering local communities as part of the solution rather than the problem in dealing with conservation issues often has direct consequence to effecting long term conservation goals in some instances. This is easier said than done, and the need to engage with various challenges to facilitate change is both the biggest challenge and the greatest reward if we are to achieve long term conservation solutions for natural landscapes and species that inhabit those regions.

For this talk on engaging with local communities toward their involvement in conserving natural landscapes and livelihoods, I will use experiences from the Andaman and Nicobar Islands where I work, to illustrate my experiences as a student and practitioner of this approach and of success and failures. I will briefly touch upon a few key aspects I continue to encounter over the years. I do not place them in this order but these are aspects that I will attempt to touch upon through this talk. Some simple but critical aspects of working with communities in conservation for the long term are, self-criticism and the need to constantly reassess what we do as practitioners, openness to new ideas, to the ideas of others, and of listening by sharing knowledge and experiences with others; of patience in building relationships with people and working with them, and last but not the least of recognising the limits of knowledge – accepting that you don't know everything and can't know everything in approaching the complexity and uncertainty of other people's livelihoods in a conservation landscape.