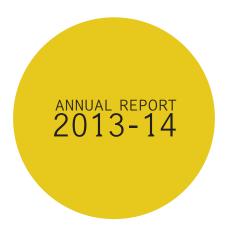




ANNUAL REPORT 2013-14



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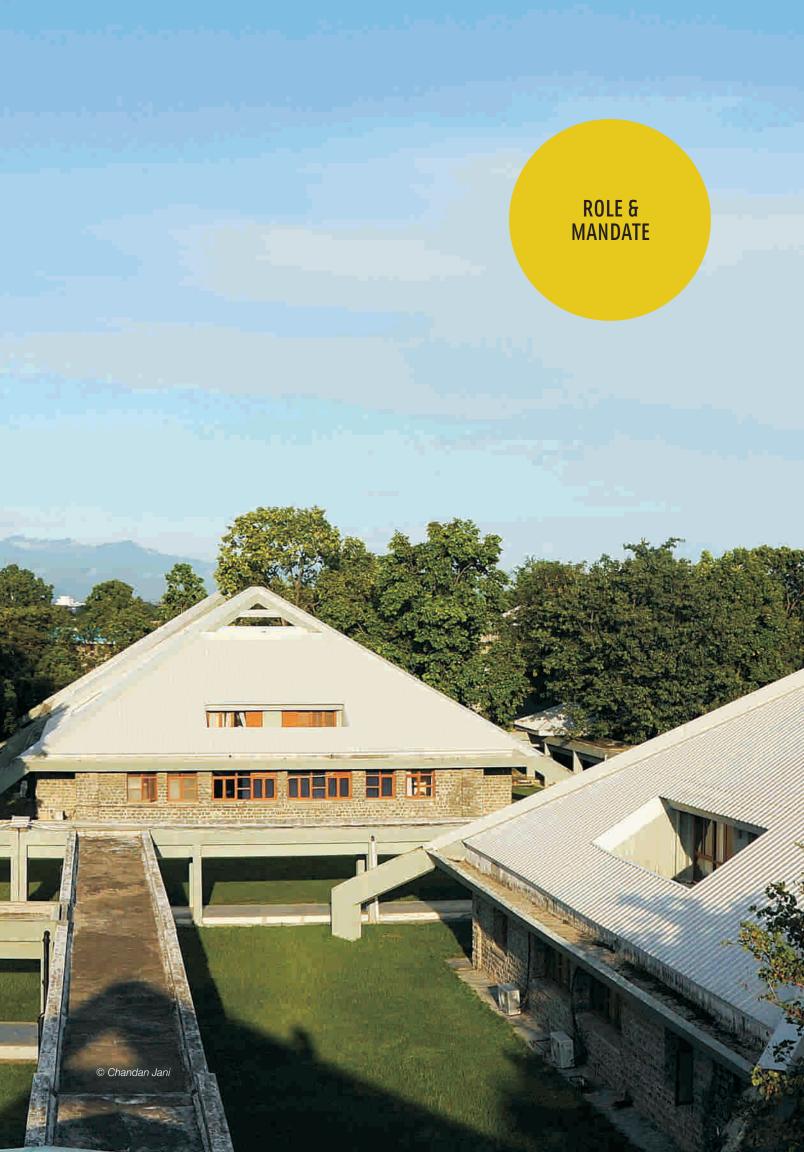
The Reporting Period 2013-2014 saw significant changes in the Institute's governance. Shri P.R. Sinha after serving as Director for over eight years superannuated in June, 2013. Shri R.K. Goel, Director, Indira Gandhi National Forest Academy, Dehradun was given the additional charge of Director, Wildlife Institute of India (WII). In February, 2014, the Search cum Selection Committee of the Ministry of Environment, Forests and Climate Change (MoEFCC) headed by the Secretary, MoEFCC selected me as the Director for the period 2014 to 2019. Having served the Institute since 1986 as a faculty member and as the Dean from 2005 to 2014 has endowed me with institutional knowledge and has helped me to carve out a vision for the growth and development of the Institute.

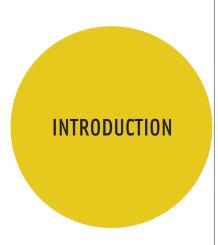
My endeavour is to make WII an institution which is liked and coveted by researchers, students and academics as an institution to conduct research and acquire knowledge and skills; sought after by policy makers and administrators as an institution to seek advice and build capacity; and an institution that is respected by national and international peers, as a world class institution not only in the field of wildlife conservation but also in natural resource conservation. In order to achieve the above vision, my priorities are to enhance institutional infrastructure and research environment so as not only to retain talent but also to attract talent from outside and to build a high performance work environment that generates both enthusiasm and nurture's talent.

I would like to put on record my appreciation for the Institute's governance especially the President, WII-Society; Chairman, WII-Governing Body; Chairman, WII-Finance Committee and the Chairman, WII-Training, Research and Academic Council and the host of stakeholders, mentors and well-wishers for their professional support during the reporting period and look forward to their active engagement in the task of carrying forward the Institute to a higher trajectory of excellence.



31st March, 2014





The Wildlife Institute of India (WII) is an autonomous organization of the Ministry of Environment & Forests. It is a premier training and research institution in the field of wildlife and protected area management in South Asia. Since its inception, WII has had the benefit of collaboration with international organizations such as UNDP, FAO, USFWS, IUCN and UNESCO. These collaborations have helped the institute build a competent faculty and staff through rigorous training and exposure to modern research and analytical techniques.

The institute's wide array of capacity building programmes provides a practical and realistic direction to the concept and practice of wildlife conservation through the involvement and cooperation of local communities. By learning from its own experiences and those of others, WII is traversing a path of hope and aspiration that will help strengthen its inputs and efforts to find answers to better address wildlife conservation issues and challenges in the country as well as in the South Asian region.



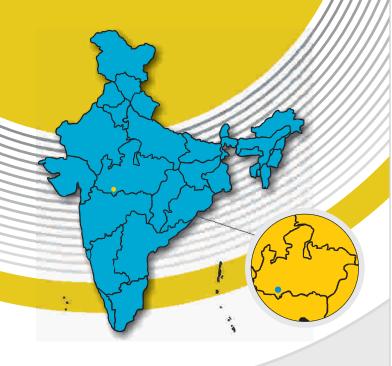
Our mission is to "nurture the development of wildlife science and promote its application in the field in a manner that accords with our economic and socio-cultural milieu".

- To build up scientific knowledge on wildlife resources
- To train personnel at various levels for conservation and management of wildlife
- To carry out research relevant to management, including the development of techniques appropriate to Indian conditions
- To provide information and advice on specific wildlife management problems
- To collaborate with international organizations on wildlife research, management and training
- To develop as a regional centre of international importance for wildlife and natural resource conservation





DEVELOPING SPATIAL DATABASE
ON THE MAMMAL DISTRIBUTIONS
AND MONITORING PROGRAMME
FOR LARGE CARNIVORES, PREY
POPULATIONS AND THEIR
HABITATS IN KHANGCHENDZONGA
BIOSPHERE RESERVE



Investigators

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Researchers

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Tawqir Bashir and
Kamal Poudyal

Grant-in-Aid

Funding Source

Date of Initiation January, 2008

Date of Completion April, 2013

COMPLETED PROJECTS

Objectives

The objectives were to:-

- (i) Develop a spatial database of the distribution of mammals, particularly large carnivores and their prey (ungulates, Galliformes), in the different watersheds of Khangchendzonga Biosphere Reserve (KBR).
- (ii) Investigate the habitat use patterns of ungulates and Galliformes and the food habits of carnivores in KBR.
- (iii) Develop a monitoring programme for monitoring large carnivores and their prey (ungulates, Galliformes) and their habitats in KBR.

Progress

During the reporting period, the presentation of the final report of the project was made by the Investigator, and the final report was submitted and accepted.

All field activities were carried out in the form of field expeditions, involving camping in different areas of the intensive study area. Different conventional field methods such as scan sampling, trail sampling, dung count and vegetation sampling were used to achieve the objectives. Camera traps were also used for the first time in Sikkim to investigate the distribution and abundance of carnivores, ungulates and qalliformes.

Forty-two species (19 carnivores, 8 ungulates, 2 primates, 7 rodents, 4 lagomorphs, 1 insectivore and 1 chiropteran) of mammal belonging to 7 orders and 16 families occur in KBR, the presence of 40 of which the research team confirmed through visual encounters, photo-captures, signs and trails. The other 2 species were recorded on the basis of information received from locals. A total of 21 photo-captures (6 right flanks and 15 left flanks) were recorded. SECR models estimated the densities as 4.25±2.55 individuals/100 km² for Maximumlikelihood estimation and 4.77±1.81 individuals/100 km² for Bayesian with Markov-Chain Monte Carlo simulations (MCMC). The number of leopard cat individuals identified was 13 using the right flank. A total of 23 photo-captures (20 right flanks and 15 left flanks) were recorded. SECR models estimated the densities as 9.75±5.80 individuals/100 km² for Maximumlikelihood estimation and 10.67±3.71 individuals/100 km² for Bayesian with MCMC simulations. The overall photo-capture rates (photographs/100 days) were calculated for each carnivore species present in the Prek Chu catchment of KBR. In the alpine zone, the highest photo-capture rate was observed for red fox followed by stone marten and snow leopard. In the subalpine zone, the maximum photo-capture rate was recorded for the Himalayan yellow throated marten, followed by the Asiatic golden cat. In the temperate zone the highest photocapture rate was observed again for Himalayan yellow throated



marten, followed by leopard cat, Himalayan masked palm civet and large Indian civet.

During scan sampling, 71 blue sheep clusters of 883 blue sheep were encountered. The overall density of blue sheep in the Prek Chu catchment of KBR was 5.25. Occupancy and abundance results derived from the Royle-Nichols heterogeneity model analyses for different ungulate species present in Prek Chu catchment area of KBR depicted detection probability corrected density for goral, serow, barking deer and blue sheep. The blood pheasant was the most visually encountered galliformes, with the overall density of blood pheasant in the study area being estimated at 13.64±2.78 individuals/km². The Himalayan monal was visually encountered on 21 occasions, and its density was estimated at 1.38±0.45 individuals/km². The snow partridge was sighted on 33 occasions. It was mostly found in groups ranging from 1 to 15 individuals. During the study period, kalij was sighted on 32 occasions. The satur tragopan was visually encountered 23 times during the study period. The photocapture rate was used to estimate the relative abundance of small mammals such as rodents and pika recorded in the study area. The overall photo-capture rate was highest for the pika, followed by rats.

Spatial distribution pattern of carnivores depicted specific distribution for some species such as snow leopard and red fox which were confined in the alpine zone of the Prek Chu catchment as well as continuous distribution for some species such as yellow throated marten which were present in temperate and subalpine habitats. Blue sheep distribution was strictly confined to the rocky areas and alpine and krummholz vegetation of the Prek Chu catchment area. The distribution of musk deer was confined to krummholz and subalpine vegetation. The spatial distribution pattern of the serow indicated that the species is widely distributed in the Prek Chu catchment area. The serow occupied both the subalpine and temperate forests. The spatial distribution of goral in the Prek Chu catchment of KBR depicted similar pattern to serow distribution. Barking deer were distributed only in the temperate forests of the intensive study area. Spatial distribution patterns of wild pig and Himalayan tahr in Prek Chu catchment area were depicted on the basis of photo-captures and lone sightings of each species. All the snow partridge evidences were found at the alpine zone, evidences of Himalayan monal were also encountered chiefly in the alpine zone. Blood pheasant evidences were recorded in sub-alpine, krummholdz and alpine zone. Satyr tragopan evidences were found mainly in the transition zone of temperate and subalpine habitats. Presence of kalij was encountered in the temperate zone. Evidences of hill partridge were found in temperate and subalpine zone.

Ungulates significantly differ with each other in their use of



WII Camera trap image

different elevation categories. It was found that barking deer (n=27) used lower elevations (2000m-2500m) and goral (n=95) used both lower and middle altitudes (2000m-3500m). Serow (n=57) used a wide range of altitude classes (2500m-4000m), whereas the musk deer (n=16) and blue sheep (n=130) both used exclusively high altitude category (>4000m). Occupancy modeling results showed that three sampling variables, viz. higher elevation and less tree/shrub cover and the alpine habitat, significantly affected the presence of blue sheep at a camera site. Two sampling variables (elevation and habitat) significantly affected the presence of musk deer, higher elevations and krummholz habitat being preferred. Occupancy modeling showed that the detection probabilities of both serow and goral were negatively related with human presence at a camera site. Denser tree cover, higher elevations and warmer aspects were determined to be the best predictors for occupancy by serow. Denser tree cover, warmer aspect and distant location of sites from regularly used tourist trails were the best predictors for occupancy by goral. Steep slopes, high tree cover, cooler aspects, absence of trekking trails and broadleaved forests significantly affected the presence of barking deer at a camera site. In contrast to the results of barking deer, only broadleaved forests significantly affected the presence of wild boar at a camera site. Kalij and hill partridge being temperate species were present in wettemperate habitat. Snow partridge was present only in alpinescrub habitat. Satyr tragopan used wet-temperate, fir-birch-Rhododendron and Rhododendron-scrub habitats according to their availability. Blood pheasant and monal both used alpine, Rhododendron scrub and subalpine habitats but blood pheasant preferred fir-birch-Rhododendron dominated subalpine habitat



RESEARCH ACADEMIC & TRAINING CAPACITY BUILDING PROFESSIONAL SUPPORT

whereas monal showed preference for Juniper and Rhododendron dwarf scrub habitat. The field data on microhabitat characters were analyzed for three different zones, i.e. temperate, subalpine-krummholz and alpine.

Pika was found most frequently in snow leopard scats, followed by blue sheep, rodents and cattle. The frequency of occurrence of pika was highest in red fox scats, followed by rodents, beetles and blue sheep. In dhole scats, rodents were the most frequently found prey item (32%), followed by serow (27%) and Himalayan tahr (22%). Small mammals (rodents and pika) constituted 82% of the mammalian prey consumed by leopard cats. Murids were the most dominant prey items, occurring in 89.2% of the scats, followed by pikas (21.62%) and birds (10.81%). The most frequently occurring item in Himalayan yellow-throated marten and beech marten scats was pika, followed by rodents, beetles and langur. In weasel scats, the frequency of occurrence of pika was highest, followed by rodents and blue sheep.

GIS data-layers for nine eco-geographic variables believed to influence the distribution of carnivores, ungulates and galliformes in KBR were generated to carry out presence-only species distribution modelling. McArthur's broken-stick model was followed to select the number of factors to be used in preparing the habitat suitability (HS) model. The geometric mean algorithm was to compute the HS index. The predictive power and accuracy of the HS model was evaluated using a jackknifed 10-fold cross-validation procedure. All the six ungulates had high global marginality values (0.85–1.2), indicating that they occupied a relatively small portion of the set of environmental conditions available in KBR. The HS map of the blue sheep identified two main zones as favourable habitats—one in the northern part and another in the southwestern part of KBR. The total area of the suitable habitats for blue sheep as calculated from this HS map was 502.35 km², and the area of the habitats of medium suitability (with 30-60% probability of occurrence of the species) was greater than the area of less and highly suitable habitats. The HS map of the musk deer identified a single favourable patch in the southwestern part of KBR. This HS map clearly showed that most of the habitats of the total predicted suitable area of 860.99 km² were less suitable (10-30% chance of occurrence of the species) for musk deer and only an area of 57.27 km² was highly favourable for musk deer. The HS map of the serow showed a continuous distribution from the lower temperate forests to the upper subalpine forests of KBR. In particular, the subalpine forests of KBR were predicted to be of medium to high suitability (163.9 km²) for the occurrence of serow. The HS map of the goral predicted a vast area of 1150.69 km² (43% of the entire area of KBR) as being suitable for goral in KBR. The HS maps of both barking deer and wild pig showed that the lower

temperate forests were the only suitable habitat (510.41 km^2 for barking deer and 463.42 km^2 for wild pig). All the six galliformes had high global marginality values (0.64-1.13), indicating that they occupied a relatively small portion of the set of environmental conditions (defined by the EGVs) available in KBR.

The HS map of the snow partridge showed alpine habitats as favourable habitats, and the HS map of the Himalayan monal identified the high altitude, alpine and subalpine areas as favourable habitats, mostly in the south-western part of KBR. The HS map of blood pheasant showed a continuous distribution from the mid-temperate to upper subalpine forests and alpine areas of KBR. The HS map of the blood pheasant showed that of a total area of 650.84 km² of suitable habitat, an extent of 116.88 km² was highly favourable. The HS map of the satyr tragopan predicted an area of 773.77 km² to be suitable habitat in KBR. The HS maps of both the kalij and hill partridge identified the lower temperate forests as the only suitable habitat. All the nine carnivores had high marginality values (0.84–1.85), which indicated a preference for specific habitats or food resources. On the other hand, yellow-throated marten and Asiatic black bear were generalists in distribution as indicated by their specialization indices. The specialization values of snow leopard, large Indian civet and masked palm civet were very low, indicating the highly specialized nature of their distribution. The HS map of snow leopard identified the alpine habitats of the south-western part of KBR. The total area of the habitats suitable for snow leopard was calculated from this HS map to be 1250.59 km², and the area of highly suitable habitats (with 60–100% probability of occurrence of the species) was 138.65 km², situated in the alpine zone or above.

The HS map of the red fox identified the high altitude, alpine and subalpine areas as favourable habitats, mostly in the south-western part and in Zema Valley, in the northern part of KBR. The HS map of stone marten showed a continuous distribution from the upper subalpine forests and alpine areas of KBR. The HS maps of Asiatic black bear and yellow-throated marten showed wide distributions for these two species. The area that was highly suitable (322.45 km²) for yellow-throated marten was the highest among the carnivores of KBR. The lower temperate habitats in the biosphere reserve part were predicted to be suitable for the lesser carnivores such as the leopard cat, large Indian civet and masked palm civet. For all these carnivores, the area that was predicted to be highly suitable was much less than the total suitable area predicted.

To detect a 5% annual decline in the snow leopard population with 70% power, 1000 effective camera days in each year was the minimum sampling effort required for 13 years, and to detect a 10% annual decline with 70% power, 800 effective camera days each year was required for 7 years. For blue sheep,



VISITORS GOVERNANCE PUBLICATIONS TALKS & MEETINGS ACCOUNTS

the power to detect annual population declines of up to 10% per year changed little when the survey effort was increased from 21 surveys/year to 24 surveys/year or more. To detect an annual 5% decline in the blue sheep population with 70% power, 33 scans each year was required for 10 consecutive years. However, to detect a 10% annual decline with the same power level of 70%, only 9 scans per year were required. For the goral population, to detect a 5% annual decline with 70% power, 390 effective camera days each year was the minimum sampling effort required for 9 years, and to detect a 10% annual decline with 70% power, 260 effective camera days per year was required for 7 years. To detect a 5% annual decline in the barking deer population with 70% power, 500 effective camera days per year was the minimum required sampling effort for 10 years; however, to detect a 10% annual decline with the same power level required 400 effective camera days each year for 8 years. The power to detect annual population declines of up to 10% per year changed little when the survey effort was increased from 80 surveys/year to 100 surveys/year or more. To detect an annual 5% decline in the blood pheasant population with 70% power, at least 100 surveys in each year was required for 10 consecutive years. However, to detect a 10% annual decline with the same power level of 70%, only 40 surveys per year was required.

In the alpine zone, the grids where the Important Habitat Index is 60-100, are situated in the South-western part of Khangchendzonga BR. The trans-Himalayan habitats of Zanak, Rasum and Dolma, along with the Green Lake area were found to be the most important habitats for threatened carnivores and their prey in the northern part of KBR. In the subalpine and temperate forest, most important habitats for threatened carnivores and their prey are situated mainly along the junction of the biosphere reserve and national park. Most of these grids are situated in the biosphere reserve part connected to or buffering the villages situated just outside the KBR boundary and hence are also very important for regular monitoring. The transition zone of the subalpine and alpine areas, such as the dwarf rhododendron vegetations of Dzongri, Thansing, upper Yambong, Panchpokhri and Thepala, are the most important habitats for the threatened carnivores and their prey.

The present study generated baseline information on the distribution, abundance, habitat use and co-existence of carnivores and their prey at the spatial scale. However, major ecological issues such as diet overlap and niche breadth at the dietary scale among these species are yet to be studied in the Eastern Himalayan landscape. Such studies can also help elucidate the impact on ungulates of pack animals grazing inside the national park. The response of these ungulates to anthropogenic factors such as extractive disturbances due to eco-tourism is yet to be studied. In the trans-Himalayan part of

KBR, more intensive camera trapping is needed to get a complete understanding of the mammal assemblage. Future endeavours to study these remaining aspects can definitely help the managers delineate a thorough and effective management plan for the conservation of carnivores and their prey, ensuring their long-term survival in the Khangchendzonga landscape.

Outputs & Outcomes

Monitoring protocols for indicator species were developed and standardized on the basis of the findings of the research project. Monitoring was carried out using sign surveys, trail/transect walks, scan sampling, call counts (galliformes) and camera trapping, but due to the remoteness and ruggedness of the terrain, most of the methods were not found to be appropriate for all the species. Overall, camera trapping proved to be a potential monitoring method for detecting most of the species in the area. But for systematic long-term monitoring of the faunal diversity of the area, a combination of different methods should be used, depending on the species of interest. The research team recommended that the monitoring efforts be continued in the future by the forest department so as to understand population trends and detect areas that require immediate management attention.

Milestone

This being the pioneering study on the mammals of KBR, the presence of many mammal species in this area was confirmed on the basis of field work and camera trap pictures. Species-specific field monitoring methods were identified and standardized. These protocols will be used to impart training for frontline staff members as well for monitoring in the future. for frontline staff members as well for monitoring in the future.

ECOLOGY OF LEOPARD

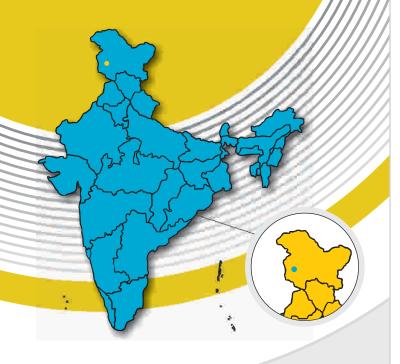
PANTHERA PARDUS IN

RELATION TO PREY

ABUNDANCE AND LAND

USE PATTERN IN KASHMIR

VALLEY



Funding Source Department of Science and Technology, Government of India

Investigator Dr. Bilal Habib and Dr. Gopi G.V.

Researchers Athar Noor and Zaffar Rais Mir

Date of Initiation December, 2010

Date of Completion December, 2013

Objectives

The objectives of the project were to:-

- (i) Estimate the density, abundance and distribution of the leopard across different study sites.
- (ii) Estimate the prey density across different sites and develop a relationship between the density of the prey base and leopard abundance.
- (iii) Study variations in food habits across different sites and seasons in Kashmir Valley.
- (iv) Study the movement patterns, home range size and social organization of leopards across different sites.

Progress

Camera trapping was undertaken in the study area in 2013 to estimate the population of leopards in Dachigam National Park. A total of 714 faecal samples were analysed using standard protocols to gain an understanding of the dietary spectrum of the leopard and its prey selectivity. The availability of prey was assessed by estimating the density of potential prey available using a line transect sampling method. An exercise of capturing and collaring leopards was also carried out to understand the ranging behaviour of the leopard. One more male leopard was captured and fitted with a GPS collar. So the final count of collared leopards in Dachigam was three individuals (two females and one male).

A total of 396 trap nights yielded a total of 14 leopard photographs with 3 individual leopards. Amongst the 3





individuals, 2 were males and 1 was a female. The density estimate produced by the average home range radius (HRR) was 2.11 \pm 1.06 individuals per 100 km², which was found to be the best density estimate of the leopard in the study area. The relative abundance index of leopards in the sampling duration turned out to be 3.5 per 100 trap nights.

Amongst large prey, the Himalayan grey langur, *Semnopithecus ajax* and hangul, *Cervus elaphus hanglu* were sighted sufficiently frequently for the data to be analysed using DISTANCE ver. 6.0. A total of 170 groups of langur with 2679 individuals and 206 groups of hangul with 829 individuals were sighted across different seasons in the study area. The density of rodents was found to be highest in summer (2014±830.71/km²) and lowest in winter (1172.6±442.74/km²).

Small rodents contributed the maximum (48.05%) to the dietary spectrum of the leopard in Dachigam in terms of percent frequency of occurrence, followed by langur (14.04%). The hangul contributed 2.05%, while Himalayan serow, *Capricornis thar* contributed only 0.20% whereas and the rhesus macaque, *Macaca mulatta* contributed the least (0.10%) to the diet of the leopard. The minimum sample size required to study the food habits of the leopard varied from 66 to 86 scats in different seasons. Jacobs' index, calculated from biomass availability and biomass consumption, indicates that small rodents and langur were consumed more than their availability and that hangul were consumed less than their availability in all the four seasons. The preference of hangul was slightly higher (-0.79) in winter compared with summer (-0.90).

The maximum home range of the female F74 was ~74 km², in summer. The summer home range of the male was 1.96 times larger than that of the female leopard. The smallest home range was in winter. The increasing trend of ranges (100% MCPs) of this female was winter<spring<autumn<summer. The leopards showed a large variation in the distance moved daily during the lean season, summer. The daily displacement of the male leopard was greater (median displacement=588 m) than that of the female leopard (median displacement=367.44 m). The total distance travelled by the male leopard (398.71 km) was greater than those of the female leopards, F74 (374.16 km) and F71 (62.91 km). In the case of female leopard F74, the median daily distance travelled was highest in winter (0.664 km), followed by autumn (0.528 km), spring (0.506 km) and summer (0.367 km).

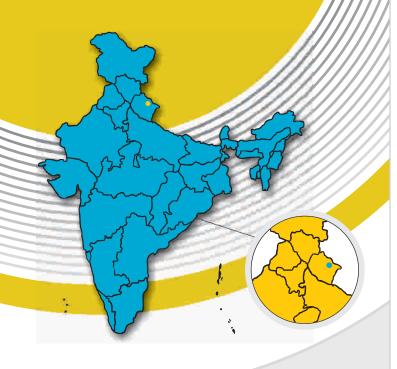
Outputs & Outcomes

The project completion report is ready for final submission. The leopards are more dependent on rodents.

Milestone

Three leopards were collared with GPS collars in the state of Jammu & Kashmir for the first time. Photographs show the animals captured during the camera trapping exercise.

AN INTEGRATED APPROACH
TO REDUCE THE
VULNERABILITY OF LOCAL
COMMUNITIES TO
ENVIRONMENTAL
DEGRADATION IN WESTERN
HIMALAYA



Investigators

Dr. Ruchi Badola and Dr. S.A. Hussain

Researchers

Pariva Dobriyal and Shivani Barthwal

Date of Initiation

January, 2008

Date of Completion

July, 2013

Grant-in-Aid

Funding Source

Objectives

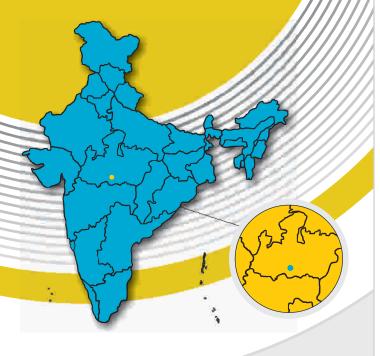
The objectives of the project were to:-

- (i) Enumerate the key ecosystem functions of the Western Himalayan forested landscapes and estimate the values of major services provided by them (the following ecosystem services will be valued - carbon sequestration, serving as a source of water, nutrient retention, protective function such as soil erosion, floods and landslides prevention, and recreation).
- (ii) Study the patterns of interaction between the local livelihoods and natural ecosystems.
- (iii) Identify the key drivers of land use & resource use changes that have taken place in the region and assess their implications for ecosystem integrity and vulnerability of the people.
- (iv) Identify ecosystem management actions and sustainable livelihood options that may reduce the vulnerability of communities to environmental degradation.
- (v) Promote the integration of this approach into emerging policy frameworks for sustainable use of natural resources in the region..

Progress

Data were analysed and a draft copy of the research report was submitted to WII in February 2014. Subsequently, a final copy of the report was submitted in April 2014 after incorporating the suggestions of the reviewing committee.

BUTTERFLIES OF SATPURA TIGER RESERVE AND THEIR ECOLOGICAL VALUES (INCLUDING PRESENCE, ABUNDANCE AND DISTRIBUTION)



Funding Source Madhya Pradesh State Bio-diversity Board

Investigators Shri Aseem Shrivastava and

Shri Subharanjan Sen

Researchers Pariva Dobriyal and Shivani Barthwal

Date of Initiation September, 2012

Date of Completion August, 2013

Objectives

The objectives of the project were to:-

- (i) Document the butterflies of Satpura Tiger Reserve.
- (ii) Estimate the abundance of different species of butterfly.
- (iii) Document the ecological role of the imago stage of butterflies (pollinators, food chain components, etc.) within the habitat.
- (iv) Identify indicator species, if any, that could help the tiger reserve management take informed decisions, especially with regard to habitat interventions.
- (v) Assess the species richness and diversity pattern of butterflies in Satpura Tiger Reserve.

Progress

The field work was completed in August 2013. Data analysis and report writing are in progress. A total of 9482 individuals of 117 species were observed on 15 transects in 4 seasons. The most abundant species were grass yellow, chocolate pansy, rings, bushbrowns and lime butterfly. Distribution maps of around 75 groups of butterflies have been prepared.

Outputs & Outcomes

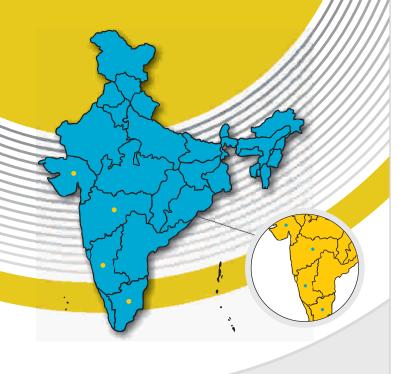
The expected outcomes of the project are:-

- (i) A checklist of butterflies.
- (ii) A photographic catalogue.
- (iii) Distribution maps.
- (iv) A digital database of the butterflies seen in Satpura Tiger Reserve.
- (v) The final report.

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CAPACITY NEEDS
ASSESSMENT FOR
PARTICIPATORY MANAGEMENT
OF COASTAL AND MARINE
PROTECTED AREAS IN INDIA
WITH SPECIAL REFERENCE TO
FORESTS SECTORS AND
YOUTHS



Funding Source GIZ Indo-German
Biodiversity Programme

Investigators Dr. V.B. Mathur, Dr. K. Sivakumar,

Dr. J.A. Johnson, Dr. G.V. Gopi,

Shri S. Prakash and Dr. Neeraj Khera, GIZ

Researchers S. Prakash, Deepak Apte

and Suvarna Raju

Date of Initiation October, 2013

Date of Completion March, 2014



Objectives

The objectives of the project were to:-

- (i) Customize the existing Capacity Needs Assessment (CNA) tool.
- (ii) Prepare a "Conceptual and Situation Analysis" of the capacity development systems, structures and tools relevant to marine protected areas (MPAs) in India, with special reference to forest sectors.

Progress & Outcomes

Coastal and marine ecosystems and their resources provide large benefits to the countries of the region through fisheries and tourism, which are important economic sectors in most of the countries, particularly India. India has a long coastline (7517 km), with an Economic Exclusive Zone of 2.02 million km².





infrastructure and leadership qualities required to involve all the stakeholders in policy making; a lack of inter-sectoral coordination and adequate skills for effective management of MPAs; and a lack of the infrastructure and equipments needed to carry out applied research and development in the research framework for improved conservation of coastal and marine protected areas in the four coastal states.

The major possible interventions of the Human Capacity Development measures of the forest sector and youths of the local populations of all the project states have been identified. They require a conducive environment to consult, debate, understand and arrive at a mutually accepted common goal: conservation of marine protected areas with the involvement of identified stakeholders including participation of local communities; intervention in existing policies to enhance the participatory approaches in the management of the protected area (PA); capacity building of resource organizations towards emerging issues such as climate change, endangered species and invasive species with better linkage and understanding; addressing issues related to the lack of funds and manpower for applied research; and training for leadership development and establishment of a knowledge based system with participatory approaches for effective management of MPAs.

This coastline supports a high human population that is dependent on the rich coastal and marine resources. It is estimated that nearly 250 million people live within a swath of 50 km from the coastline of India. Despite the tremendous ecological and economic importance and the existence of a policy and regulatory framework, India's coastal and marine biodiversity, including sea turtles, is under threat. The MPA network in India has been used as a tool to manage natural marine resources for biodiversity conservation and for the wellbeing of people dependent on it. The capacity needs assessment was carried out in four coastal states of Gujarat, Maharashtra, Karnataka and Tamil Nadu.

Based on the field assessment studies, the major gaps in the capacities of the forest sectors of all the coastal states are inadequacy of the baseline data relating to biodiversity, the

STATUS AND HABITAT
ASSESSMENT OF BENGAL
FLORICAN HOUBAROPSIS
BENGALENSIS IN THE
GRASSLANDS OF UTTAR
PRADESH



Funding Source

Uttar Pradesh State Biodiversity Board

Investigators

Dr. K. Sivakumar, Shri Subharanjan Sen and

Dr. G.S. Bhardwaj

Date of Initiation

May, 2011

Date of Completion

May, 2013

Objectives

The project has the following objectives:-

- Identification of potential habitats of the Bengal florican in Uttar Pradesh.
- (ii) Understanding the current status of Bengal florican populations and their habitats in Uttar Pradesh.
- (iii) Initiation of a Bengal florican conservation network and enhancing capacity building among the staff of the forest department, local people and NGOs to conserve this species.

Progress & Outcomes

The Bengal Florican Houbaropsis bengalensis is a 'Critically Endangered' bustard restricted to India, Nepal and southern Indochina. In India, it occurs in a few protected pockets; these fragmented populations of this species seem to be declining at a fast rate due to habitat loss and poaching. Further, there has been no information on the current status and distribution of this species in most of its range, including Uttar Pradesh. Therefore, the status of the population of the Bengal florican and its habitat was assessed in Dudhwa National Park, Kishanpur Wildlife Sanctuary, Pilibhit Reserve Forest and Lagga-Bagga, in Uttar Pradesh, during this reporting period. The present population of the florican was assessed using the area search method, along with focal animal sampling to study the behaviour. The habitat parameters were collected using the vegetation quadrat sampling method. A stakeholders' workshop was also conducted to enhance the capacity of the staff of the forest department, NGOs and local people to conserve this species in and around Dudhwa Tiger Reserve.

About 23 potential grassland sites have been identified as breeding habitats of the florican in Dudhwa Tiger Reserve. The number of Bengal floricans in various grasslands of Uttar Pradesh in 2013–2014 was estimated to be 20. Fifteen Bengal floricans were sighted in various grasslands of Uttar Pradesh in 2012–2013, and only 3 birds were sighted in 2011–2012.

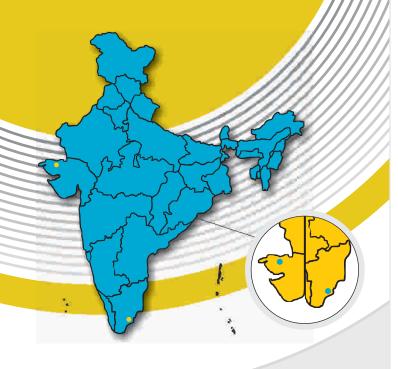


Currently, the grass burning in Dudhwa National Park starts in February and continues up to March. This practice seems to be delaying the arrival of the Bengal florican in the park.

Therefore, the current practice of grassland management in the park needs to be reviewed with respect to the florican. It was also found that there was a drastic decline in the population of florican in this region, which might be due to degradation of the habitat or poaching outside protected areas. Although most of the prime habitats of the florican in Uttar Pradesh have been

protected, there has been a continuous decline in the population here, which might be due to the tiger-centric conservation plan, which failed to conserve some of the other taxa, especially the Bengal florican. Therefore, it is important to revisit the Management Plan of Dudhwa Tiger Reserve so that the critically endangered Bengal florican is conserved forever. Further, it is important to monitor certain grasslands within Dudhwa Tiger Reserve using CCTV cameras to assess the population and behaviour better.

ASSESSMENT OF
DUGONG DISTRIBUTION,
HABITAT AND RISKS DUE
TO FISHERIES AND
OTHER ANTHROPOGENIC
RELATED ACTIVITIES IN
INDIA



Funding Source Ministry of Environment &

Forests,

Government of India

Investigator Dr. K. Sivakumar

Researcher Aditi Nair

Date of Initiation July, 2012

Date of Completion May, 2013

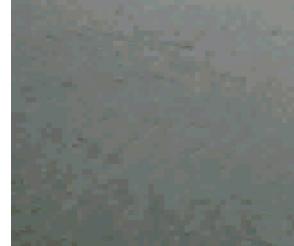
Objectives

The objectives of the project are to:-

- (i) Determine the relative distribution and abundance of the dugong population in India.
- (ii) Identify and map important dugong habitats.
- (iii) Assess risks to dugong populations and their habitats in selected priority areas.
- (iv) Assess the status of artisanal fisheries in identified dugong habitats.
- (v) Study the status of and threats to sea turtles and cetaceans found in dugong habitats.
- (vi) Understand the perception of fishermen towards conservation of the dugong and other marine species.

Progress & Outcomes

The dugong *Dugong dugon*, also called 'sea cow', is one of the four surviving species in the order Sirenia, and it is the only existing species of herbivorous mammal that lives exclusively in the sea. Dugong are usually found in calm, sheltered, nutrient-rich waters, generally in bays, shallow





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waters around islands and reef areas that are protected against strong winds and heavy seas and that have extensive sea grass beds. Such sea grass habitats are still found in India in the Gulf of Mannar, Palk Bay, Gulf of Kutch and Andaman & Nicobar Islands. This study utilized a standardized dugong questionnaire developed by an expert panel with support from the CMS-UNEP Dugong Memorandum of Understanding as it is cost-effective and flexible, provides quantifiable output and is ideal for comparison of results within and across regions. The questionnaire aimed to examine the perception of fishermen regarding conservation. The questionnaire was translated into local languages to facilitate data collection. Local interpreters conversant with the local language as well as the national language assisted with data collection.

The study found that the dugong populations are on the decline in the Gulf of Kutch, Gulf of Mannar and Palk Bay regions. Although the small but fragmented populations of dugong in the Andaman seemed to be stable, in the Nicobar region the dugong has declined, probably due to the tsunami, which adversely affected the sea grass beds there. Various fishery-related factors such as accidental capture in gill nets, hunting and boat strikes are responsible for the dwindling dugong

numbers and degradation of its habitat in Indian waters. Pollution was found to be another major factor for the degradation of sea grass habitats, especially in the Gulf of Kutch and Gulf of Mannar region. The study identified regionspecific threats to the dugong and its habitat in India. The spatial distribution of fishery-induced pressure on dugong and its habitat, based on fishing months and type of craft and gear used by respondents, was mapped. Occupancy models were built to identify priority areas for dugong conservation using sighting data from the past 5 years (2008-2012) in the PRESENCE software package. Dugong occupancy was highest in the Gulf of Mannar and Palk Bay, followed by the Andaman & Nicobar Islands, and lowest in the Gulf of Kutch. The range of variables that influenced occupancy and detection were also assessed. Preventive measures such as speed limits on boats and the use of less damaging gear in these critical dugong habitats are recommended. The need to educate and involve the local stakeholders in conservation of the dugong and its habitat has been suggested in the final report.



ASSESSMENT OF ECOLOGICAL
SETTINGS AND BIODIVERSITY
VALUES OF PAPIKONDA NATIONAL
PARK AND INDIRA SAGAR
(POLAVARAM) MULTIPURPOSE
PROJECT AREAS IMPACT ZONE IN
ANDHRA PRADESH FOR
DEVELOPMENT OF MITIGATORY
MEASURES



Funding Source
Andhra Pradesh
Forest Department

Dr. K. Sivakumar and
Dr. J. A. Johnson

Researchers
N. Goukulakannan,
Paromita Ray and
Gitanjali Katlam

Date of Initiation
November, 2012

February, 2014

Date of Completion

Objectives

The project has the following objectives:-

- (i) To determine the current status of the wildlife habitat and distribution pattern of mammals, birds, herpetofauna and fish within Papikonda National Park and the submergence zone of the Polavaram Project area.
- (ii) To determine the status and distribution pattern of aquatic vertebrates in the project area, including the national park.
- (iii) To identify corridors and migratory paths of important wildlife species, keystone habitats within the conservation area and the impact of the project on these values
- (iv) To develop mitigatory measures as part of the biodiversity management plan of the extended Papikonda National Park and the environmental management plan of the Indira Sagar (Polavaram) Multipurpose Project.

Progress & Outcomes

The Indira Sagar (Polavaram Project) Multipurpose Project envisages construction of a zoned earth-cum-rock fill dam with an impervious core across the Godavari River in Polavaram. The status and distribution of certain taxa such as mammals, birds, reptiles and fishes were assessed using various census techniques such as line transects, camera traps and sign surveys (for mammals), points counts (for birds), quadrat methods (for the herpetofauna), CPUE and market surveys (for fishes) and circular plots (for vegetation assessment). Further, GIS and remote sensing tools were used to assess the landcover and land-use pattern and potential impact of the project at the landscape level. Of the 89 species of fish recorded from the impact zone of the Godavari River, it is believed that 59 species will be affected during the construction phase as these species are reported from the close proximity of the dam site. It was observed that the riparian vegetation of the downstream of Dowlaiswaram barrage was adversely affected compared with upstream of Dowlaiswaram barrage due to significant changes in the water flow between the upstream and downstream stretches of the Godavari River from Dowlaiswaram.

An area of 3267 ha of forest land in Bhadrachalam (S), Bhadrachalam (N), Paloncha, Krishna, Eluru, Kakinada and Visakhapatnam Forest Division will be affected by submergence, construction of a power house, digging of canals, etc. During the 89.92 km of transects walks in forests, a total of 47 common langur and 1 wild boar were directly sighted, and there was no sighting of other major mammalian species during

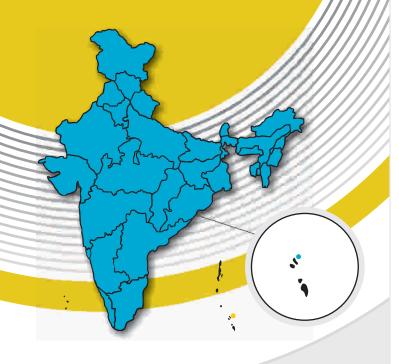


the transect walks. However, a sambar and a palm civet were sighted from outside the transects. During the carnivore sign surveys, which were conducted along 37 km of trails, some indirect evidence for the presence of jungle cat Felis chaus and sloth bear Melursus ursinus was found, though in fewer numbers, showing that the submergence zone was comparatively poorly used by wild mammals. Further, the camera trap census technique also confirmed the poor presence of mammals in this area. According to the forest department, the area is also home to one or two tigers.

Various mitigatory measures have been suggested to minimize the impact of this project on the biodiversity, including fish ladders, an integrated management plan for Papikonda National Park and Coringa Wildlife Sanctuary, fish hatcheries, a riverine eco-sensitive zone, a climate change adaptation plan, a disaster management plan and the release of 26% cumecs of water from the Dowlaiswaram barrage from November to May, 30% cumecs during June and October, and 35% cumecs from July to September. These suggested flows, are the minimum flows that are expected to provide the required environmental cues to the biota of the region and to permit the ecosystems and their biodiversity to perform their normal ecological services.



SURVEY OF TERRESTRIAL HERPETOFAUNA OF ANDAMAN & NICOBAR ARCHIPELAGO



Funding Source

Department of Science

& Technology

Investigators

Dr. Abhijit Das and Dr. Karthikeyan Vasudevan

Researcher

Harikrishnan S.

Date of Initiation

November, 2009

Date of Completion

November, 2013



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Objectives

The objectives of the project are to:-

- (i) Document the distribution, species richness and abundance of the terrestrial herpetofauna in the Andaman & Nicobar Archipelago.
- (ii) Identify vulnerable species and potential threats to the terrestrial herpetofauna in the Andaman & Nicobar Archipelago.

Progress

A 4-year survey of the terrestrial herpetofauna was conducted in the Andaman & Nicobar Islands. During this period, 24 islands were surveyed for the terrestrial herpetofauna. A total of 65 species of terrestrial reptile and 17 species of amphibian were recorded from across the Andaman & Nicobar Islands. The





island group differences. Differences in the biogeographic and colonization histories of the two groups of islands are suspected to be the reasons behind the species co-occurrence patterns observed. The abundance and geographic distribution patterns were less clearly defined for both frogs and lizards. It is suspected that introduced species such as the chital and Indian bullfrog might be having adverse impacts on the native herpetofauna in the Andaman & Nicobar Islands. A classification of the island herpetofauna according to vulnerability to extinction was attempted. The current conservation status according to the IUCN criteria and legal protection status according to WPA, 1972 were also assessed to show that the majority of species occurring in the Andaman & Nicobar Islands have not yet been assessed properly. This report was concluded with a checklist of the herpetofauna, other than turtles and crocodiles, of the Andaman & Nicobar Islands.

Outputs & Outcomes

In all, 65 species of terrestrial reptile and 17 species of amphibian were recorded from the islands.

Milestone

One new species of lizard and 1 new species of amphibian were discovered, and 1 rediscovery was made during the survey.

research team presented the presence absence matrix for all species recorded from the various islands. As expected, the largest islands had the highest number of species and the smaller islands within an island group tended to have communities that were subsets of the larger island community. It was found that the terrestrial herpetofauna in the Andaman $\boldsymbol{\epsilon}$ Nicobar Islands occur in relatively high densities in undisturbed habitats, reaching numbers as high as 3630 individuals per hectare, in Little Andaman Island. The patterns of body size distribution were mostly right skewed, but inter-taxon differences were observed. The shape of the body size distribution did not change between the Andaman Islands and the Nicobar Islands. Distribution of body sizes within communities of co-existing species of frog and lizard revealed a highly structured distribution but not in the case of snakes. Species co-occurrence patterns showed inter-taxon and inter-

PHYLOGENETIC STATUS OF SAMBAR, RUSA UNICOLOR IN WESTERN GHATS



Funding Source Grant-in-Aid

Investigator Shri S.K. Gupta

Researcher Nipun Mohan

Date of Initiation February, 2012

Date of Completion August, 2013



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Objectives

The objectives of the project are:-

- (i) To gain a molecular insight into the taxonomy of the sambar by using potential mitochondrial DNA (mtDNA) markers.
- (ii) To examine the genetic variation in the sambar population of the Western Ghats by using potential mtDNA and STR markers.





Progress

Despite its wide distribution and significant morphological variations, no study has examined the genetic variation among the sambar *Rusa unicolor* populations in India. Genetic variations among select sambar populations were described using the mitochondrial DNA (mtDNA) control region. Sequence variations in a partial fragment of the mtDNA control region were examined from biological samples collected from southern India, the central highlands and semi-arid regions. The study

demonstrated that the south Indian population of sambar is genetically distinct from the central and north Indian populations. The southern population had 40 bp insertions in the control region. During this study it was observed that 40 bp insertion-positive populations also have the sore spot. Sambar populations found in a few southern India sites, the central highland and Gangetic plains did not exhibit active sore spots. The 40 bp insertion after the 233 bp nucleotide position was also not observed in these populations. The molecular feature of a 40 bp insertion indicates that these sambar populations in select locations in southern India could be an ecologically significant clade.

The DNA sequences of the mtDNA cytochrome b (cyt b) gene were generated from sambar populations across India.
Phylogenetic analysis

indicated that there was a wide distribution of one common ancestor of the sambar around 2.8 million years ago (mya). This ancient ancestor was restricted to the Western Ghats in India. The modern sambar, Rusa unicolor, and rusa deer evolved around 1.2 mya. The Western Ghats retained its old genetic features and its habitat. Hence, India inhabited two distinct lineages of the sambar: one is similar to the South-east Asian lineage, and the other is a genetically distinct Western Ghats lineage. Hence the Western Ghats sambar appears to be a significant evolutionary unit.

Outputs & Outcomes

A couple of novel research articles were published during this study (Gupta et al 2013, 2014). Two distinct lineages of the sambar were recorded from India.

Milestone

Two distinct lineages of sambar were recorded from India. It was also found that India retained one of the ancient lineages of the sambar.

ECOLOGICAL
MONITORING OF TIGER
POPULATION IN PANNA
LANDSCAPE, MADHYA
PRADESH



Funding Source

Madhya Pradesh Forest Department, supported by

National Tiger Conservation

Authority

Investigators

Dr. K. Ramesh, Subharanjan Sen and Dr. J.A. Johnson

Researchers

Mriganka Shekhar

Sarkar and Sonal K. Romin

Date of Initiation

April, 2010

Date of Completion

January, 2014



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Objectives

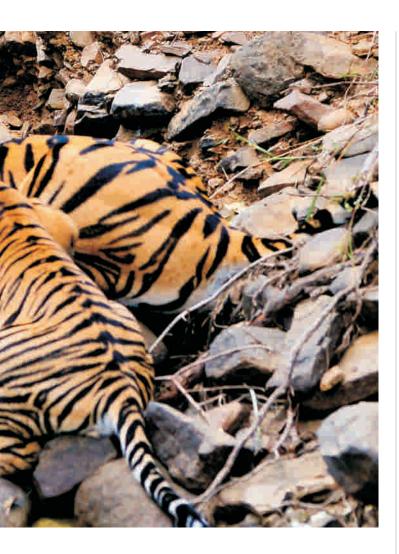
The objectives of the project are to:-

- Monitor and study the population growth of the translocated/re-established tiger population in Panna Tiger Reserve (PTR) as well as the food habits and genetic structure of the tigers.
- (ii) Understand the dynamics of co-predator and prey populations in relation to the tiger occupancy pattern and management interventions.
- (iii) Study the landscape ecology of the tiger, including human interface issues and ecological correlates linked to economics and system services.

Progress

During the interim period, three tiger offspring (P121, P221 and P222) were radio collared. One adult tiger, *i.e.* P212, born to reintroduced animals dispersed from the population and moved





about 60 km towards the south-eastern side of the park. It was then rescued, re-collared and translocated to Sanjay-Dubri Tiger Reserve, within Madhua Pradesh, where it is being monitored by the staff of the reserve. Another female tiger, T6, was translocated from Pench Tiger Reserve to PTR, making the total number of adults translocated to PTR during Phase I of the project period 6. The geographic locations of the radio-collared tigers were obtained using the "home in" method, while nonradio collared adult tigers were monitored through indirect evidence such as pugmarks, scratch marks, scent marks and scat marks and through periodical camera trapping sessions. These locations were analysed for estimating the home ranges seasonally using Hawth's analysis tool in the ArcGIS platform. Two estimates i.e. Minimum Convex Polygon (MCP) and Fixed Kernel (FK) method were obtained for these tigers. Hawth's analysis tool was also used to identify centres of activity and range shifts between seasons.

A total of 6 blood samples and 7 fresh scats were collected and stored in appropriate media in a refrigerator. DNA samples were extracted from these 13 samples, and all consensus genotype data were analysed to assess the genetic structure of this new population.

Camera trap based sampling was carried out to assess the status of the populations of tigers and co-predators. A total of 120 pairs of Cuddyback Attack camera traps were deployed throughout the park for a session of 30 days' duration in both summer and winter. The camera trap data were compiled, and a relevant matrix was prepared for statistical analysis. An appropriate mark-recapture model was then used to estimate the size of the population using the CAPTURE software package. Subsequently, the data were analysed in the DENSITY 6 software package to estimate the population density.

Line transect sampling was carried out to estimate the abundance of tiger prey species. A total of 41 lines transects of ca. 2 m width each were sampled across PTR, covering different habitats, both in winter and summer (243.6 km effort). Density estimates were obtained using DISTANCE 6.

Outputs & Outcomes

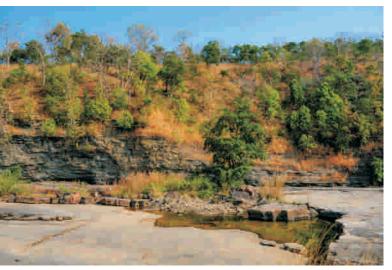
At the end of 2013, the number of individuals remaining in the park was 22, including 9 adults, 7 sub-adults and 6 cubs.

Overall, the cumulative survival of the cubs and adults was 83% and 100%, respectively. With additional births, translocation and dispersals, the population increased to 25 animals. Home range estimates revealed a striking variation between males (ca. 60 km²) and females (ca. 100 km²). Although there were individual variations in the home range estimates across seasons, the pooled home range estimate for all the animals did not show significant variations across seasons.

In this population, the observed heterozygosity is 0.60 ± 0.23 , the expected heterozygosity is 0.62 ± 0.20 , and Nei's heterozygosity is 0.59 ± 0.19 . Overall, the genetic diversity is moderate, and genetic intervention in the population may be needed in the future. It was also found that T2's first litters were not fathered by T3 but by a transient male representing the old Panna population.

The camera trap data, converted into an 'X matrix', were subjected to a closure test to test for closure. The results showed that the data set was amenable to closure assumption for the entire sampling period. Eleven individual tigers were captured in summer in 2013 (7200 trap nights), with the total number of recaptures being 79 pictures. Using DENSITY 4.46, the estimate was translated into a 1/2MMDM density of 1.14/100 km² (SE 0.10) for the 2013 summer. A density estimate based on a habitat masked spatially explicit capture recapture (SECR) model provided a density estimate of 1.59/100 km² (SE





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0.50) for the 2013 summer. Other co-predators, leopards and hyaenas, were photo-captured in all the seasons, but estimates could only be obtained for the 2012 summer. The estimate for the 2012 summer yielded a minimum of 53 individual leopards and 102 hyenas, with total captures of 89 and 361, respectively, for these 2 animals. These records provided a SECR based density of 12.2/100 km² (SE 0.02) for leopards and 15.1/100 km² (SE 0.02) for hyaenas.

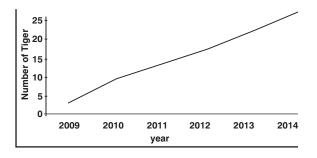
The tiger prey species in PTR include sambar, chital, nilgai, wild pig, langur, peafowl, chinkara, chowsingha and domestic and feral cattle. However, density analysis could not be performed for chowsingha due to a very low small number of detections during the sampling periods. The prey (wild ungulate prey) population size (wild ungulate prey) was estimated to be between 30 animals / km² to and 45 animals / km². Based on the standard error (SE) for the density estimates and the coefficient of variation (CV) of the encounter rate, the estimates in winter were reliable for langur, peafowl, sambar, chital and chinkara were reliable during winter, while and the estimates in summer were reliable for wild pig, nilgai and cattle were reliable in summer, although these variations could also be explained by the seasonality of habitat choice for these species. Of the ungulate species, the abundance ranking of the ungulate species follows is sambar>nilgai>wild pig>chital, although cattle, occurring in restricted areas, have scores the highest density, but occur in restricted areas scores. The density estimates obtained for the different administrative units (i.e. ranges) suggest that four ranges (Panna, Hinauta, Madla and Gaharighat) have diverse prey species with reasonable abundance, while Chandranagar and Kishnagarh ranges are deprived of do not have diversity of prey and are dominated by the nilgai.

Milestone

The status of the tiger and related species in PTR should be seen in the context of population extinction and recovery of the species following a full-fledged reinforcement and recovery programme. Beginning with 3 animals (1 male and 2 females) translocated from other wild populations in 2009, 2 hand-reared and semi-wild females (2011) and 1 female (2014), the PTR population has now grown to 25 animals, to which the successful breeding of almost all the females has contributed. In all, 10 animals have been collared, of which 9 are still being monitored through radio-tracking. Therefore, in the context of Phase IV monitoring, PTR offers further insights, since the population is known and population estimation procedures can be tested here.

Camera trap sampling captured 100% of the adult and sub-adult tigers in the population in all seasons (note that the population is known), but there was variation in the recapture rate, which was higher in winter and lower in summer. This possibly relates to a skewed distribution of the animals in the summer months and the camera locations being static. The co-predators, the leopard and the hyaena, have high densities in PTR, and this is again related to the diversity of prey species and to the habitat conditions being suited for the co-occurrence of these species. This is also reflected in the space use pattern of the leopard and hyaena. The spatial occupancy of the tiger suggests that space use increases progressively, showing a tendency towards occupancy of unclaimed territories. Leopards and hyaenas are distributed well in the sampled area, indicating the health of PTR in the larger context.

The prey population density in PTR is comparable with other similar habitats, and the current estimate of ca. 32 ungulates/km² is dominated by sambar, followed by nilgai, wild pig and chital. Cattle also contribute substantial biomass in the area. Although the estimate is slightly lower than the previous estimates obtained in PTR, it is within the confidence limits, and so the prey density in PTR can be stated to be stable.



EVALUATION OF PHYSIOLOGICAL STRESS AND REPRODUCTIVE POTENTIAL IN REINTRODUCED TIGER POPULATIONS IN SARISKA TIGER RESERVE, RAJASTHAN AND PANNA TIGER RESERVE, MADHYA PRADESH



Funding Source National Tiger Conservation
Authority, New Delhi

Investigator Dr. K. Ramesh; Dr. K. Sankar

and Dr. G. Umapathy

Researcher Manjari Malviya

Date of Initiation April, 2012

Date of Completion March, 2014

Objectives

The project has the following objectives:-

- (i) Assessment of faecal steroid concentrations to determine the stress level and reproductive status of the translocated tiger populations in Sariska and Panna tiger reserves, their sources and representative free-living populations.
- (ii) Identification of anthropogenic stressors and assessment of the magnitude of the pressures on the target tiger populations.

Progress

During the interim period, scat samples of re-introduced tigers were collected from Sariska (STR) and Panna (PTR) tiger reserves, and these were processed for extracting reproductive and stress hormones. The protocol that had a high extraction efficiency (85.2-93.4%; n=22) compared with the others was used for fecal steroid metabolite extraction. In brief, 0.2-0.3 q of dried, mixed and pulverized faecal sample was weighed and boiled in 5 ml of 90% aqueous ethanol for 20 minutes. After centrifugation at 500 g for 10 min, the supernatant was recovered and the pellet was re-suspended in 5 ml of 90% aqueous ethanol, vortexed for 1 minute and re-centrifuged to recover the supernatant. Both the ethanol supernatants were then combined, dried (in an oven at 40°C), re-suspended in 1 ml of absolute methanol, vortexed for 1 minute, sonicated for 30 seconds (Branson Ultrasonics 250, CT, USA) to free particles adhering to the wall of the test tube and stored at -20°C until the hormone assay was conducted. The mean cortisol concentrations of the two re-introduced tiger populations and tigers housed in Hyderabad Zoo were then calculated, and the t-test was performed to find out if there was any significant difference between the cortisol levels of the different tiger populations.

Line transect sampling was carried out to estimate the abundance of prey. A total of 41 and 48 line transects, each up to 2 km long, were walked in PTR and Sariska (STR), respectively, between November 2013 and March 2014. The transects were walked during the early morning hours, and prey species were recorded, along with their cluster size, sighting angle and angular distance as well as the terrain type and vegetation type of the location where they were sighted. All the line transects at both the reserves were walked in a replicate of 3. The data for the 2012–2013 sampling season were then entered in an MS-Excel spreadsheet and analysed using the DISTANCE 5.0 software package.

Circular plots of 15 m and 1 m radius were laid every 400 m on the line transects to estimate the anthropogenic disturbance. A total of 235 and 238 circular plots were laid in STR and PTR,



respectively. Descriptive statistics of the anthropogenic disturbance such as percentage, means and modes were calculated for the weed abundance, cutting and lopping. The Mann–Whitney U test was run to compare the cutting and lopping in the two reserves.

Outputs & Outcomes

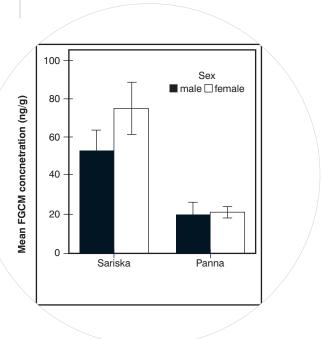
The faecal cortisol concentration was estimated for both male and female tigers in STR. The mean faecal cortisol level was 54.13 ng/g for tigers and 89.56 ng/g for tigresses. The results of the t-test reveal that the cortisol levels of the 2 sexes were significantly different (p<0.05). The tigress ST-2 had a consistently higher concentration of cortisol compared with others although it littered. It was found that the cortisol levels in the tiger population of STR were higher during June and July in 2013. On comparison, it was also found that the mean cortisol level in STR was the highest, greater than those of PTR and the captive population of Hyderabad Zoo.

The prey abundance estimates indicate that the overall prey density in STR is very high compared with PTR. The highest density of ungulates in PTR was that of the nilgai, and in STR it was that of the sambar.

The three important disturbance parameters indicate that weed presence is greater in STR with PTR, whereas the wood cutting in STR is comparable with that in PTR. The Mann–Whitney U test also indicates that the cutting at the 2 sites is similar (p>0.05), while lopping is higher in STR (p<0.05). Overall, the anthropogenic disturbance was significantly higher in STR.

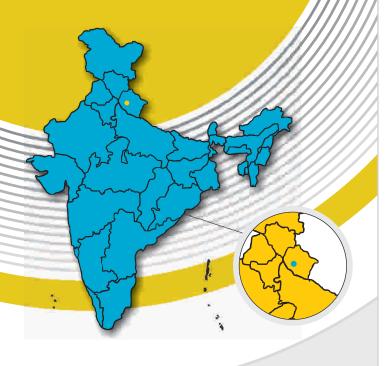
Milestone

It was established that the re-introduced tigers of STR experience a high level of stress as reflected by the significantly higher cortisol concentration in the scat samples. In line with the expectation, females showed higher levels of stress compared with males. Potential stressors (prey and anthropogenic disturbance) in the environments of the 2 free ranging populations were studied. It was found that the prey density was higher in STR, negating the possibility of nutritional stress in the tigers of STR. The anthropogenic disturbance was found to be higher in STR, indicating humaninduced stress in the tigers of Sariska. The scope of the study is on detailed analysis of the individual stress levels as they will reveal which animals are facing higher stress and hence are likely to be less reproductively active presently and in the long term.



Mean faecal glucocorticoid metabolite (fGCM) concentrations in male and female tigers in Sariska (n=202) and Panna (n=143) tiger reserves during the study period

ECOLOGY AND CONSERVATION OF THE YELLOW-HEADED TORTOISE INDOTESTUDO ELONGATA IN AND AROUND RAJAJI NATIONAL PARK, UTTARAKHAND



Funding Source The Mohamed Bin Zayed Species Conservation Fund

Investigators Shri R. Suresh Kumar and

Dr. Bivash Pandav

Researcher Zehidul Hussain

Date of Initiation June, 2012

Date of Completion March, 2014

Objectives

The objectives of the project were to:-

- (i) Assess the status and distribution of the yellow-headed tortoise in and around Rajaji National Park.
- (ii) Collect detailed information on the population structure, habitat use and activity pattern of the yellow-headed tortoise.

Progress

This study has been completed. In total, 75 individual tortoises (38 male, 27 female and 10 juvenile) were captured, of which 42 were captured during summer in 2012. Around 102 days were spent searching for tortoises, and the captured tortoises were marked by filing notches into the marginal scutes of the carapace. The overall adult sex ratio was unbiased, and on the basis of the scute ring count, most tortoises (76%) were in the age group of 11-20 years. Male tortoises were observed to be larger and heavier (SCL, 257.7±23.7 mm; weight, 2231.0±488.1 g; n=38) than females (SCL, 247.6±16.5 mm; weight, 2154.7±299.5 g; n= 27) though male tortoises were found to differ significantly from females only in the straight carapace length (Z=-2.569, p=0.01). The average carapace length of juvenile tortoises was 159.0±30.2 mm, and the weight was 785.7±405.1 g. Most tortoises were captured in June (67%), when they were mostly found buried under dense leaf-litter. In 2013, 24 tortoises (19 male and 5 female) marked in 2012 were

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recaptured, and these were found in the same locality where they were first captured, suggesting site fidelity. Tortoise captures declined during the monsoon in the area. Three individuals (2 male and 1 female) were fitted with VHF transmitters and tracked for more than 2 months. One male tracked for 70 days covered an overall distance of approximately 3000 m and had a home range of 8.5 ha.

Outputs & Outcomes

This is the first ecological study on the endangered yellow-headed tortoise in India. A detailed report on the study has been prepared, and a research paper on the work is currently being prepared.

Milestone

The overall adult sex ratio was unbiased, and most tortoises (76%) were in the age group of 11–20 years. Tortoise captures declined during the monsoon in the area. Three individuals (2 male and 1 female) were fitted with VHF transmitters and tracked for more than 2 months.



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A RAPID FIELD SURVEY OF TIGERS AND PREY IN DIBANG VALLEY DISTRICT, ARUNACHAL PRADESH



Funding Source National Tiger Conservation
Authority

Investigator Dr. G.V. Gopi

Date of Initiation September, 2013

Date of Completion March, 2014

Objectives

The objectives of the project are to:-

- (i) Generate baseline distribution data for tigers and their prey in the Dibang Valley District landscape.
- (ii) Identify suitable tiger habitats for conservation in the Dibang Valley District landscape.

Progress and Outcomes

A combination of methods was used to assess the status of tigers, their prey and habitat in Dibang Valley District, Arunachal Pradesh in North-east India. The effort included trekking over 103 km, 24 interviews with local people and officials and vehicle surveys over 320 km. This rapid assessment survey was conducted in an expedition mode from 23 December 2013 to 22 January 2014. The research team camera trapped the first ever image of an adult tiger from Dibang Valley Wildlife Sanctuary (DWLS) on 2 January 2014. The team also observed 10 pugmarks and collected 11 scats in and around the sanctuary. All the 24 local people whom the team interviewed informally confirmed the presence of tigers in the sanctuary. A preliminary assessment of the prey suggested that DWLS holds a good diversity and abundance of prey such as takin Budorcas taxicolor taxicolor, wild pig Sus scrofa, goral Naemorhedus goral, musk deer Moschus fuscus, barking deer Muntiacus muntjak, Himalayan serow Capricornis thar and mithun Bos frontalis, which can sustain a good population of tigers in the sanctuary. DWLS has the potential to become a tiger reserve in the future as it may harbour a very important source population of tigers in this region. However, the next immediate priority must be to ensure that this vital tiger population is protected and continuously monitored. This can be achieved through a collaborative effort of the National Tiger Conservation Authority, WII, the Government of Arunachal Pradesh and, most important, the local people. It may be achieved by conducting long-term research to establish robust ecological and genetic baselines that can aid long-term conservation and monitoring of tigers, co-predators, prey and their habitats in this unique landscape, which is part of a global biodiversity hotspot.

Milestone

The Department of Forests & Environment, Government of Arunachal Pradesh is preparing a proposal based on the findings of the study to be submitted to the National Tiger Conservation Authority for declaring Dibang Wildlife Sanctuary a tiger reserve.

ECOLOGICAL EFFECTS OF ROAD THROUGH SENSITIVE HABITATS: IMPLICATIONS FOR WILDLIFE CONSERVATION



Funding Source Grant-in-Aid

Investigators Dr. Asha Rajvanshi and Dr. V.B. Mathur

Researcher A. Pragatheesh

Date of Initiation April, 2008

Date of Completion October, 2012

Objective

The objectives of the projects are to:-

- (i) Assess the nature of ecological effects associated with roads based on a study of existing road sections aligned through or along an ecologically sensitive area.
- (ii) Predict the nature of the ecological effects of proposed road upgrading (from two lanes to four lanes) project with and without mitigation measures.
- (iii) Evaluate the effectiveness of the mitigation proposed on the basis of a study of a road project implemented earlier.
- (iv) Suggest effective measures for preventing road-induced impacts for harmonizing conservation and development.

The research work under this project was completed in the reporting year, and the final report has been submitted.

Progress

The research helped answer the following key questions:

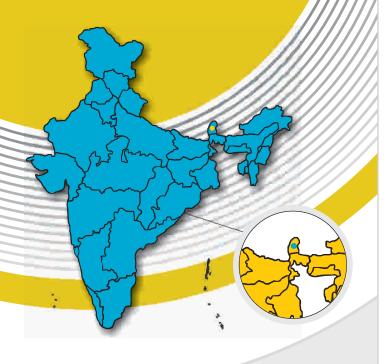
- (i) How are the wild animals distributed along the roadside?
- (ii) What is the spatio-temporal pattern of road use by animals?
- (iii) What factors influence the vulnerability and mortality of animals?
- (iv) What is the present use of animal crossings and how suitable are they?
- (v) What are the mitigation options for road-induced impacts?
- (vi) What is the state of compliance of mitigation measures in implemented projects and how successful were these?

Outputs & Outcomes

The outcome of the research clearly established the importance of road ecology as a discipline that needs to be promoted for combining conservation science and road building for securing and enhancing connectivity between natural areas; improving the prospects of conserving biodiversity within the landscapes in which roads were built wherever feasible and creating a crossroads for ecology and economy through the development of permeable passages for wildlife in transportation corridors.



MONITORING LAND USE BY WILDLIFE, LIVESTOCK AND HUMANS IN KHANGCHENDZONGA BIOSPHERE RESERVE



Funding Source Ministry of Environment & Forests

Investigators Dr. S. Sathyakumar and

Shri Sandeep Kumar Gupta

Researchers Nand Kishore Dimri, Suwankar Biswas and

Sandhy Mitra

Date of Initiation June, 2011

Date of Completion May, 2014

ONGOING PROJECTS

Objectives

The objectives of the project are to:-

- Assess the distribution and land use patterns of carnivores, ungulates, livestock and humans in Khangchendzonga Biosphere Reserve (KBR).
- (ii) Develop a monitoring programme for monitoring patterns of land use by carnivores, ungulates, livestock and humans in KBR.

Progress

Field activities were carried out in the buffer zone of KBR. Land use by local communities and tourists was observed made by monitoring important entry/exit points, trekking routes and forested areas near villages. Questionnaire surveys were administered in some of the villages of the buffer zone to assess the land use by local communities (natural resource use, wildlife-human conflicts) and visitors (ecotourism). Samples collected from the field were subjected to analysis in the WII laboratory. DNA was extracted for species identification using standard protocols.

Outputs & Outcomes

During the reporting period, short sequences of ca. 146 bp (for all carnivore samples) and ca. 381 bp (ungulates samples) were generated. Standardization of protocols for PCR amplification of other samples that generated potentially degraded DNA was carried out.

Household village surveys (n=122) were conducted in 11 villages inside the buffer zone of KBR, viz., Tingting (12), Chung (9), Labdang (19), Karjee (17), Karjee-pokhri (6), Mangnam (6), Kongri-naku (8), Kyongtey (9), Pokhridara (10), Nessa (18) and Hungri (8). In total, 377 human-wildlife conflict cases were recorded from 11 villages, mostly in the form of crop damage (n=288), followed by livestock depredation (n=87) and, in recent years, a few cases of human attacks (n=2) by Asiatic black bears. The greatest number of cases of livestock depredation was recorded from Mangnam and Kongri-naku villages, followed by Labdang and Karjee-pokhri villages.

The research team proposed to amplify the larger fragments of the same genes with more robust primers and samples and plan to collect more fresh samples from KBR. Field surveys will be carried out in the study area during the third year of the project to validate species distribution models developed from WII's previous research project to assess land use by wildlife, livestock and humans.

STUDIES ON HOUSING AND ENCLOSURE **ENRICHMENT OF SOME SPECIES IN SELECTED INDIAN ZOOS**

Funding Source

Central Zoo Authority,

New Delhi

Investigators

Shri P.C. Tyagi and Dr. Parag Nigam

Researchers

Sitendu Goswami,

Nilofer Kundu, T. Ajay Kumar,

Malemleima Ningombi

Project Consultant

Dr. Anupam Srivastav

Date of Initiation

January, 2011

Date of Completion

April, 2014

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Objectives

The project objectives include:-

- (i) Carrying out a literature review of the existing knowledge relevant to captive management of target species.
- (ii) Assessment of the existing housing facilities and enclosure enrichment for target species in Indian zoos.
- (iii) Developing a critical note for suitable housing and enclosure enrichment for target species.
- (iv) Developing protocols for enclosure enrichment for the well-being of target captive wild animals.

Progress

The captive environment (40 species) and the behavioural responses elicited (32 species) were assessed in selected zoos in India. Evaluation reports of the captive environment of these species were prepared on the basis of these assessments. Enrichment plans were prepared for 8 representative species. Pre- and post-enrichment evaluations were carried out for selected species to encourage species-specific behaviour patterns.

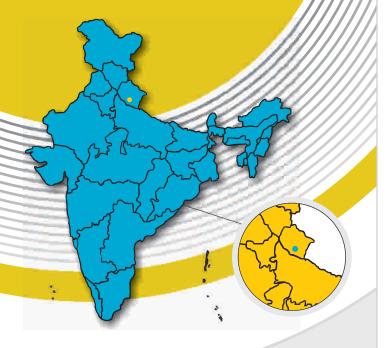
Outputs & Outcomes

An enclosure complexity-scoring index was developed that was based on the enclosure assessment and literature review. The enclosures of the selected species were evaluated and the strengths and weaknesses of various enclosures identified. Based on the evaluations, enrichment plans for 8 species were tested at selected enclosures.

Milestone

Development and testing of enrichment plans for 8 selected native species housed in Indian zoos.

MONITORING SOURCE POPULATION OF TIGER IN CORBETT TIGER RESERVE



Funding Source National Tiger Conservation
Authority, New Delhi

Investigators Dr. Y.V. Jhala and Shri Qamar Qureshi

Researchers Shikha Bisht and Sudip Bannerjee

Date of Initiation October, 2009

Date of Completion December, 2014

Objectives

The objectives of the project are to:-

- (i) Monitor the source population of tigers in Corbett Tiger Reserve (CTR) and
 - (a) Estimate the tiger population within selected areas of the reserve.
 - (b) obtain survival and mortality information through a mark-recapture study.
- (ii) Monitor prey and co-predator populations and the condition of the habitat in the tiger reserve.
- (iii) Gain an understanding of tiger dispersal patterns.

Progress

The current study is concerned with detecting change, establishing its direction and measuring its extent and intensity in CTR. This will enable site-specific changes to be detected in time and addressed through timely intervention by management. Camera trap-based capture-recapture (Pollock's robust design) was conducted in two successive blocks and continued seasonally (summer, from May to July, and winter, from December to January) each year for a period of 30–45 days per block to ensure population closure in an area of 450–500 km² (MCP) to estimate the population size, density and survival of tigers. In 2013, an area of ~1100 km² across the entire CTR was camera trapped from February to April. A total of 251 camera locations were sampled in the area identified on the basis of our reconnaissance survey and the local knowledge of the staff of the forest department.

An effort of 7920 trap nights yielded 2266 photographs of 144 individual tigers. Closed population estimators selected Mh as the best-fit model, thereby accounting for heterogeneity.

The population estimate computed using the Mh jackknife estimator was 109 (9.8). Under the spatial likelihood model the density was 17.5 (1.7) tigers per 100 km².

Outputs & Outcomes

Estimates of density at the same site over multiple years are very useful for understanding and managing populations of large carnivores. Intensive camera trapping in the same area of CTR, which is the source population of the Tera-Shiwalik Landscape or Terai-Arc Landscape (TAL), will bring forth trends in the tiger population through monitoring their abundance and density over time.



Camera Trap Image

MONITORING SOURCE POPULATION OF TIGERS IN RANTHAMBHORE TIGER RESERVE, INDIA



Funding Source National Tiger Conservation
Authority

Investigators Dr. Y.V. Jhala and Shri Qamar Qureshi

Researchers Peter P. Chakravarthy and Ayan Sadhu

Date of Initiation September, 2011

Date of Completion December, 2014

Objectives

This project aims to:-

- (i) Monitor the source population of tigers in Ranthambhore Tiger Reserve (RTR) through intensive camera trap surveys and obtain survival and mortality information through a capture-mark-recapture study.
- (ii) Understand and monitor tiger dispersal patterns and land tenure systems.
- (iii) Keep a vigil on dispersing tigers so as to provide an update to protected area managers regarding their location for subsequent protection measures.

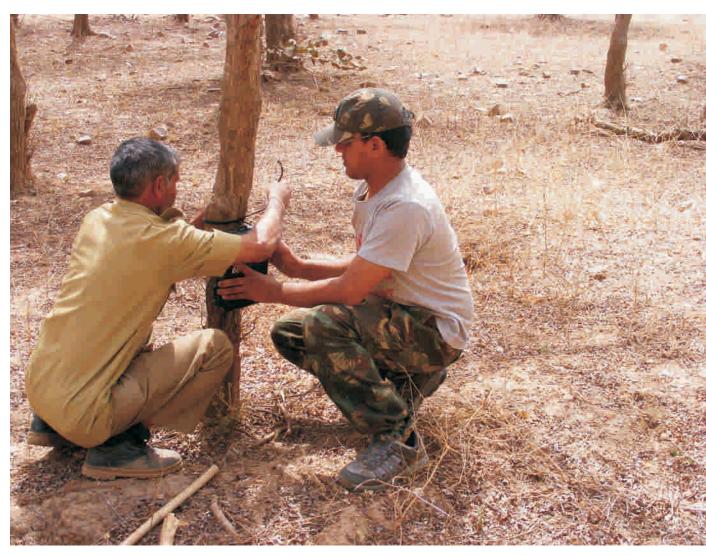
Progress

The photographic capture–recapture technique was used to estimate the density and abundance of tigers. The intensive study area (trapping area 465 km²) was divided into 2×2 km spatial grids (n=76), and in each grid one pair of camera traps was deployed (total effort 4180 trap nights). To maximize the detection probability, camera traps were placed in areas frequently used by tigers. Each camera trap location was recorded using a handheld GPS unit and plotted on a digitized map of the study area to ensure a survey design without any sampling holes. Each tiger that was photo captured was identified using the Extract-Compare software package and given a unique ID (e.g. T1, T2, etc.). Later, a capture history matrix was prepared for further analysis. The abundance was estimated using a close population capture recapture (considering time, behaviour and individual heterogeneity) framework (MARK, ver.7.0). Density was estimated using the spatially explicit capture recaptures (SECR) technique (DENSITY, ver.5.1). The spatial location of each capture/recapture was used in calculating the number of home range centres (activity centres) present in the sampling area. Demographic parameters such as the litter size, age of female at first reproduction, inter-birth interval and recruitment were estimated through long-term monitoring of the tiger population through camera trap surveys paired with tracking of tiger individuals with the help of the forest department. Life history events were recorded to get an account of these parameters. The litter size at birth was rarely recorded, and so the estimation of litter size could be an underestimate of the actual litter size. Population estimation of the prey species of the tiger was carried out in RTR using the distance sampling technique. Transects of fixed bearing were placed in all the major habitat types, considering the maximum spatial coverage of each stratum (i.e. habitat) of the study area. Each transect was walked between 6:30 am and 8:30 am. The GPS locations of the beginning points and end points of each transect, as well as the bearing of the line, GPS location, angular distance, animal bearing and habitat type of each sighting were recorded. Each



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line transect was walked thrice, with the total effort amounting to 360 km of walking.

Outputs & Outcomes

Abundance was estimated by using a closed capture with heterogeneity framework (MARK, ver.7.0), which incorporates individual as well as time-induced heterogeneity, and the best fit model was selected. In the present study, the abundance was estimated at 31.0 (\pm 0.01) adult individuals. The density of tigers was estimated using the likelihood based spatially capture recapture technique. For the entire data set, different models were tested along with detection functions. The best model among these was selected with respect to the AIC value. The density was 6.11 (\pm 0.01) tigers per 100 km2. The population was demographically closed since tigers aged less than 2 years

were not taken into account for population estimation. A habitat mask was used to eliminate non-habitat areas from the survey area. The female age at first reproduction was recorded at 55.5 months (the data range from 34 months to 68 months) by observing 10 breeding females. All of them were monitored since their birth to the time of first reproduction. The average interval between 2 successive litters was observed at 32.1 months. Interestingly, it was observed the intervals were less when females lost their cubs before maturity (<20 months). The average litter size was recorded at 2.25 (the data range from 3 to 1 litters) by monitoring 28 litters of 17 different breeding females. The survival rate of tigers with known fate was estimated from 2 months of age (when they were first sighted) to recruitment age (>2 years). A total of 37 cubs were



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monitored. Among these, 30 survived till recruitment age, 5 died (3 natural deaths and 2 were poisoned) and 2 went missing before recruitment age. The recruitment percentage of tigers was estimated by monitoring tigers with known fate from 2 months to the time they established their territories. Out of 37 cubs (22 males and 15 females), 16 (10 males and 6 females) succeeded in establishing their territories. The density of the prey base was estimated using the DISTANCE 6.0 software package. A total of 60 line transects of length 2 km were walked thrice by trained personnel, the total effort being 360 km. All the major prey species were clustered in the 'All prey' category (density 51.4±7.03), while chital, sambar and nilgai were clustered into the 'Large prey' category (density 40.1±5.59). Species-wise density estimates were done for chital (density 26.3±4.7), sambar (density 8.4±1.6) and nilgai (density 3.5±0.9). Individual estimates were not possible for chinkara and wild pig due to the insufficient sample sizes (<20).

Milestone

For long-term survival of a long ranging carnivore, such as the tiger, monitoring the population source along with its adjoining sink population is very important as this will bring forth trends in the tiger population through the abundance and density over time so as to provide inputs for adaptive management.

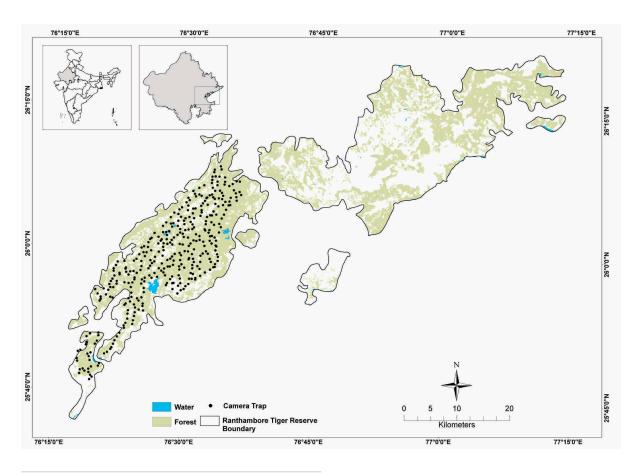
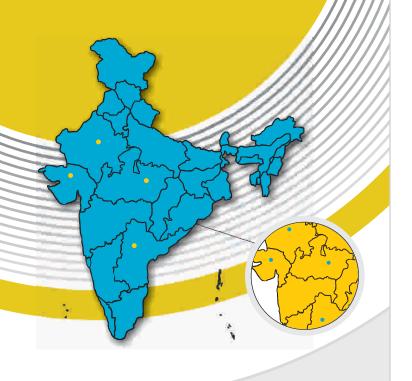


Fig. 1: Placement of camera traps in core area of Ranthambhore Tiger Reserve (RTR), India

STUDY OF THE ECOLOGY AND MIGRATION OF THE LESSER FLORICAN SYPHEOTIDES INDICA THROUGH SATELLITE TELEMETRY



Funding Source Grant-in-Aid

Investigators Dr. K. Sivakumar,

Dr. K. Sivakumar, Dr. Y.V. Jhala and Dr. G.S. Bhardwaj

Researchers Omkar Dhavale and

A. Mohan

Date of Initiation March, 2012

Date of Completion March, 2015







Objectives

The objectives of the project are to:-

- (i) Study the migration and movement patterns of the lesser florican and to identify their non-breeding habitats using satellite tracking techniques.
- (ii) Assess the current status and distribution of breeding of the lesser florican in north-western India and Andhra Pradesh.
- (iii) Study the habitat and breeding ecology of the lesser florican in north-western India.
- (iv) Assess the status of the non-breeding habitat of the lesser florican
- (v) Prepare a comprehensive conservation plan covering both the breeding and non-breeding ranges and the migration pathways of the lesser florican.

Progress and Outcomes

The lesser florican *Sypheotides indica*, a species endemic to Indian subcontinent is seen during the monsoon in the north-western India, where it breeds. Its population and range are continuously decreasing at an alarming rate due to loss of breeding habitat and certain threats prevailing in the non-breeding habitats, which are believed to be in south and south-east India. However, in the recent past there has been no confirmation about the distribution of the species in India during the non-breeding season. In this connection, this 3 year study was proposed to study the ecology and migration pattern of the lesser florican using satellite tracking techniques to determine its non-breeding habitats. It also aimed to study the current status, distribution and ecology of this species in north-western India.

The entire breeding range of the lesser florican in western India was stratified into $1\ \text{km}^2$ grids. In 2013, a total of 224 male lesser floricans were found in the agricultural fields in and around Ajmer. This is the single largest population of the lesser florican recorded in a single district so far in India, particularly all in agricultural fields. The florican population was widely dispersed in the form of lekking clusters and spread into the neighbouring districts of Tonk, Bhilwara and Beawar.

In Madhya Pradesh, 6 male and 6 female floricans were found in Sailana, in Ratlam district. Two male floricans were found in Petlawad, in Jhabua district, 5 males and 4 females were found in Shikarwadi, 1 female was found in Amba, and 1 male, along with 1 female, was found in Samjarumi. As most of the land is under cultivation, all except 1 florican were found in crop fields. The lands not used for agriculture, also called as charakhas, are used by the locals for grazing their cattle. This leaves the grass barely a few centimetres high (3–4 cm, to be precise). This was the main reason why the birds were seen in crop fields only.

LANDSCAPE ECOLOGY OF LARGE MAMMALS IN THE SHIVALIK-TERAI LANDSCAPE WITH FOCUS ON FLAGSHIP SPECIES AND ECOSYSTEM **SERVICES**



Funding Source Grant-in-Aid

Investigators Dr. K. Ramesh and Dr. Bivash Pandav

Researcher M. Naveen

Date of Initiation February, 2012

Date of Completion February, 2016

Objectives

The objectives of the project are to:-

- Determine the spatial pattern of distribution and abundance of tigers in the landscape.
- (ii) Quantify the impact of anthropogenic disturbance on tiger and livestock-mediated competition on the distribution and abundance of wild ungulate species.
- (iii) Evaluate the landscape permeability and probability of long-term survival of tiger populations in this landscape.

Progress

The landscape was resurveyed according to the framework of Johnsingh et αl . (2014) after a gap of 10 years. The ranges in each forest division and protected areas were taken as the basic sampling units. The survey routes ranged from 3 to 9 km in length, with an average of 4 km, and were spread 3-4 km apart. In all, 240 transects were resurveyed in the entire Terai Arc Landscape (TAL). Each survey route/transect was divided into 250 m segments and evidence of tiger presence (pug marks, scats and scrape marks) was recorded within each segment. The intensity of use by these carnivores was established on the basis of the frequency of occurrence of signs in the surveyed segments (i.e. number of segments with carnivore signs/total number of segments surveyed).

Data on prey presence and frequency of occurrence were recorded on the same survey routes. The presence of prey species was established largely on the basis of indirect signs such as tracks and pellet groups and direct observations

Disturbance indicators such as dung and sightings of livestock (cattle and buffalo), tracks and sightings of domestic dogs and people and signs of lopping and cutting were quantified within 250 m segments along the transects. These signs were also recorded in circular plots (10 m radius for lopping and cutting signs and 5 m radius for cattle dung) at 250 m intervals along the transects laid for vegetation sampling.

During the interim period, 43 tiger scats and 28 leopard scats were collected opportunistically across the landscape. The scats were collected in paper bags, and the details of species, date, locality and geo-coordinates were entered in data sheets. After the scats were sun dried, the remains of the prey were filtered through a sieve and items such as hair, bones, skin, claws, hooves, mandibles and guills were noted in the data sheets. Then the remains were investigated under a microscope, and proportional contribution of each prey species was analysed.

Outputs & Outcomes

The team recorded the presence of species on the basis of direct sightings and indirect evidence (tracks, droppings) during the occupancy surveys. We collected information on

major habitat covariates including forest type and indicators of anthropogenic disturbance.

Thirteen corridors were revisited:-

- (1) Yamuna river corridor.
- (2) Kansrau-Barkote corridor.
- (3) Chilla-Motichur corridor.
- (4) Rajaji-Corbett corridor.
- (5) Kalagarh corridor.
- (6) Kosi river corridor.
- (7) Boar river corridor.
- (8) Nihal-Bhakhra corridor.
- (9) Gola river corridor.
- (10) Kilpura-Khatima-Surai corridor.
- (11) Lagga-Bagga-Sukhlaphanta-Tatarganj corridor.
- (12) Kishanpur-Dudhwa corridor.
- (13) Dudhwa-Katerniaghat corridor.

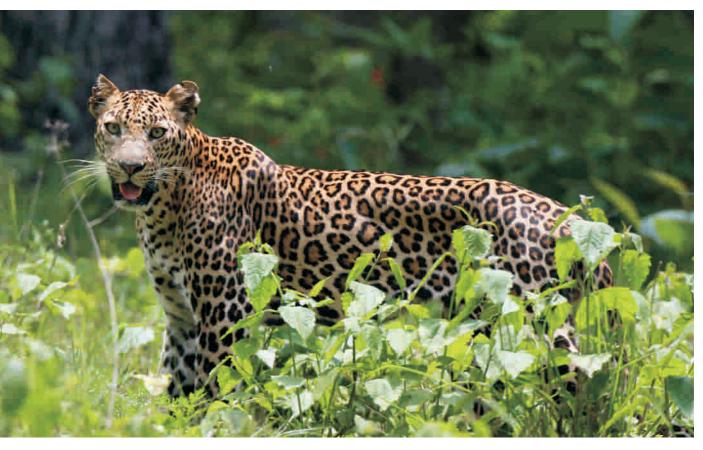
Further analyses of the data will be carried out subsequently.

Scat analyses revealed the presence of nine prey species in the diets of tigers and leopards. Chital constituted the maximum (30%) in the diet of the leopard, followed by cattle (20%),

common langur (16.7%), nilgai (13.3%) and sambar (3.3%). In the diet of the tiger, 8 prey species were found. Interestingly, nilgai (25.9%) showed up consistently, followed by sambar (24.1%), chital (19%), wild boar (10.3%) and cattle (5.7%). langur (5.2%), Buffalo (3.4%) and porcupine (3.4%) were also represented. Comparing the prey consumption of tigers and leopards, it was found that tigers consumed more sambar and nilgai, and less chital, while leopards consumed more chital, cattle, langur and nilgai. During the reporting period, there were regular reports of incidents of child and cattle lifting in the villages on the fringe of TAL, specifically in Suhelwa Wildlife Sanctuary.

Milestone

The project has already established the occupancy status and abundance of tigers in the western and eastern Terai Arc Landscape and has provided evidence for the factors that are linked to the different patterns of occupancy in different tiger habitat blocks. Going further, the efforts to resurvey the entire landscape are expected to provide important insights into the trajectory of occupancy pattern.



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REPRODUCTIVE BIOLOGY
AND BEHAVIOUR OF
CAPTIVE AND WILD
POPULATIONS OF
WESTERN TRAGOPAN IN
HIMACHAL PRADESH



Department

Investigators

Dr. K. Ramesh and Dr. Parag Nigam

Researchers

Lakshminarasimha R. and Vipin Upadhyaya

Date of Initiation

June, 2011

May, 2014

Himachal Pradesh Forest

Funding Source

Date of Completion

Objectives

The objectives of the project are to:-

- (i) Maintain a studbook with information on genetic and demographic parameters.
- (ii) Record the breeding chronology and growth pattern.
- (iii) Assess nutrition, body condition and stress factors.
- (iv) Determine the activity budget and vocalizations.
- (v) Carry out field surveys to estimate the population status in the wild.
- (vi) Undertake Population Viability Analysis to determine suitable founder populations and a reintroduction strategu.
- (vii) Monitor and study the habitat occupancy, behaviour and population growth of released birds.

Progress

The project has two components—one looking at the captive population and the other looking at mapping the wild habitat. The studbook was continued to be maintained, and various management inputs were provided to maintain the captive populations such that they displayed natural behaviour. A behavioural study of the captive population was undertaken.

The primary goals of behavioural management were to:-

- (1) Optimize the keeping system for western tragopans in captivity.
- (2) Promote the expression of natural behaviours.
- (3) Address aspects of stereotypic behaviours and increase behavioural diversity.

The behaviours of the birds were observed with reference to a pre-defined list of behaviours from the previously established ethogram. The focal animal time under all observational settings was 10 minutes. The enclosure space was divided into grids, and the locations of the individuals were recorded with reference to these grids to study space-use.



A spatial database on various thematic layers was generated on basis of open source data and the information available with WII. Location information about tragopan presence was obtained through field surveys and secondary data from Birdlife International and WPA sources. An intensive GIS analysis was carried out to prepare various layers amenable to habitat suitability analysis and occurrence of the species predicted using a Maxent model.

Outputs & Outcomes

The size of the captive population at Sarahan was 27 individuals (12 males and 15 males). The values of the population growth rate (λ –proportional change in population size from one year to the next) and instantaneous rate of change (r-intrinsic rate of increase in population per unit time as determined by births and deaths) show a positive response, indicating a growing population. The population was founded by 7 wild-born individuals (3 males and 4 females), with 2 potential founders (1 male and 1 female) still part of the living population. The current genetic diversity is lower than the potential genetic diversity due to unequal founder representation and noncontributing wild-born founders in the captive population. The proportion of the normal eggs/females and total number of normal eggs produced in 2013 have increased compared with previous breeding years. The clutch sizes were closer to the natural clutch size of 3–5 eggs. In 2013, all the adult females showed incubation behaviour. All the chicks born in 2012 and 2013 were reared by tragopan hens. The improved keeping system, along with intensive reproductive management, has allowed the birds to show specific patterns of behaviours especially related to reproduction. Following improvements in the keeping system, no stereotypic behaviours were observed, and the amount of time spent in the indoor area reduced. The space utilization patterns prior to enrichment in which the breeding pairs were in visual range of each other also corresponded to this, with the birds spending most of the time

near the fence-line, pacing. Post-enrichment, during which the pairs were visually isolated, the space utilization pattern indicates increased use of enclosure space, with no observations near the fence line.

A habitat suitability model was constructed, and it revealed that the western tragopan population is concentrated in the western part of Himachal Pradesh, in districts such as Shimla and Kullu. It was possible to discern a variation between the summer and winter habitats, and interestingly, wherever the winter habitat extent was minimal, the overall distribution of the species was affected. This is being further verified by intensive analyses, and the results have implications for the population management of the species. Also, during the interim period, 2 sites were identified as potential sites for reintroduction of the western tragopan. These sites once had western tragopan populations but have been devoid of the western tragopan in the last decade.

Milestone

The first objective has been achieved with the establishment of a national studbook, which is updated regularly. The second objective, focusing on studying the behavioural ecology of the species, has been completed. The key point to note is the marked reduction in the proportion of stereotypic behaviours in both the sexes. Stereotypic behaviours are often associated with sub-optimal housing conditions. The reduction in the proportion of stereotypic behaviours is indicative of the positive effects of improved housing conditions. The third objective of establishing husbandry guidelines for the species has been completed, supported and validated through scientific investigations. The enclosure redevelopment and modifications were developed only after looking at the habits of the species as available from the literature and through field visits. The breeding season in 2013 has been successful, with all the adult females having incubated eggs naturally. The proportion of

	Total number	Normal	thin-shelled	Mean	
	of females	eggs	eggs	clutch size	
2005-2010	Median 3 females year ⁻¹	122	139	7.0 <u>+</u> 3.54	
2011	9	9	10	4.75 <u>+</u> 2.36	
2012"	9	26	36	6.9 <u>+</u> 3.70	
2013"	12	33	23	4.5 <u>+</u> 2.1	

^{*}Years following improvements in the keeping system

Clutch sizes and mean clutch sizes of captive western tragopan females, 2005–2013



thin-shelled eggs produced by females has been reduced, and all the juveniles born in 2012 produced only normal eggs. The decreased proportion of thin-shelled eggs, normalization of clutch-size and natural rearing were amongst the significant achievements following the improvement in the keeping

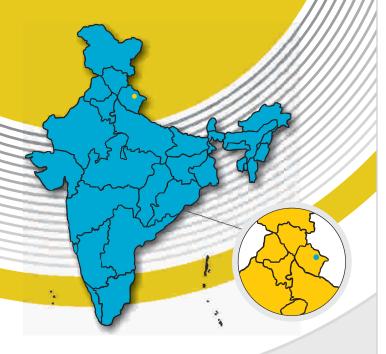
conditions. A habitat suitability model will facilitate a field survey for estimating the population of the species and also planning reintroduction of the species once a sizeable captive population has been achieved.

	Total number of females	Females laying eggs	Incubating females	Chicks:mother reared
2005-2010	Median 3 females year ⁻¹	Median 3 Females year¹	5	5
2011	9	4	0	0
2012"	9	9	8	7
2013"	8	8	8	5

^{*}Years following improvements in the keeping system

Incubation and chick-rearing in captive western tragopan females, 2005–2013

EFFECTS OF CLIMATE CHANGE ON RIVERINE FORESTS AND INDICATOR SPECIES ALONG RIVER GANGA IN UTTARAKHAND: A MULTI-SCALE APPROACH



Funding Source Department of Science & Technology

Investigators Dr. K Ramesh and Dr. B.S. Adhikari

Researcher Ankita Sinha

Date of Initiation September, 2012

Date of Completion August, 2015

Objectives

The objectives of the project are to:-

- (i) Study the distribution pattern, range shift and population response of indicator species along the Ganga in Uttarakhand, from the foothills to the snout of the Gangotri glacier.
- (ii) Quantify the structure and functional attributes of the vegetation along selected climatic ecotones.
- (iii) Detect major drivers of landscape composition and configuration in space and time and develop spatially explicit predictive models.

Progress

The catchment of the river Ganga is broadly divided into two major river basins, i.e. the Alaknanda and the Bhagirathi. Although both the rivers are target for extensive surveys, intensive efforts are being made in the Bhagirathi catchment according to the objectives of the project. The sampling and analytical regime follows a hierarchical framework, incorporating variations in the spatial scale and ecological correlates. The entire area was divided into sub-basins, and a specific sampling scheme was devised to collect information within the sub-basins. Broad-scale assessment was initially planned for buffer widths of 1 km, 5 km and 10 km from the river, but it has been decided to focus on a 1 km buffer due to the restrictive nature of the riverine vegetation although largescale variables will be incorporated for landscape analysis. Sufficient time was spent on developing sampling protocols and reconnaissance surveys. The major focus was on establishing a spatial database involving remote sensing and GIS tools, which required extensive efforts as the terrain was complex and confounded by shadow and cloud effects. During the interim period, surveys were carried out in the entire river system, collecting information on vegetation parameters and the distribution and abundance of river birds. A spatial database was created, and preliminary thematic layers were created. Field data were collected for ground-truthing of satellite images and for classification of vegetation types in the river system, in line with the Champion and Seth classification scheme.

The surveys for river birds were based on trail walks distributed systematically across the gradient of the Bhagirathi river basin. The length of a sampling unit varied from 200 m to 2 km. Field work was carried out in the pre-monsoon (April-May) and post-monsoon (October-November) seasons. In each sub-basin, depending upon its accessibility, the sampling unit varies from one to eight with some difference in the sampling effort in the two seasons.



Outputs & Outcomes

Geospatial and ecological criteria were used to define and map sub-units in the entire area for sampling and further analysis. Based on these criteria, five sub-basins have been recognized and mapped in the main Ganga:-

- (1) **Bhagirathi I,** from Gaumukh to Harsil (in the Greater and Trans-Himalayan regions).
- (2) **Bhagirathi II,** from Harsil to Uttarkashi (middle and high Himalaya).
- (3) **Bhagirathi III**, from Uttarkashi and New Tehri (lower and middle Himalaya).
- (4) Bhagirathi IV, from New Tehri to Devprayag, where the Bhagirathi joins the Alaknanda (the lower Himalaya, with deep cliffs).
- (5) The Ganga, from Devprayag to Rishikesh (in the lower Himalayan range). During the survey, which was undertaken in the months of April–May and October–November in 2013, it was recognized that the riverine forest patches are in fragments. The slopes of the riverine patches had exposed soil because of rampant anthropogenic activities.

Spatial data on land cover, elevation, slope and contours and non-spatial data on river flows were obtained during the interim period. These involved data downloads and extensive processing, involving considerable time. Landsat 8 images were used to prepare a spatial database of the study area. Climate data were retrieved from the WorldClim global data set.

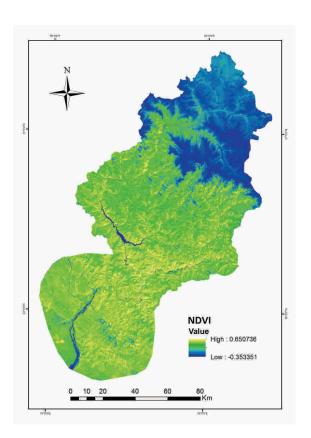
The relative abundance of bird species is often associated with the vegetation community and food resources. Hence, alterations in a riverine ecosystem may cause changes in the avian abundance and diversity. In this study, baseline data on the major riverine bird species, which are often indicators of the climatic and habitat regimes, and their pattern of distribution and abundance, were documented. We observed that with increasing altitude there was an increase in bird diversity, Which can be attributed to:-

- (a) Less anthropogenic pressure.
- (b) Water of better quality.
- (c) More undisturbed vegetation.

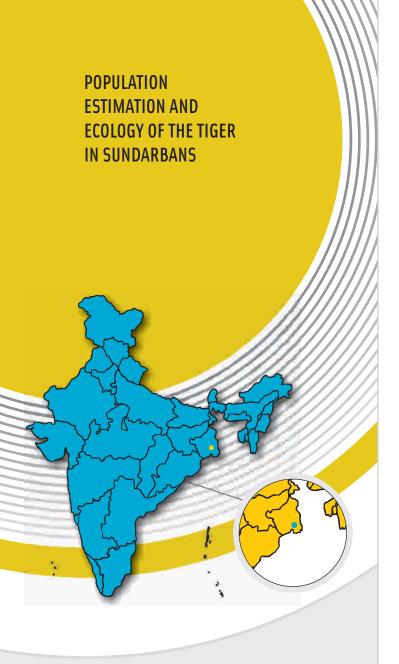
The diversity measure. based on Sorenson's coefficient. was 0.78, which is quite close to 1 and shows that the sampled streams are quite similar in terms of river bird species richness and abundance.

Milestone

Quantitative research on the effects of the climate on biodiversity in India is still at an early stage, and there is a critical requirement for establishing baseline information for monitoring and for developing local and national strategies. Therefore, the baseline established by the project is a significant value addition to the efforts dealing with climate change assessment and mitigation. The focal area, the river Ganga, is a major life support system for a rich biodiversity and for a large human population. Any negative influence on the system is likely to manifest in a large-scale impact, not only on the biodiversity values but also the human population. Against the backdrop of the recent floods, a natural disaster, the project gains further significance and will add insights on the drivers of the landscape, in terms of climatic and anthropogenic variables.



Normalized Difference Vegetation Index of the study area



Funding Source National Tiger Conservation
Authority

Manjari Roy

Investigators Dr. Y.V. Jhala and Shri Qamar Qureshi

Researchers Dipanjan Naha and

Date of Initiation October, 2009

Date of Completion December, 2014



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Objectives

The objectives of this project are to:-

- (i) Develop a methodology for monitoring tigers, copredators and their prey in the mangrove swamps.
- (ii) Estimate the tiger population and density.
- (iii) Estimate the population and density of prey species.
- (iv) Assess the home range of tigers.
- (v) Suggest management recommendations for effective conservation of tigers in the reserve.

Progress

Four tigers were radio-collared in Sundarban Tiger Reserve between February and May 2010. These included 1 adult female and 3 adult male tigers. Satellite collars (Vectronics Iridium) were deployed on all the 4 individuals. The estimated average overall home range (95% FK) size was 167.61 km² (SE 60.34) (range 83.1–239.9 km²). The overall home range (100% MCP) of male tigers was 141.7 km² (SE 58.6) (n= 3). The overall 100% MCP home range including female home ranges was 190.5 km² (SE 102.5) (range 120.7–336.8 km²).

For assessing the population status of tigers, the research team of WII set up camera traps and used olfactory lures to attract animals to the camera stations. Traps were operated in 8–9 day sessions during the neap tide phase, when tidal fluctuations were minimal and the forest floor was relatively dry to prevent damage from tidal inundation. For estimating the prey density, boat transects were carried out using distance sampling methods. These were usually 10-15 km long. Camera trapping was carried out in a 257 km² area (effective camera trapped area). Photo-captures of 10 tigers and 2 cubs were obtained in 2010. In 2012, camera traps were operated in Netidhopani and Haldibari Beat in a 495 km² area (effective camera trapped area), photo-captures of 22 individual tigers and a cub (more than 1 year old) were obtained. The population of tigers in the effective camera trapped area was estimated using the best fit model (Mh) at 11 (SE 3) individuals. The tiger density was computed to be 4.3 (SE 0.3) tigers per 100 $\rm km^2$ in 2010. The population was estimated using the best fit model (Mb) at 22 (SE 0.9) with a capture probability of 0.09, whereas the tiger density was computed to be 4.44 (SE 0.2) per 100 km² in 2012. Considering the area occupied by tigers within the tiger reserve to be 1645 km² and extrapolating this density estimate, the population of tigers in the Sundarban Tiger Reserve was determined to be between 64 and 90 individuals. The team has carried out camera trapping exercises in additional areas of the tiger reserve in 2014.

DISTRIBUTION PATTERN, HABITAT USE AND MOVEMENT OF BREEDING WATER BIRDS WITH RESPECT TO BLACK-NECKED CRANES AND BAR-HEADED GEESE USING TELEMETRY IN CHANGTHANG COLD DESERT SANCTUARY, LADAKH AND GHARANA WETLAND CONSERVATION RESERVE, JAMMU, JAMMU & KASHMIR



Funding Source Department of Wildlife Protection,
Jammu & Kashmir

Investigators Dr. S.A. Hussain and

Dr. Bilal Habib, WII; Shri Jigmet Takpa, Shri Tahir Shawl and Shri Intesar Suhail,

DWP, J&K

Researcher Neeraj Mahar

Date of Initiation July, 2012

Date of Completion July, 2015

Objectives

The objectives of the project are to:-

- (i) Quantify the current status of water-birds with special reference to black-necked cranes (BNC) and bar-headed goose (BHG) in the Changthang Cold Desert Sanctuary, in Ladakh, and Gharana Wetland Conservation Reserve, in
- (ii) Examine the habitat use and movement pattern of BNC and BHG in the Changthang Cold Desert Sanctuary and Gharana Wetland Conservation Reserve.
- (iii) Use this information to devise an effective management strategy for wetlands in the wintering grounds of the cranes and BHG as well as their nesting or feeding and roosting sites.

Progress

The present study is Phase-II of the project. Phase-I was conducted in Gharana Wetland Conservation Reserve, Jammu in 2013. In Phase-II, concurrently 2 BNC and 2 BHG were fitted with PTTs in Changthang Cold Desert Wildlife Sanctuary.

The telemetry study can be broadly divided into two distinct parts:-

Capturing

The capture exercise was carried out during 14-22 September 2013. Four BHG and 2 BNC were captured by using noose traps. After the necessary biometric measurements were taken, 2 geese and 2 cranes were randomly selected for deployment of transmitters. Telonics transmitters (TAV-2656, maximum battery life 12 months, weight 55 g), were attached to the birds with backpack harnesses. The team used spherical nulon traps for capturing water birds. The size of the traps varied with the bird species. Mostly noose traps were preferred for deployment in the foraging areas of target species. The team used 840 noose traps for capturing BNC and BHG. PTTs were attached with Teflon harnesses, and the backpack method was used for deploying PTTs with epoxy. On average 384 man hours were used to capture BNC and BHG. A total of 4 BHG were captured from Chushul, and only 2 of these were fitted with PTTs. Two BHG were tagged with neck bands and rings. One BNC was captured and fitted with a PTT at Tsi-Gul Tso (Chushul). Subsequently, 1 BNC was captured and fitted with a PTT in the Rhongo (Tibra) area of the Hanle-Indus river marshland. The research team took the necessary biometric measurements of the PTT-fitted birds within limited time. However, the team made efforts to capture BNC and BHG at the Hanle marshes, but unfortunately no bird was captured during the exercise.

Telemetry

The transmitters were set to record 5 locations per 24 hour cycle. ARGOS locations are provided with different location



classes according to the accuracy of the location: the high accuracy location classes are 3, 2, 1 and 0. However, low accuracy classes (A, B and Z) are also transmitted from the PTTs and received at the database centre. The high accuracy location classes provide the following ranges of error: 3, <150 m; 2, 150–350 m; 1, 350–1000 m; 0, >1000 m. There are no accuracy estimates for the other classes (A, B and Z), and thus only classes 3 to 0 can be used for analysis (ARGOS 2007). GIS software (ArcGIS 9.3, Hawth's tool) was used for spatial analysis (movement), and maps were prepared using Google Earth.

Outputs & Outcomes

The team conducted a reconnaissance survey in 17 wetlands of Changthang Wildlife Sanctuary between 15 August and 4 September 2013. The total effort was about 1000 km by vehicle transects and 40 km by walk along the shorelines of the wetlands in the morning (7:00–12:00 hours) and evening (13:00–18:00 hours). After a reconnaissance survey, the research team identified and prioritized sites for capturing BHG and BNC. The team counted a total of 57 BNC in Changthang Wildlife Sanctuary during the survey. Suitable sites such as the Chushul, Hanle and Hanle-Indus river plains were suggested for deployment of PTTs. The greatest numbers of BNC were recorded from the Chushul and Hanle marshes. Besides, the team observed a total of 186 BHG in the Tso Kar. Chushul and Hanle marshes. The greatest number was recorded from the Tso Kar and Statspuk marshes; however, owing to logistic problems, the team selected the Chushul and Hanle marshes for the capture exercise. Eventually, the team tagged BHG only at the Chushul marshes.

Landscape use by PTT -fitted birds: Within a one flight, BHG130044 moved around 120 km, from Pangong Lake to near the Himachal border. Among the all PTT tagged birds, BHG130044 moved the greatest distance covering a total of 945 km from Pangong Tso to near the Himachal Pradesh border. The PTT BHG130046 was not functioning since October, 2103. However, a total movement of 361 km was recorded till the month of October. The bird travelled in and around the site of capture, the Rala marshes (Chushul), and Chinese territory. The bird was mostly restricted into and around the capture site Rala marshes (Chushul) and its vicinity though on a few occasions it used the Tsi-Gul and Tso-Nyak marshes of the Chushul area. The cranes are still using their capturing areas and areas nearby areas. Till date, the total movement of BNC130047 has been recorded to a total of 279 km in and around the site of capture, Tsi Gul (Chushul).

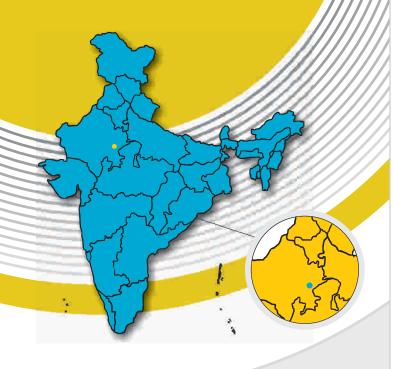
The bird has three core areas of use:-

- (1) Tsi Gul.
- (2) An area near Pangong Lake.
- (3) The Tso-Nyak marshes of Chushul.

Only on one occasion did the bird visit the Tibetan Autonomous Region. The second BNC130045 moved 329 km in and around the site of capture, Rhongo. The bird is using the Hanle-Indus marshes and occasionally shifts near Tibra village. On 2 occasions the bird visited areas near the line of actual control (LAC). Nevertheless the bird is utilizing these areas, though usually in this period the temperature at Rhongo can drop below -30°C.

Migration by conventionally collared and ringed birds: The team confirmed the winter migration of collared BHG with neck bands. Recently, geese collared with ID nos. K-24 and K-27 were sighted in Gharana Wetland Conservation Reserve, Jammu. Thus, the geese must have travelled a minimum linear distance of 400 km between the Chushul marshes and Gharana Wetland. Besides, previous studies revealed winter migration towards low altitudes and moderately warmer wetlands. However, in contrast to what was previously believed, BNC are still utilizing the areas of Changthang Wildlife Sanctuary instead of migrating towards China or other wintering sites. Nonetheless, it is early to state much about the migration behaviour and wintering sites of BNC. Further results will reveal more about the movement pattern and habitat use of BNC and BHG in Ladakh and possible wintering sites. The research team is planning to deploy more PTTs on BNC this year.

STUDY OF GENETIC DIVERSITY IN WILD PIG, SUS SCROFA CRISTATUS AND DOMESTIC PIG SUS SCROFA DOMESTICA TO FIND LEVEL OF HYBRIDIZATION BETWEEN THEM IN THE VICINITY OF RANTHAMBORE NATIONAL PARK



Funding Source Grant-in-Aid

Investigators Dr. S.P. Goyal,

Dr. Parag Nigam and Dr. N.P.S. Chauhan

Researcher Puneet Pandey

Date of Initiation July, 2012

Date of Completion August, 2014

Objectives

The present study was initiated with three main objectives:-

- (i) To study the genetic diversity in wild and domestic pigs in the vicinity of Ranthambhore National Park (RNP).
- (ii) To find the level of hybridization between wild and domestic pigs on the basis of genetic variability.
- (iii) To examine the possibility of hybridization between wild and domestic pigs in other parts of the country on the basis of the findings of the project.

Progress

The research team systematically collected biological samples of unrelated domestic pigs (n=65) from different villages surrounding RNP as a zone of interaction and from different parts of Sawai Madhopur city as a control. For genetic characterization and detection of events of introgression in wild pigs, the team collected blood samples (n=6) of unrelated wild pigs representing RNP. Apart from blood samples, the team also collected faecal (n=26) and hair (n=34) samples from wild pigs. The team amplified a partial fragment (662 base pairs) of the control region from the mitochondrial genome and a panel of 11 highly polymorphic microsatellite markers in domestic (n=55) and wild pig (n=6) to study the genetic diversity and detect events of introgression.

Outputs & Outcomes

Genetic diversity of domestic pig Sus scrofa domestica and wild pig Sus scrofa cristatus in and around RNP. A total of 13 haplotypes with 24 segregation sites were recorded in 590 base pairs of amplified sequences of domestic pigs. Two haplotypes (Hap-1 and Hap-9) were shared by 80% of the domestic pigs examined. Seven haplotypes were detected only once (DP_Hap-3, DP_Hap-5, DP_Hap-8, DP_Hap-10, DP_Hap-11, DP_Hap-12 and DP_Hap-13), indicating their different geographic origin. The overall haplotype diversity of domestic pigs was found to be 0.79±0.04, and the nucleotide diversity

The team recorded 2 haplotypes with 1 segregation site in 560 base pairs of amplified sequence in wild pigs. Two haplotypes (WP_Hap-1 and WP_Hap-2) were shared equally, i.e. 50% each, in the population. The overall haplotype diversity of wild pigs was found to be 0.6 \pm 0.13, and the nucleotide diversity was 0.001.

Out of the 11 microsatellite markers tested on domestic and wild pig samples, CGA did not show amplification and was hence excluded from the analysis. Three loci (S0090, S0026 and SW72) deviated from HWE, whereas SW72 also showed the presence of null alleles in domestic pigs. Six loci (SW122, SW24, S0090, S0225, S0226 and SW911) deviated from HWE,



whereas none of the loci showed signs of null alleles in the wild pig samples analysed. The team found overall a high level of genetic diversity in domestics pigs (Na=14.2, Ho=0.72 and He=0.86) compared with the wild pig samples analysed (Na=.3.2, Ho=0.7 and He=0.7).

Genetic introgression between domestic pig Sus scrofa domestica and wild pig Sus scrofa cristatus in and around RNP. The research team amplified more than 550 base pairs of the mitochondrial control region in 61 domestic and wild pig samples, which yielded 15 different haplotypes. The team did not find any common haplotype between wild and domestic

pigs, and thus introgression at the mitochondrial level can be ruled out in the samples analysed.

The team analysed domestic and wild pig samples together using the MCMC approach implemented in Structure 2.3.1. They ran the software from K=1 to 10, and the resultant file was analysed using the Structure Harvestor software package. Based on the criteria devised by Ivano $et\ al\ (2005)$, K=2 was selected to view the structure results. At K=2, one of the wild pig samples (107) showed the signature of the domestic pig, and thus it was determined as being a genetically hybrid individual (Fig. 1).

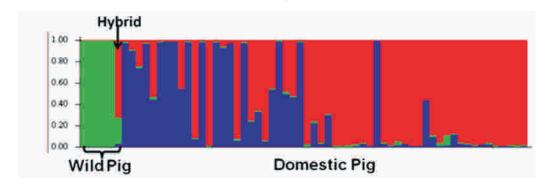
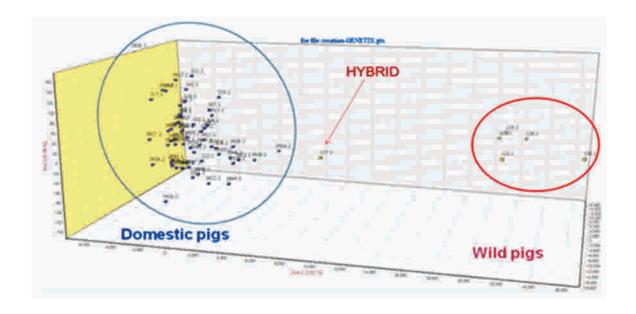


Figure 1. Structure results showing presence of hybrid in wild population

Similarly, factorial component analysis also suggests that sample 107 has a greater affinity towards domestic pigs than towards wild pigs (Fig. 2).



 $\textbf{Figure 2.} \ \textbf{Factorial component analysis based on allele frequency of } 10 \ \textbf{microsatellite loci}$



Major achievements: The present study has been planned for genetic evaluation of wild and domestic pigs at 2 levels (mitochondrial and nuclear). We found fairly good genetic diversity in domestic pigs living in the vicinity of RNP. The overall haplotype diversity (0.79 \pm 0.04) and nucleotide diversity (0.01) in the native domestic pig population was found to be concurrent with other pig breeds worldwide (Alves, 2010). The existence of 2 maternal lineages (2 haplotypes) in the 6 wild pig samples examined so far indicates the healthy genetic status of the population. Nuclear genetic analysis also revealed that the status of wild and domestic pigs was healthy but that the wild pigs had a comparatively improvised genetic status compared with domestic pigs.

The team did not find any haplotype common to the wild and domestic pigs examined, and thus our initial finding is that there is no mitochondrial genetic introgression in the wild pigs of RNP. However, microsatellite analysis clearly indicates the presence of 1 hybrid in the wild stock examined. Since mitochondrial DNA is maternally inherited, a single backcross (male wild pig hybrid × female domestic pig) can make hybridization undetectable. Therefore, microsatellite allele frequencies are depicting what has been masked by events such as backcrosses.

PATTERNS OF SPATIAL AND
TEMPORAL HABITAT OCCUPANCY IN
RELATION TO CROP RAIDING
BEHAVIOUR AND GENETIC
VARIATION OF FREE-RANGING
ASIAN ELEPHANTS, ELEPHAS
MAXIMUS IN NORTH-WEST INDIA
USING NON-INVASIVE GENETIC
SAMPLING



Funding Source

Project Elephant, India, Asian Rhino and Elephant Action Strategy (WWF- International), Operation Eye of the Tiger, India and University Grants Commission

Investigators

Dr. S.P. Goyal, Shri Qamar Qureshi, Dr. Parag Nigam and Dr. A.C. Williams

Researcher

Rahul De

Date of Initiation

October, 2012

Date of Completion

December, 2015

Objectives

The primary objectives of this project are:-

- (i) Estimation and modelling of spatial and temporal habitat occupancy of elephants.
- (ii) Providing baseline genetic structure information using mtDNA and nuclear microsatellite variations across different populations.
- (iii) Identification of any patterns in dispersal in terms of age and sex of individual elephants.
- (iv) Documenting and testing for population genetic differentiation and recent bottlenecks, if any.
- Examining the existence of any age/sex-based patterns of crop depredation and incidences of habitual raiding in relation to cropping patterns.
- (vi) Investigating the social organization of Asian elephants.

Progress

During the period, efforts were made to collect faecal samples in a non-invasive manner from the study area as a source of DNA. A total of 783 geo-referenced samples were collected, and the age and sex of the animals were recorded upon encountering defaecation events. Besides, dung bolus circumferences were also measured for intact boluses to classify them into age classes. The team recorded 59.5% of the samples from known female individuals and 14.7% from known male individuals. The sex was unknown for 25.8% of the samples, including calves for which the sex could not be identified upon sighting. The number of samples taken from adults, sub-adults, calves and old animals represented 51.8%, 7.2%, 5.7% and 10.3%, respectively. The group size ranged from a single individual to a herd of 20 individuals, with a group size of 5-7 being most common. Multi-locus microsatellite genotyping and identification of sex from faecal DNA samples were standardized. A success rate of genotyping from faecal samples of 92.6% with 94.9% consensus in allele calling from a replicate data set was achieved. Baseline reference data on the frequency of different alleles in the population were generated using high quality tissue and blood samples from the study area, which would be used to eliminate any false alleles being amplified from relatively inferior quality faecal DNA samples. The allele sizes ranged from 94 bp to 169 bp.



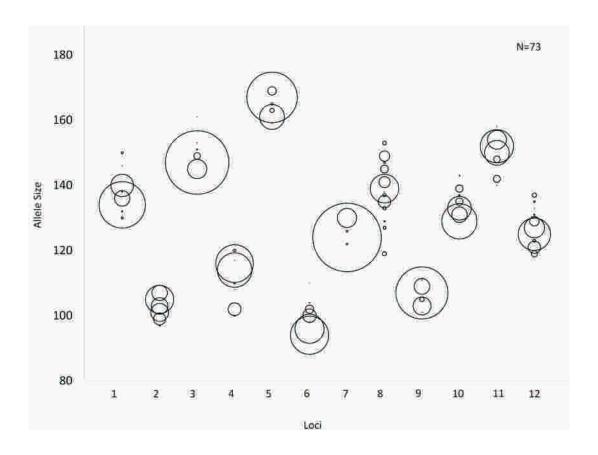


Figure 1. Frequency distribution of alleles by locus in north-west Indian elephant population. Diameter of bubbles represents frequency of individual allele (number of samples=125; number of alleles=73)

Outputs & Outcomes

A case study, the use of non-invasive genetic techniques for identifying individual Asian elephants and their sex in Barkot and Rishikesh forest ranges, Uttarakhand, has been submitted to the state forest department. An inventory of genetic profiles, along with the sex, of 15 elephant individuals, of which 6 are males and 9 females, from the Barkot and Rishikesh forest ranges has been established. The team found that the population has a negative inbreeding coefficient ($F_{\rm IS}$) value of -0.071±0.170, which is indicative of panmixia, though a larger sample size is required for more accurate estimation.

MONITORING SOURCE POPULATION OF TIGER IN KANHA TIGER RESERVE



Funding Source National Tiger Conservation
Authority

Investigators Dr. Y.V. Jhala and Shri Qamar Qureshi

Researchers Ujjwal Kumar and Neha Awasthi

Date of Initiation June, 2009

Date of Completion December, 2015

Objectives

The objectives of the project are to:-

- Monitor the source population of tigers in Kanha Tiger Reserve.
 - (a) Estimate the tiger population within selected areas of the reserve.
 - (b) Obtain survival and mortality information through a mark–recapture study.
- (ii) Monitor prey and co-predator populations and the condition of the habitat in the tiger reserve.
- (iii) Gain an understanding of tiger dispersal patterns.

Progress

Monitoring a tiger population on an annual basis will give not only estimates but also trends and directions of change. As in previous years, the team camera trapped an area of 491 km2 of the Kanha–Kisli–Mukki block and 232 km2 in Supkhar block, with an effort of 3800 and 2592 camera trap nights this year. In all, 48 and 14 individual tigers were photo captured at the two sites. Three tigers were collared in February 2014, and data collection on the home range, movements and habitat use are in progress.

Outputs & Outcomes

The tiger population in Kanha Tiger Reserve was estimated at 69 (63-74 SE range). The tiger density was computed to be 6.5 (SE 0.80)/100 km2 in Kanha and 2.13 (SE 0.6)/100 km2 in Supkhar (Table 1). After a decline in 2010, the tiger population of Kanha has shown a growth spurt of 21% since 2010 in Kanha block, while it has not been significantly different in Supkhar block since 2010 at the 95% confidence interval (CI).



Camera Trap Image



Sampling area	TAA	M _{t+1} (tiger)	M_{t+1} (leopard)	<i>Ñ</i> (tiger)	Ñ (leopard)	\hat{D} MLSECR (tiger)	\hat{D} MLSECR (leopard)	Best model (tiger)	Best Model (leopard)
Kanha	491	48	36	54 SE 3.7	65 SE 15.6	6.5 SE 0.80	6.5 SE 1.07	M _h	M _h
Supkhar	232	14	22	15 SE 2.0	29 SE 5.3	2.13 SE 0.6	5.2 SE 1.12	M _h	M _h

TAA, – Trapping Array Area; \mathbf{M}_{t-1} -, unique individuals; $\hat{\mathbf{N}}$, population; $\hat{\mathbf{D}}$, density (number/100 km²) in Kanha; MLSECR, – Maximum Likelihood Spatial Capture Recapture; SE, – Standard Error

 Table 1. Abundance estimate of tiger in Kanha Tiger Reserve, 2013

The prey status in Kanha Tiger Reserve was estimated using distance sampling on line transects. A total effort of 900 km was invested in sampling 150 spatial transect replicates and 450 temporal replicates. Amongst ungulates, chital had the highest density, 33.2 (4.69 SE)/km 2 (Table 2).

Species	Group density (number/km²)	Density (number/km²)
Chital	03.43 SE 0.43	33.2 SE 4.47
Sambar	02.63 SE 0.32	08.51 SE 1.11
Gaur	00.69 SE 0.10	04.11 SE 0.80
Wild pig	01.15 SE 0.15	05.48 SE 0.96

SE = Standard Error.

Table 2. Abundance estimate of ungulates in Kanha Tiger Reserve, 2013 (temporal replicates, 450; total effort, 900 km)

Milestone

Three tigers (1 female, 1 sub-adult male and 1 resident adult male) were collared with GPS-Iridium satellite transmitters. These collared tiger are providing interesting insights into movement patterns, dispersal and general ecology. The camera trapping effort has resulted in the first photographic record of the rusty spotted cat at Kanha Tiger Reserve.

ECONOMICS OF LIVING IN THE WILD: COST-BENEFIT ANALYSIS FOR THE FOREST CORRIDOR LINKING RAJAJI AND CORBETT NATIONAL PARKS



Funding Source South Asian Network for

Development and Environmental Economics (SANDEE), Kathmandu

Investigators Dr. Ruchi Badola and

Dr. S.A. Hussain

Researcher Nitika Sharma

Date of Initiation October, 2012

Date of Completion October, 2014

Objectives

The objectives of the project are to:-

- (i) Assess use values and the benefits of the corridor forests accruing to the local communities residing in the corridor forests.
- (ii) Assess the cost incurred by the local community due to wildlife presence in the corridor forests.
- (iii) Determine the spatial distribution of costs and benefits across different stakeholder groups.

Progress

The team collected secondary data for demographic and socioeconomic indicators and has inventoried forest resource use through information from the forest department and a rapid survey of villages. The secondary data regarding livestock loss, crop loss/damage and loss of human life were procured from the forest department and the villages associated with the forest corridor.

A rapid survey of the villages was carried out, and the data and the information generated through RRA, were subjected to principal component analysis to identify relatively homogeneous groups of villages based on selected characteristics. Representative villages within each identified cluster were selected in proportion to the size of the cluster. Households in the villages from the cluster were identified for intensive sampling. The household level survey, market survey and resource extraction monitoring work are going on.

DEVELOPMENT AND
MAINTENANCE OF
STUDBOOKS OF
SELECTED ENDANGERED
FAUNAL TYPES IN INDIAN
ZOOS

Funding Source Central Zoo Authority

Investigators Dr. Parag Nigam and

Shri P.C. Tyagi

Researchers Nilofer Begum and

Dr. Anupam Srivastav

Date of Initiation September, 2012

Date of Completion September, 2017

Objectives

The project was initiated with objectives of development of population management plans for identified species in captivity:-

- (i) Updating studbooks for the Asiatic lion, Bengal tiger, lion-tailed macaque, Indian one-horned rhinoceros, red panda, snow leopard, Tibetan wolf, clouded leopard, hoolock gibbon, Nilgiri langur, gaur (Indian bison), Indian wild ass, dhole (wild dog) and Bhutan grey peacock pheasant.
- (ii) Initiation of new studbooks for the Indian gazelle (chinkara), brow-antlered deer (sangai), swamp deer (barasingha), four-horned antelope (chowsingha), mouse deer, serow, blue sheep (bharal), golden langur, pigtailed macaque, stump-tailed macaque, Phayre's leaf monkey (spectacled leaf monkey), Indian wolf, Indian pangolin, white-backed or Bengal vulture, long-billed vulture, slender-billed vulture, Nicobar pigeon, cheer pheasant, Himalayan monal and western tragopan.

Progress

During the reporting period, the following activities were carried out.

Updating of existing studbooks of lion-tailed macaque, Indian one horned rhinoceros, red panda, snow leopard, Tibetan wolf, clouded leopard, hoolock gibbon, Nilgiri langur, gaur, Indian wild ass, dhole and Bhutan grey peacock pheasant. Field visits were conducted to zoos for collection of pedigree data for the species identified for compilation of studbooks. New studbooks were developed for the stump-tailed macaque Macaca arctoides, pig-tailed macaque Macaca leonina, golden langur Trachypithecus geei and Phayre's leaf monkey Trachypithecus phayrei.

Outputs & Outcomes

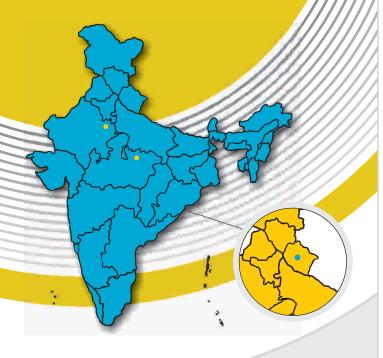
Studbooks of 4 threatened primate species (stump-tailed macaque *Macaca arctoides*, pig-tailed macaque *Macaca leonina*, golden langur *Trachypithecus geei* and Phayre's leaf monkey *Trachypithecus phayrei*) were prepared and submitted to the Central Zoo Authority and holding zoos.

Milestone

The national studbook for threatened species was prepared.



DIVERSITY OF MOTHS
(LEPIDOPTERA: HETEROCERA)
ASSEMBLAGE AND THEIR
POTENTIAL ROLE AS A
CONSERVATION TOOL IN
DIFFERENT PROTECTED AREAS OF
UTTARAKHAND



Funding Source Department of Science & Technology

Pritha Dey

November, 2012

Investigator Dr. V.P. Uniyal

Researcher

Date of Initiation

Date of Completion November, 2015

Objectives

The objectives of the project are to:-

- (i) Document and prepare a taxonomic inventory of the rich moth fauna of the protected areas of Uttarakhand.
- (ii) Assess and analyse the diversity and distribution of moth assemblages along elevation and vegetation gradients and the influence of anthropogenic disturbance factors on moth assemblages in different protected areas of Uttarakhand.
- (iii) Establish moth assemblages as surrogates for the entire insect community and use them as indicator taxa in rapid habitat-quality assessment programmes.

Progress

A reconnaissance survey was conducted for the project in Nanda Devi Biosphere Reserve. The standard method of collecting moths, i.e. light-trapping, was used in 6 distinct locations in the landscape, covering different habitat types. Light-trapping was carried out for 4 hours (20:00 hours to 12:00 midnight) at 3 sites (Joshimath, Suraithota and Malari). Lata was sampled for 6 hours at 2 sites and Tolma at one site; sampling was done from dawn-to-dusk. Vegetation sampling was carried out in 20×20 m plots with the light trap at the centre, ensuring a homogenous vegetation cover. A total of 163 samples were collected across the 3 sites. Moths belonging to the 5 most diverse families (Noctuidae, Geometridae, Arctiidae, Crambidae and Lymantridae) were identified to morphospecies. The most dominant family was the family Geometridae family across all the sites. The influence of climatic, topographic and anthropogenic effects on moth assemblages was investigated.

Milestone

A total of 163 samples were collected across the 3 sites. Moths belonging to the 5 most diverse families (Noctuidae, Geometridae, Arctiidae, Crambidae and Lymantridae) were identified to morphospecies. The most dominant family was the family Geometridae across all the sites. The influence of climatic, topographic and anthropogenic effect on moth assemblages was investigated.

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ECOLOGY AND CONSERVATION OF HIMALAYAN WOLF



Funding Source Grant-in-Aid

Dr. Bilal Habib, Dr. Y.V. Jhala and Shri Salvador Lyngdoh Investigators

Researchers Shivam Shrotriya and

Hussain Reshamwala

Date of Initiation August, 2010

Date of Completion May, 2017



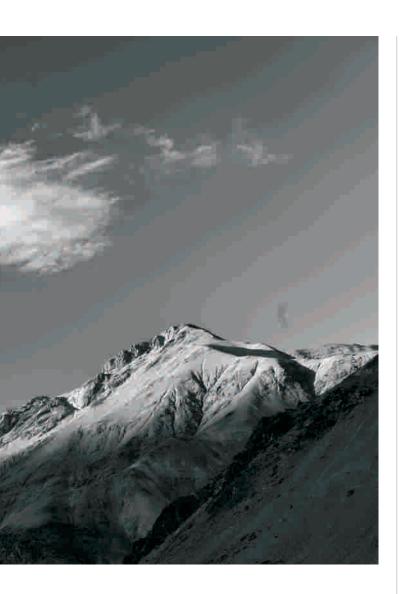
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Objectives

The major objectives of the project are:-

- (i) To estimate the distribution and abundance of the Himalayan wolf in India and to identify viable populations that need to be protected.
- (ii) To determine the food habits and consumption rate of the Himalayan wolf in different areas and the extent of its dependence on domestic livestock and wild prey populations.
- (iii) To estimate the home-range/territory size of selected Himalayan wolf packs and their relation to the biomass of the major prey.
- (iv) To estimate the critical Himalayan wolf habitat needs,





especially for denning and rendezvous sites.

- To identify major factors of mortality and current and potential threats to surviving Himalayan wolf populations.
- (vi) To evaluate the attitudes and concerns of local people living in and around Himalayan wolf habitats and conservation areas.
- (vii) To utilize the information obtained from achieving the above objectives for making management recommendations to conserve Himalayan wolf populations in India.

Progress

The prediction map of wolf presence probabilities, resulting from the analysis of the previous year, was divided into 15×15

km² grids. Sign surveys for wolf presence are under progress, beginning in Changthang Wildlife Sanctuary (WLS), Ladakh region and Kibber WLS, Himachal Pradesh. The grid cells for the survey have been selected on basis of higher probabilities of wolf presence and spatial distribution of efforts to represent the whole landscape. An effort of a 50–60 km transect walk is being used per grid cell. A protocol has been developed for data collection regarding signs and direct sightings of wolves, sympatric carnivores and ungulates, and soliciting information from the public. This protocol is being followed in the field.

Exploratory analysis of the general trend of distribution of the only Himalayan wolf lineage was carried out using the maximum entropy model, using the MaxEnt (ver. 3.3.3e) software package. Presence locations in the western and central Himalaya in India were obtained from the questionnaire survey, and additional locations for Sikkim and Nepal were collected from reports and records. A total of 182 locations could be ascertained for the Himalayan wolf lineage. The responses for most of the variables used for the holistic analysis carried out previously are quite similar to those of the prediction model for the wolf in the western and central Himalaya in India without considering Sikkim and Nepal.

However, the new variables added to this analysis have provided a better insight. Those are:-

- (1) Distance to rivers and lakes.
- (2) Distance to glaciers.
- (3) Distance to roads.

The response to water source stabilizes after a certain distance, explaining the importance of availability of water to the species.

So far, 12 grid cells (10 in Changthang WLS, Ladakh region of Jammu & Kashmir, 2 in Kibber WLS, Himachal Pradesh) have been sampled by transect walks, covering a 2700 km² area. During the survey, the research team also collected scats of wolves, foxes and snow leopards. A total of 30 wolf scats were collected in the year 2012–2013. The scats are being washed and dried according to a standard protocol. Further analysis will continue after the scats are washed. After drying, these will be examined for remains of prey. Prey species will be identified on the basis of the remains, *i.e.* hairs, bones, hoofs, etc.

Continuing the public surveys, the team surveyed a total of 17 villages. In all, 40 respondents were interviewed in Srinagar Valley, pertaining to the southern, western and northern regions.

The field surveys are currently being conducted, and a substantial amount of data has to be collected before a trend analysis is carried out.



Information was obtained from locals residing in Srinagar Valley to understand the predation patterns of the wolf. This information revealed a significant conflict in terms of livestock depredation and injury to residents. But the information may have been diluted due to a lack of strong evidence and hearsay. It is suggested that further investigations be carried out.

Kibber WLS is located strategically within Spiti Valley. Our survey revealed much diversity of prey species. Good signs of ungulates such as blue sheep (*Pseudois nayaur*) and cattle were observed. The total survey effort was 140 km of track along Kibber WLS. During the survey 37 signs of wolves, *i.e.* scats and pugmarks were found. The encounter rate was 0.26 signs/km. Signs of other carnivores such as the snow leopard (*Panthera uncia*) and red fox (*Vulpes vulpes*) were also seen. Scats of these 3 predators were collected, and these are being analysed.

Outputs & Outcomes

The report of Phase 1 has been submitted to the MBZ Species Conservation Fund.

Milestone

The first phase of the project generated a probability distribution map of the wolves in the Himalaya, which is a big step, and we hope that consequent research will provide much better insights into the ecology of the Himalayan wolf. The accuracy of these maps is being tested in the current intensive field surveys. The final report of the first phase was published last year, in which we recommended that the authorities consider the management of stray dogs as they are not only becoming a menace to the livestock holders in the high-altitude landscape but also create a negative perception towards wolves due to mislabelling of dog-kills as wolf-kills. The research is continuing and will come up with details for formulation of objective management strategies.

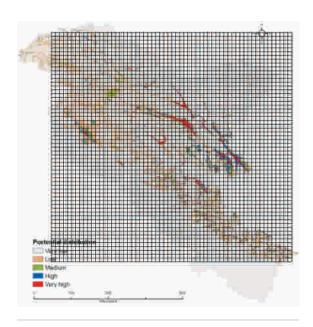


Figure 1. Gridded map of potential wolf distribution in Himachal Pradesh and Jammu & Kashmir (grid cell size 15×15 km²).



Figure 2. Sampling effort and trend of records in Ladakh, Jammu & Kashmir and Himachal Pradesh

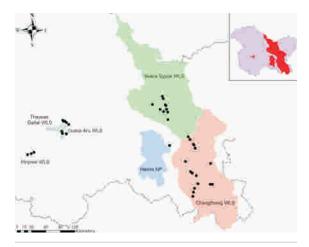
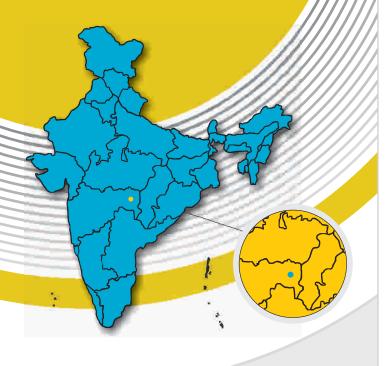


Figure 3. Study area and sign locations of wolf in Spiti Valley, Himachal Pradesh

LONG-TERM MONITORING
OF TIGERS, CO-PREDATORS
AND PREY SPECIES IN
TADOBA-ANDHARI TIGER
RESERVE AND ADJOINING
LANDSCAPE,
MAHARASHTRA, INDIA



Funding Source National Tiger Conservation

Authority,

Maharashtra Forest Department

Investigators Dr. Bilal Habib, WII;

Chief Conservator of Forests

and Field Director,

Tadoba-Andhari Tiger Reserve,

Maharashtra

Co-investigators Shri Mukul Trivedi and

Dr. (Capt.) Parag Nigam

Researchers Madhura Davate,

Anil Dashahare and Nilanjan Chatterjee

Date of Initiation Phase I, 2012; Phase II, 2017

Date of Completion Phase I, 2017; Phase II, 2022

Objectives

The objectives of the project are:-

- (i) Mapping the current land use pattern, infrastructure, mining areas, villages, roads, power transmission lines, demographic profile, livestock population, dispersal corridors, prey and predator occupancy, etc. within the landscape surrounding Tadoba–Andhari Tiger Reserve (TATR):-
- (ii) Determining the spatial distribution and temporal dynamics of the habitat occupancy of tigers, co-predators and prey species and the relationship of these parameters to habitat-related variables.
- (iii) Determining the population density, abundance and demographic structure of tigers and co-predators in the landscape.
- (iv) Estimating the population density and abundance of key prey species in the landscape.
- (v) Estimating the vital rates (survival, recruitment, temporal emigration, dispersal, etc.) of tigers and co-predators.
- (vi) Studying tiger/leopard conflicts and socio-economic aspects.
- (vii) Monitoring village translocation sites (Tadoba provides an opportunity to study the impact of village translocation)
- (viii) Investigating the food habits of tigers and co-predators in the TATR landscape complex.
- (ix) Training the field staff for managing human-wildlife conflict and emergency situations.

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Progress

A total of 85 grids were surveyed for carnivore and herbivore occupancy. The total walk effort in the carnivore sign survey was 1370 km and the herbivore sampling was 192 km through total 96 transects. Core forests of TATR were excluded from the sampling since the occupancy was assumed to be 1, *i.e.* 100%. Territorial forests sampled included the TATR buffer zone under Chandrapur Division, along with parts in the non-buffer zone and under the Forest Development Corporation Limited (FDCM).

The core zone of TATR was sampled for a total of 5076 trap nights spread over 54 trap days with 94 trap stations. This exercise yielded 51 unique tigers and 13 unique leopards when the results were analysed with the help of Program Mark. Data from the line transect survey gave density estimates for the prey species (gaur, sambar and chital) as 24.4 \pm 3.2, 1.7 \pm 0.5, 2.9 \pm 0.7 and 8.5 \pm 2.3, respectively. The results indicate the high abundance of chital and sambar, followed by wild pig, gaur and barking deer.

This study intended to estimate the minimum numbers of tigers, leopards and their prey. Camera trapping is a well established method and the most reliable one for estimating the population of an animal with unique markings. During the trapping session other species such as the sloth bear, dhole, small Indian civet, palm civet, jungle cat, honey badger, hyaena, chital, sambar, nilgai, wild pig, chowsingha, common langur and peafowl were also photographed.

Outputs & Outcomes

Phase IV Monitoring Report—Winter 2013 and Phase IV Monitoring Report—Summer 2013.

Milestone

Camera trapping was completed in 1750 km² of the TATR Landscape for 2014.



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ASSESSMENT OF POLLINATORS IN DIFFERENT AGRO-ECOSYSTEMS AND FOREST TYPES AROUND DEHRADUN



Funding Source State Biotechnology Department,

Department of Science and

Technology,

Government of Uttarakhand

Investigator Dr. V.P. Uniyal

Researcher Preeti Virkar

Date of Initiation January, 2012

Date of Completion January, 2015

Objectives

The objectives of the workshop were to:-

- Assess the types of pollinators in different agroecosystems and forest types around Doon Valley.
- (ii) Assess the species diversity of different pollinator groups.
- (iii) Determine the cause of the decline of pollinators.

Progress

Several sampling methods are available to assess pollinator diversity patterns and abundance. Observation plots and/or transects are methods used often, besides the use of pan traps which is a passive method. We deployed active and passive methods for sampling pollinators. The active method included counting pollinators (belonging to four major orders—Coleoptera, Diptera, Hymenoptera and Lepidoptera) and net-sweeping over vegetation. The passive sampling methods included the use of coloured pan traps (yellow, blue and white).

- *Transect counting.* Transect counting has been found to be effective for bees and butterflies. Similarly, flies and beetles were found be easily sampled using a transect as a sampling unit. Random belt transects were laid in different habitats such as dense sal forests, open forests and riverine forests, and these were used as sampling units to address the patterns of pollinators. Each transect consisted of five sampling points (25 m² quadrat), 20 m apart from one another (as a no-sampling zone) so as to maintain an adequate sampling distance between 2 consecutive plots and to avoid double counting. The minimum spatial distance between 2 transects was 200 m. Transects were walked thrice in a day, at 08:00 hours, 12:00 hours and 16:00 hours, on the basis of preliminary observations of active periods of insects and studies carried out on pollinators by various workers. Different microhabitat (elevation, GPS location, vegetation, etc.) and micro-climate (sunny/cloudy day, temperature, relative humidity, time of the day, etc.) variables were documented at the beginning and end of each transect. All the different pollinators encountered in each quadrat were recorded.
- (ii) Sweep net sampling. Sweep net sampling was done on vegetation to collect pollinators for identification and comparison.
- (iii) Coloured pan traps. Coloured traps (yellow, blue and white) are used for sampling bees. Each pan consists of a yellow bowl filled with clean drinking water (as a trap medium) with common salt (as a preservative) and liquid detergent (to lower the surface tension). The yellow

colour of the bowls resembles the colour of flowers and hence serves as an attractant for bees. Five bowls were placed one in each quadrat.

Outputs & Outcomes

Sampling was carried out in the peak flowering period, from March to May, in 2012 and from February to December in 2013. Riverine forests, open forests, sal forests and agro-ecosystems were the major habitats in which sampling were carried out. A total of 27 bee species were recorded from 60 sub-sampling units from 11 sampling sites. These bees belonged to 4 families: Apidae, Megachilidae, Andrenidae and Halictidae. The species area curves of the 4 habitats indicate further sampling is needed. Eight bee species were found in open forests, which were the highest number among forests, followed by 6 and 5 species in dense sal and riverine forests, respectively. Agroecosystems had 16 bee species.

Milestone

The study is anticipated to collect further repeated sampling which will assist to support a precise and accurate determination of the diversity pattern displayed in the study area.



Preeti S. Virk

EVALUATION OF MHC HETEROZYGOSITY IN ISOLATED TIGER POPULATION



Funding Source Grant-in-Aid

Investigator Shri S.K. Gupta

Researcher Ajit Kumar

Date of Initiation February, 2012

Date of Completion February, 2015

Objectives

The objectives of the project are to:-

- (i) Evaluate the level of MHC Class-I polymorphism in the tiger population.
- (ii) Evaluate the MHC heterozygosity level in the tigers of Ranthambore and Bandhavgarh.
- (iii) Compare the heterozygosity levels of microsatellite and MHC markers.

Progress

A total of 112 samples (14 blood samples and 98 scats) were collected for genetic assessment in isolated and connected tiger reserves. These samples were collected from Ranthambore Tiger Reserve (n=24), Bandhavgarh Tiger Reserve (n=16), Panna Tiger Reserve (n=40) and Kanha Tiger Reserve (n=32). All the scat samples were kept in airtight plastic bags along with silica gel. Global Positioning System (GPS) coordinates were recorded during sample collection. Fresh sampling allows better DNA extraction for estimating populations. In the laboratory, all necessary precautions were taken to prevent crosscontamination of samples.

After the tiger scat samples were identified, the research team amplified the highly polymorphic MHC- α 1 and MHC- α 2 genes, from exon 2 to the end of exon 3, encoding the catalpha 1 and catalpha 2 domains of class I proteins, respectively. These primers have been used in several studies and successfully amplified in a variety of felid species including tigers. These genomic regions include the functionally important antigenbinding sites (ABS), *i.e.* amino acid positions postulated to interact directly with foreign antigens.

Primer 1: MHC α 1F:5'-CCACTCCCTGAGGTATTTCTACACC-3'

-MHC lpha1R:5'-GGACTCGCTCTGGTTGTAGTAG CG-3'

Primer 2: MHC $\alpha \mbox{2F:5'-CGCACAACATCCAGA GAATGTACG-3'}$

-MHC α 2R:5?-TGTCCAGGTATTTGGCGAGC-3'

The research team amplified the alpha-1 and alpha-2 domains of MHC Class I in blood and scat samples (Fig. 5a and 5b). In all PCRs, the team used AmpliTaq Gold polymerase (Life Technologies) to minimize PCR-induce substitutions. The amplified MHC fragments will be cloned prior to sequencing into electro-competent *Escherichia coli* cells (ElectrocompTM TOP10 cells, Invitrogen), using the TOP0 TA Cloning® Kit for sequencing (Invitrogen).

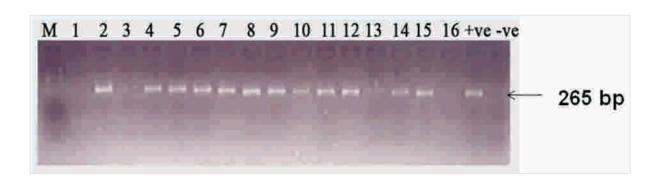


Fig. 5(a). Image showing the amplified product with MHC Class- 1. Lane 1-8 are scats, and lanes 9 to +ve are blood samples.



 $\textbf{Fig. 5(b)}. \ \\ \textbf{Image showing the amplified product with MHC Class-2. Lanes 1-8 are scats, and lanes 9 to +ve are blood samples.}$

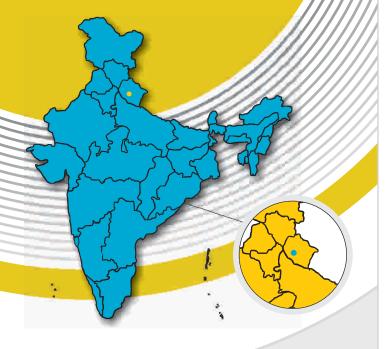
Outputs & Outcomes

The research team could successfully amplify the MHC locus from scat samples. The team could successfully amplify the MHC locus from faecal samples. The results of sequencing suggest that further cloning of the PCR product is needed. The team is procuring equipment for cloning work, which includes a bio-safety Class II cabinet for culture of a non-pathogenic *E. coli* strain for gene cloning. Once the cloning facility is established, the team will be able to sequence and analyse the unambiguous MHC alleles.

Milestone

Successful amplification of the MHC loci was achieved from scat samples.

ECOLOGY, CONSERVATION AND STATUS OF HOUSE SPARROW, PASSER DOMESTICUS IN UTTARAKHAND



Funding Source Uttarakhand State Council for Science & Technology

Investigator Dr. V.P. Uniyal

Researcher Jiju J.S.

Date of Initiation July, 2012

Date of Completion July, 2014

Objectives

The objectives of the project are to:-

- (i) Assess the density and distribution of the house sparrow in different urban and rural areas of Uttarakhand.
- (ii) Identify the factors influencing the distribution of the house sparrow.

Progress

The line transect and point count methods were used to survey the different habitats, *viz.* rural, urban, forest and agrarian ecosystems, in Uttarakhand. It is proposed to cover each tehsil, the smallest sampling unit for the study. Line transects of length 1 km were laid in various habitats with 5 point counts carried out at 200 m intervals along the transect. Five randomly selected transects were laid in the selected study area, and each transect was walked thrice. In each transect, the number of sparrows encountered, presence of predators (*e.g.* cats, raptors), presence of competitors (*e.g.* doves and pigeons) and presence of mobile towers were recorded. DISTANCE software was used to analyse the data and half normal cosine fitted the data best (X=0.21, df=2, P=0.90). A questionnaire survey was also carried out to get an insight into the present status and distribution of the house sparrow in the study area.

Outputs & Outcomes

Ten tehsils in 4 districts of Uttarakhand have been surveyed. In each tehsil, 5 line transects were walked, and in each transect 5 nested points were chosen for a point count survey. A pair of binoculars, a laser range finder and a handheld compass were used during the survey. A total of 35 transects, along with 3 temporal replicates (105 transect walks) of each, were walked. A total of 105 km was walked in the morning and evening hours. Out of 35 transects, house sparrows were seen in 24. The flock size varied from place to place: 30 individuals were seen in Rishikesh, whereas single individuals were encountered at some places. The maximum number of house sparrows was encountered in Rishikesh tehsil, and the least was in Rudraprayag. Artificial nest boxes were installed in different areas of Dehradun and Chamoli. Some of these boxes are occupied by house sparrows. Different aspects were covered in the questionnaire survey, which was conducted in Dehradun district. People were shown pictures of both male and female house sparrows and asked whether they had seen the bird or not

and if yes, the number of individuals and how frequently. The occupations and major activities, e.g. use of chemicals in agricultural farms, that can influence the presence of sparrows were recorded during the survey. People's perspectives towards the sparrow were also considered. Most of the people said that they had seen sparrow, and according to them, house sparrows were common. At the same time, most of them failed to differentiate the house sparrow, Sind sparrow and russet sparrow, and so the frequency of sighting is to some extent doubtful.

Milestone

In urban areas, a lack of nesting space was observed during the study. Therefore, wooden nest boxes were mounted on buildings in Dehradun on a test basis to encourage the study species to nest and breed. Some of the nest boxes have been occupied successfully by the house sparrow.



EVALUATION OF METHODS TO ESTIMATE WILD ASS POPULATION IN RANN OF KUCHCHH, GUJARAT



Funding Source

Grant-in-Aid

Collaborating Agency

Gujarat Forest Department

Investigators

Shri Qamar Qureshi and Dr. Nita Shah

Date of Initiation

February, 2012

June, 2016

Date of Completion



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Objectives

The objectives of the project are to:-

- (i) Compare estimates of the wild ass population using various methods and the effectiveness of these methods.
- (ii) Develop cost-effective methods for monitoring the population.

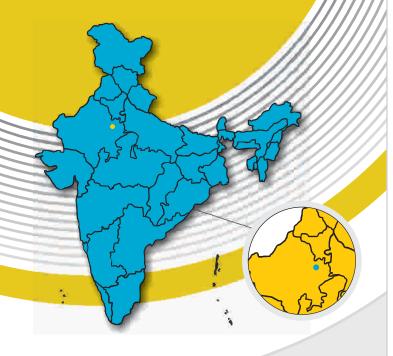
Progress

The Little Rann of Kutch sanctuary, with an area of 4953.71 km², is spread over 5 administrative districts, i.e. Rajkot, Surendranagar, Mehsana, Banaskantha and Kachchh, of Gujarat. To estimate the density and abundance of the wild ass Equus hemionus khur, 74 foot transects were laid in the southern and eastern parts of the wild ass sanctuary, covering a length of 268 km. Special care was taken to maintain a minimum distance of 500 m between 2 parallel transects to avoid double counting of the wild ass population. An aerial survey was carried out using a high wing Cessna aircraft to standardize the methods and assess the feasibility of using drones for population estimation. The team flew the aircraft at various heights from 50 to 1000 m and found that 100-200 m is appropriate for sampling. Strip width calibration was done to estimate the perpendicular distance. There were 2 observers were used at the right windows (front and rear) of the plane to calibrate or estimate the correction factor for observer bias. The team is in the process of testing the issue of availability bias in aerial surveys. The data have been analysed using the conventional distance sampling (CDS), multi-covariate distance sampling (MCDS) and mark recapture distance sampling (MRDS) methods. The observers, fatigue level, habitat type, distance and group size were taken as covariates.

Outputs & Outcomes

The wild ass population is distributed over 10,000 km² in the arid area of Gujarat. The khur is a highly endangered wild equid, with its range restricted now to India. The density of wild ass as determined through foot transects was 6.99±1.156 and that of nilgai 1.49±0.519. These are the large wild herbivores of the region. The cluster size of wild ass was found to be 1.21 (SE 0.147). Out of a total of 301 sightings of all wild animal species, 225 sightings of wild ass and 57 sightings of nilgai have been used. Chinkara and blackbuck were also seen, but these sightings were too few to use for density estimation. There is a seasonal variation in the abundance and distribution of the wild ass, which is governed by the resource distribution. Further data collection in summer will add information to this aspect of the distribution. The aerial survey standardization protocols indicate the effects of observer fatigue and height, a correction factor for which needs to be incorporated in abundance estimation. The density estimate as determined through the aerial survey was 2±0.49 individuals. The current density estimates from the aerial survey and foot transect are not comparable due to design issues. In the coming winter, we will cover same area by both the methods.

MONITORING OF RE-INTRODUCED TIGERS IN SARISKA TIGER RESERVE, RAJASTHAN



Funding Source	National Tiger Conservation
	Authority

Investigators	Dr. K. Sankar, Dr. P.K. Malik
	and Dr. Parag Nigam

Researcher Dibyendu Kumar Mandal

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Date of Initiation February, 2009

Date of Completion March, 2015

Objectives

The objectives of the project are to:-

- (i) Study the home range and movement patterns of the reintroduced tigers and their dispersal pattern.
- (ii) Assess the habitat use by the re-introduced tigers.
- (iii) Study the food habits of the re-introduced tigers.
- (iv) Estimate the population of the preu species.
- (v) Suggest management recommendations for effective conservation of tigers in Sariska Tiger Reserve (STR).

Progress

All the tigers were monitored periodically in STR through ground tracking using the "homing in" and "triangulation" techniques and through pugmark tracking and camera trapping. The minimum convex polygon (100% MCP) technique was used to evaluate the home ranges of individual tigers, seasonally and annually. To evaluate the habitat use pattern of tigers, habitat variables such as the terrain type, vegetation type and distance to nearest water body, road and human settlement were recorded at each radio collar location. A total of 3129 radio locations were recorded for 7 tigers during the reporting period, using a handheld Global Positioning System (GPS). The food habits of tigers were estimated through scat analysis and kill data. In total 170 tiger scat samples were collected and analysed for remains of prey. Ninety-two tiger kills were recorded during the study period. A total of 52 line transects were walked thrice in each season (summer, winter, monsoon) to estimate the prey availability. Each transect was walked between 6:30 am and 9:00 am. The cluster size, encounter rate, angular sighting distance and animal bearing of the encountered prey species were noted on line transects. The prey species densities were estimated using the program DISTANCE.

Outputs & Outcomes

A total of 366, 341, 588, 540, 616, 267 and 411 radio locations ST2 (female), ST3 (female), ST4 (male), ST5 (female), ST6 (male), ST9 (female) and ST10 (female) were recorded, respectively. The annual home ranges were estimated as 48.15 km², 100.14 km², 203.18 km², 79.7 km², 171.97 km², 78.88 km² and 185.57 km² for ST2, ST3, ST4, ST5, ST6, ST9 and ST10, respectively. In 2013, the estimated summer home ranges of the 7 tigers were 33.22 km², 108.58 km², 119.3 km², 60.48 km², 128.52 km², 38.3 km² and 153.64 km² for ST2 to ST10, respectively. The estimated monsoon home ranges in 2013 were 34.3 km², 80.74 km², 137.15 km², 73.37 km², 171.63 km², 49.76 km² and 168.59 km² for ST2 to ST10, respectively. The observed monsoon home ranges of the tigers were large due to the widespread distribution of the prey species and water in the

study area. The estimated winter home ranges in 2013–2014 of the tigers were 35.2 km², 65.95 km², 171.6 km², 63.27 km², 192.82 km², 64.44 km² and 109.27 km² for ST2 to ST10, respectively. The observed large home ranges of the male tigers (ST4 and ST6) during winter were due to their association with the newly reintroduced female tigers (ST9 and ST10). These two females (ST9 and ST10) occupied northern areas of STR falling in Akbarpur and Talvriksh ranges. The overall habitat use of the reintroduced tigers was in the following order: *Zizyphus* woodland>scrubland>*Butea* mixed forest>water body>*Acacia* mixed forest>barren land>*Boswellia* forest>*Anogeissus* forest (X-squared=199.684, degrees of freedom=8, p-value<0.0001). *Zizyphus* woodland, *Butea* mixed forest, water body and scrubland were utilized more than their availability.

Six prey species, namely sambar, chital, nilgai, wild pig, peafowl and domestic cattle, were recorded in the tiger scats. Of these, sambar contributed the maximum (55.88%) to the tiger's diet, followed by wild pig. Livestock (buffalo and brahminy cattle) was found highest in tiger kills (62%), followed by sambar (19.5%), nilgai (14.13%), chital (2%) and wild pig (2%).

The density of peafowl was found to be the highest in the study area ($103\pm14.10/\text{km}^2$), followed by nilgai ($26.75\pm8.96/\text{km}^2$), livestock (buffalo, brahminy cattle, goat and sheep) ($42.35\pm8.83/\text{km}^2$), sambar ($16.41\pm5.10/\text{km}^2$), chital ($13.15\pm3.16/\text{km}^2$), common langur ($7.60\pm2.12/\text{km}^2$) and wild pig ($5.76\pm1.89/\text{km}^2$). The findings of the present study are in accordance with those of previous studies conducted in the same study area during 2008–2012. Restricted grazing and village relocation (n=8) from the notified national park area are recommended for the survival of tigers in the future in Sariska.

Milestone

All the tigers were monitored on a daily basis during the reporting period.

MONITORING OF RE-INTRODUCED GAUR BOS GAURUS GAURUS IN BANDHAVGARH TIGER RESERVE, MADHYA PRADESH



Funding Source	Madhya Pradesh Forest Department
Investigators	Dr. K. Sankar, and Dr. Parag Nigam
Researchers	B. Navaneethan and Manas P. Manjrekar
Date of Initiation	January, 2011
Date of Completion	January, 2015

Objectives

The objectives of the project are to:-

- (i) Study the ranging patterns of the reintroduced gaur.
- (ii) Evaluate the habitat use patterns of the reintroduced gaur.
- (iii) Study the food habits of the reintroduced gaur.

Progress

All the radio collared gaur (n=15) were monitored periodically in Bandhavgarh Tiger Reserve (BTR) through ground tracking using the "homing in" and "triangulation" techniques. The minimum convex polygon (100% MCP) technique was used for calculating the home range. Habitat variables such as terrain, broad vegetation type and distance to nearest water body, road and human settlement were recorded at each radio-collared location to evaluate the habitat use patterns. A total of 9210 radio locations were recorded for all the radio collared individuals during the reporting period, using a handheld Global Positioning System (GPS). Data on the food habits of the reintroduced gaur were collected through the scan sampling technique and opportunistic sightings. The gaur fed on 49 different plant species during the study period. Through the scan sampling technique, a total of 3364 feeding records were collected during the study period. Of these, 1052 were collected in summer (2013), 1275 in the monsoon (2013) and 1037 in winter (2013-2014). From the group scan data, the percent time spent feeding on each plant part and species were calculated. Samples of food plants eaten and dung samples of gaur for each season were collected. Analysis of the food plant samples for nutrient content and the dung samples for the monocot-dicot plant fragment ratio were carried out.

Outputs & Outcomes

All the collected GPS positions were later transferred to the Bandhavgarh beat map. This was required for home range estimation. During the study period, the home range of the gaur was estimated using the 100% MCP to be 240.5 km²; with the 95% kernel it was 142.1 km², and with the 50% (core area) kernel, the estimated home range was 25.5 km². The average annual home range (100% MCP) for the males (n=2) was 84.5 ± 9.5 (SE) km², and for the females (n=14) it was 63.5 ± 10.1 (SE) km². The gaur is a gregarious animal, but adult males have the tendency to range solitary for some time, after which they join a herd for a while and then become solitary again. In summer the estimated home ranges of males (n=231) and females (n=1267) were 22.1±9.4 (SE) km² and 16.6±3.4 (SE) km², respectively. In the monsoon and post-monsoon, the home ranges of males (n=149) and females (n=1103) were 12.6 ± 3.1 (SE) km² and 20.2 ± 4.6 (SE) km², respectively. In winter, the home ranges of males (n=197) and females (n=1311) were 10.0±2.2 (SE) km² and 11.2±1.7 (SE) km², respectively.



Compositional analysis showed that the overall habitat use of the reintroduced gaur was in the following order: bamboo forest>mixed forest>sal forest>grassland>riparian>open mixed forest> agriculture land (chi-square (6 df)=148.40 (P<0.0001).

It was observed that Dendrocalamus strictus leaves (bamboo leaves) formed a major part of the gaur diet in all the seasons. Along with the leaves, the young and tender shoots formed a major food item of the gaur in the monsoon. In winter Dendrocalamus strictus leaves formed a major portion of the gaur diet as the time spent feeding doubled in winter compared with summer and the monsoon. Also, the consumption of grasses was seen to be high in summer and the monsoon, whereas it declined in winter. The major grass species eaten in summer were Saccharum spontaneum, Vetiveria zizanoides and Phragmites karka. In monsoon the major grass species eaten (young shoots) were Vetiveria zizanoides, Eragrostis spp., Andropogon spp., Digitaria spp., Setaria spp., Aristida setacea, Saccharum spontaneum and Phragmites karka. In winter the grass species consumed were Saccharum spontaneum, Vetiveria zizanoides, Phragmites karka, *Eragrostis* spp. and *Bothriochloα* spp. In the monsoon, herbs also constituted a major food item of the gaur. The herb Oplismenus compositus was consumed in higher proportions especially. Young leaves of *Shorea robusta* constituted a major food item in early summer. The leaves of Chloroxylon swietenia and Butea superba (climber) were consumed in winter.

A total of 45 food plant samples were analysed for nutrient content during the study period (these included food plant samples for summer (2012 and 2013), the monsoon (2012) and winter (2012-2013).

It was observed that the crude protein content of mature Dendrocalamus strictus leaves was high in all seasons (summer (2012 and 2013), 3.76% and 3.9%; monsoon (2012), 5.22%; winter (2012-2013), 5.6%). The young leaves of Dendrocalamus strictus, which are available in summer, especially had a very high protein content (summer (2012 and 2013(, 5.65% and 7.65%). Minerals such as Fe (Iron) (summer (2012 and 2013), 458.5 ppm and 768.1 ppm) and K (potassium) (summer (2012 and 2013), 13520 ppm and 15750 ppm) were present in high quantities in these young leaves. The young leaves of *Shorea robusta*, a major food item of gaur in summer, had high levels of protein (summer (2012 and 2013), 6.52% and 5.84%) and minerals such as K (potassium) (summer (2012 and 2013), 9681 ppm and 6785 ppm) and Mg (magnesium) (summer (2012 and 2013), 2800 ppm and 2608 ppm). All the grass samples had high protein content (summer (2012 and 2013): Vetiveria zizanoides, 3.05% and 1.92%; Phragmites karka, 4.82% and 5.61%; *Saccharum spontaneum*, 1.75% and 2.88%. monsoon (2012): grasses 2.75%. winter (2012-2013): grasses, 8.2%) and also had high contents of minerals such as Ca

(calcium) (summer (2012 and 2013): Vetiveria zizanoides, 10680 ppm and 11490 ppm; Phragmites karka, 28950 ppm and 5250 ppm; Saccharum spontaneum, 35550 ppm and 5820 ppm. monsoon (2012): grasses, 7950 ppm. winter (2012-2013): grasses, 5070 ppm), Mg (magnesium) (summer (2012 and 2013): Vetiveria zizanoides, 2847 ppm and 3145 ppm; Phragmites karka, 5220 ppm and 1402 ppm; Saccharum spontaneum, 2352 ppm and 1557 ppm. monsoon (2012): grasses, 2075 ppm; winter (2012-2013): grasses, 1194 ppm) and Fe (iron) (summer (2012 and 2013): Vetiveria zizanoides, 425.4 ppm and 426.2 ppm; Phragmites karka, 868.8 ppm and 488.4 ppm; Saccharum spontaneum, 542.9 ppm and 257.1 ppm. monsoon (2012): grasses, 1050 ppm. winter (2012-2013): grasses, 321 ppm) in all the seasons.

A total of 150 dung samples were analysed for the monocotdicot plant fragment ratio during the study period (dung samples of summer (2011), the monsoon (2011) and winter (2011–2012)). The percentage of monocot plant fragments was very high in gaur dung samples for all the 3 seasons (summer (2011), 88.2%; monsoon (2011), 93.4%; winter (2011), 89.4%). The percentage of dicot fragments was highest in summer (2.5%), and it was lowest in winter (0.2%).

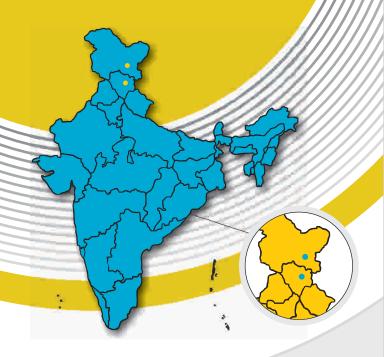
Milestone

A total of 50 gaurs were translocated from Kanha Tiger Reserve to BTR during 2011–2012. During the study period, 4 gaurs were preyed upon by tigers (2 calves, 1 sub-adult female and 1 sub-adult male). Also, there were 16 natalities among the reintroduced population during the reporting period. The present gaur population of BTR is 72. The overall growth rate of the re-introduced gaur population was 44%.

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A SURVEY OF THE
AVIFAUNA IN THE
IMPORTANT BIRD AREAS
(IBAS) OF THE TRANSHIMALAYAN REGION



Funding Source

Grant-in-Aid

Collaborating Agency

State Forest and Wildlife Departments, Jammu & Kashmir and Himachal Pradesh

Investigators

Shri Subharanjan Sen and Dr. G.S. Bharadwaj

Researcher

Suresh Pawan Kumar

Date of Initiation

February, 2012

February, 2015

Date of Completion

Objectives

The objectives of the project are to:-

- (i) Document the current status of birds in IBAs of the Trans-Himalayan region.
- (ii) Assess the habitat requirements of the endangered species in the region.
- (iii) Identify potential and current problems in the conservation of the avifauna of the region, especially with reference to the increasing anthropogenic pressures including grazing, expanding agriculture, biomass removal, plantation and increasing tourism activities.
- (iv) Demarcate the exact boundaries of the existing IBAs and identify potential IBAs based on the IBA criteria.

Progress

Observations are being made using different methods including line transects and point counts. The relative abundance of birds is being estimated through relative density/abundance estimates. During the survey, the following details were noted:

- (i) Type of contact, e.g. visual sighting, call or nest.
- (ii) Name of the bird.
- (iii) Time and date of observation.
- (iv) Weather.
- (v) Tpography of the area.
- (vi) Aspect of the slope.
- (vii) Place where bird is perching, such as rock, ground, bush, water or nest.
- (viii) Activity of the bird at the time of observation.
- (ix) Single or in a group and if in a group, the number of birds.
- (x) GPS reading along with altitude.
- (xi) Presence and nature of any anthropogenic disturbance/influence.

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The study was carried out through:-

- (a) Transects.
- (b) Trail surveys.

A total of 10 transects of length 500 m were laid in 3 different habitats randomly (meadows, agricultural land and Kibber Wildlife Sanctuary).

Habitat Type	Number of transects
KWLS	6
Agricultural land	2
Meadows	2

Transects were traversed during the early morning hours, when bird activity is at its peak. The species, GPS location, distance of sighting, cluster size, transect and animal bearing, altitude (in meters), guild, water availability and weather were recorded. Trail surveys were carried out randomly in and around the reserve during morning and evening hours.

Outputs & Outcomes

All the IBAs proposed to be covered, including Chushul Marshes (IN-JK-01), Hanle Plains (IN-JK-06), Hemis National Park (IN-JK-07), Pangong Tso (IN-JK-15), Tso Kar Basin (IN-JK-18), Tso Morari (IN-JK-19), Kibber Wildlife Sanctuary (In-HP-12) and Pin Valley (IN-HP-18), have been covered at least once so far during the project. In addition, several new areas such as Suru Valley, which has seen few ornithological surveys recently and was recommended by the independent referees during the sanctioning of the project, were surveyed.

In all, about 15,300 observations on birds have been recorded thus far. About 150 species have been documented, including several rare ones.

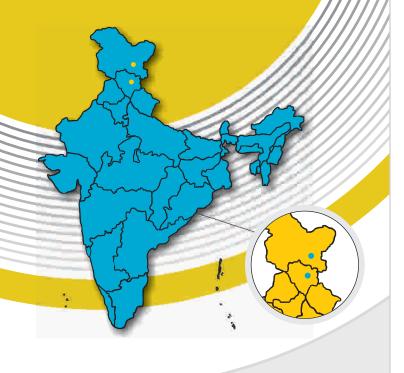
The following are the detailed objectives achieved:-

- (i) Identification of different habitats in the region.
- (ii) laying of traverses, transects and sample points in the field.
- (iii) GPS recording of the altitude profile, latitudes and longitudes.
- (iv) Collection of data through direct observations in the field, including making a check list of birds and estimating the number/abundance at different sampling points and transect lines.
- (v) Estimating the relative abundance of different birds at different sampling points and transect lines. The factors responsible for the different relative abundances of the avifauna at different places at different times will be worked out. The selection of different habitats, including niches, by different birds will be analysed. The impacts of anthropogenic and other biotic factors on the distribution, diversity and abundance of birds in the study area will be studied.



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KAILASH SACRED LANDSCAPE CONSERVATION AND DEVELOPMENT INITIATIVE PROJECT: **IMPLEMENTATION PROGRAMME IN INDIA**



Funding Source ICIMOD, Nepal

Investigators Dr. P.K. Mathur (Nodal Person, ICIMOD activities),

Dr. B.S. Adhikari (Project Coordinator), Dr. S. Sathyakumar, Dr. V.P. Uniyal, Shri Mukul Trivedi, Dr. K. Sivakumar and Dr. Gopi G.V.

Researcher Arti Kala

Ajaz Hussain, Sumit K. Arya, Sweta Singh, Nayan Gogoi **Project Biologists**

and Richa Shah

Date of Initiation March, 2012

December, 2016 Date of Completion



© Dr. Arti Kala

Objective

The objective of the project is to conserve and develop the Indian part of the Kailash Sacred Landscape.

Progress

The Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI) project relates to a trans-boundary landscape straddling 3 countries (China, India and Nepal). The project primarily aims to conserve biodiversity, i.e. maintain ecological and biological diversity at hierarchal scales (landscape, ecosystem, community and species levels), ecological integrity, continued ecological processes and services besides reducing the vulnerability of local communities with other partner institutes (G.B. Pant Institute of





Himalayan Environment and Development, Almora; Uttarakhand State Biodiversity Board and State Forest Department, Uttarakhand). The project also aims to promote development in the landscape for human well-being, sustainable livelihoods and economic prosperity and resilience to climate change. The LoA signed by ICIMOID and WII for 2013-2016 has spelt diverse activities to be performed by WII's team under 3 different components (ecosystem management for sustaining services; biodiversity conservation, long-term monitoring and regional cooperation enabling policies and knowledge management) of the project.

During the reporting period, a horizontal transect was selected for various field level assessments, and consultations were

conducted using a participatory approach. Through conventional methods, viz., quadrat sampling, transects, point count sampling, scanning and sign surveys, data collection was carried out at the village level on forest vegetation, habitat evaluation, distribution of wild animals and abundance, biotic pressure, medicinal plants, ecological services, human-wildlife conflict, diversity of agro-ecosystem and livelihoods in van panchayats for all 15 villages on the horizontal transect, under 3 sub-watersheds. The data are being analysed.

Extensive consultations were held with communities, prominent NGOs, the district administration, forest department and other line agencies. Appropriate dialogues, interaction and communication were had with partner organizations. Three consecutive workshops (Project Consultative Workshop for the district level officials, Participatory Natural Resource Management of Van Panchayat for sarpanchs and local representatives and Capacity Building on Field Techniques and Wildlife Management for the forest frontline staff) were conducted in November 2013. Apart from these, several informal meetings were conducted with local communities, especially women, van panchayat committees and the Mahila Mangal Dal. From time to time, awareness programmes were conducted for school children during November-December on wildlife conservation and management. Concurrently, drawing competitions (for primary classes) and essay writing competitions (for students of standards 8 to 12) were conducted for children from both private and government schools.

Considering the foregoing, the project incorporates a multidisciplinary outlook as it relates to biological, ecological, social and management aspects of natural resources and involves a large number of scientific and social disciplines. Output in the form of a Landscape Management Plan for the Indian part of the Kailash Sacred Landscape is anticipated.

CAUSES OF AVIAN DIVERSITY GRADIENTS ALONG THE HIMALAYAS



Funding Source

Department of Science & Technology

Investigators

Shri R. Suresh Kumar, Shri Sandeep Gupta, Shri Pratap Singh (WII) and Dr. Dhananjai Mohan (Uttarakhand State Forest Department)

Researchers

Suresh Kumar Rana and Ashutosh Singh

Date of Initiation

August, 2013

Date of Completion

August, 2016

INITIATED PROJECTS

Objectives

The objectives of the project are to:-

- (i) Understand distributions, densities and habitat associations in the western and eastern parts of the Himalayan range for a select group of closely related birds.
- (ii) Study genetic differentiation across the range of species shared between the east and west.
- (iii) Combine the results in an evaluation of the ecological and historical hypotheses to explain the diversity gradients in the Himalayas.

Progress & Outcomes

Researchers were appointed in August 2013 through a walk-in interview at WII, following which they started collecting secondary data on the ecological and molecular aspects of the study. Training was given to the researchers on identification, mist-netting and handling of birds and collection of blood samples. One of the researchers participated in the DST-sponsored field school for ornithology, organized by SACON,

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within the 5 ha plot were marked. There were 72 species in the foothills plot, while there were only 38 species in the plot at 2000 m. The tree density was 327/ha, with a basal area of 47.26 m²/ha at 2000 m, and in the foothill plot, the tree density was 247/ha and the basal area was 31.38 m²/ha. How this difference in vegetation structure influences the diversity of flycatcher

species in the mid-elevation is being investigated.

Coimbatore in December 2013, while another attended a 3 month course, Ecology and Evolution, at the University of Chicago. In April 2014, field work was initiated with intensive sampling for vegetation in the Eastern Himalaya, specifically in the previously established 5 ha grids in Chapramari Wildlife Sanctuary and Neora Valley National Park, in West Bengal, and has nearly been completed. Recordings of calls of flycatcher species were made in Arunachal Pradesh and West Bengal, and vocalization experiments were carried out. Vegetation sampling and behavioural observations will be taken up in late June 2014 in Jammu & Kashmir.

Milestone

Intensive vegetation sampling in the 5 ha grids in Chapramari Wildlife Sanctuary (foothills) and Neora Valley National Park (mid-elevation) has been completed. Vegetation data, specifically on tree diversity, were analysed. All the trees

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PROMOTING LIVELIHOOD
SECURITY AND
COMMUNITY
PARTICIPATION IN FOREST
CONSERVATION IN
FRINGES OF KEDARNATH
WILDLIFE SANCTUARY,
WESTERN HIMALAYA



Funding Source Uttarakhand State Council for Science and Technology

Investigators Dr. Ruchi Badola and Dr. Syed Ainul Hussain

Researcher Upma Manral

Date of Initiation May, 2013

Date of Completion May, 2015

Objectives

The objectives of the project are to:-

- (i) Quantify the extraction of forest resources by the local people.
- (ii) Quantify the availability of major forest resources along the altitudinal gradient.
- (iii) Estimate the contribution to the total income of the local of the agricultural and forest products traded by them.
- (iv) Facilitate the establishment of Self-Help Groups (SHGs) in selected study villages.
- (v) Find ways and possibilities of transforming local goods into value added products through value chain analysis and market surveys.

Progress

Hierarchical cluster analysis was carried out to select study villages for sampling using secondary data collected from various government agencies. A household level questionnaire survey has been initiated using a semi-structured questionnaire with both open and close-ended questions on socio-economic profile, resource use pattern and participation in community based activities and local level institutions. The study villages are categorized into 3 groups, viz., villages located inside the sanctuary, proximal villages and villages situated at a distance of or more than 3 km. A socio-economic survey has been completed in 90% of the study villages. A total of 120 leaders and members of around 80 SHGs have been interviewed for the fourth objective. For value addition, the possibility of organic certification of the local produce has been explored through market surveys. The Uttarakhand Organic Commodity Board was visited and local representatives from the board were met at the field site.

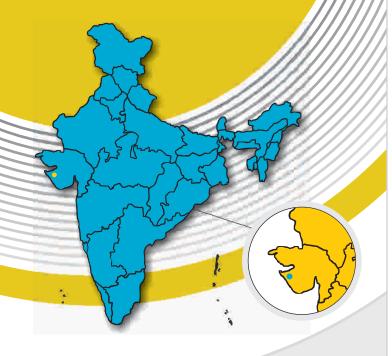
Outputs & Outcomes

Fuelwood is the primary source of energy in the region, and on an average 25-30 kg/day/household of fuel wood is collected for about 180 days/year from sanctuary forests and trees on civil land and along agricultural field boundaries. The various sources of fodder included leaf and grass fodder from sanctuary and community forests, agricultural byproducts and grass and trees along the boundaries of fields. Villages in and near the sanctuary were most dependent on the forests for fodder, while the availability of fodder was better within distant villages as fodder trees have been planted along agricultural fields and



wastelands. *Quercus leucotrichophora* was the most preferred leaf fodder brought from forests (35-40 kg/household/day), primarily from October to May. Most often, kidney bean is inter-cropped with climbers of various vegetables such as bitter gourd, pumpkin and ridge gourd. Higher and heavier branches are used for this. As the traditional agricultural practices in the region resemble those of organic farming, the option of organic certification for amaranth, kidney bean and citrus fruits was explored for augmenting the income of locals. SHGs working in the region focus on savings, with members pooling financial resources and earning some interest by providing loans among themselves. The functional SHGs had better cooperation among the members and had visibly strong leadership, which resulted in the economic independence of its members.

ECOLOGY OF THE ENDANGERED ASIATIC LIONS USING SATELLITE AND GPS TELEMETRY



Funding Source Department of Science & Technology

Investigator Dr. Y.V. Jhala

Researchers Kausik Banerjee and Stotra Chakrabarti

Date of Initiation June, 2013

Date of Completion June, 2016

Objectives

This, study mandated by the Gujarat Forest Department, aimed at quantifying prey, predators, human disturbances, land-use patterns and the local people's perception of the reintroduction of lions in Barda.

Progress

The Barda landscape was surveyed between October 2013 and March 2014. The research team used spatially explicit capture-recapture (n=1856 camera trap nights) and a distance sampling (n=27 line transects) framework for estimating the abundance of predators and prey, respectively. Potential habitat corridors between Gir and Barda were delineated using lion habitat-suitability models and Circuits cape. Social perceptions of lion reintroduction were quantified through questionnaire surveys (n=90 respondents). Information on lion habitat use, home range and prey availability from eastern Gir (habitat similar to Barda) was used to estimate the lion carrying capacity of the Barda landscape.

Outputs & Outcomes

The Barda landscape (410 km²), comprising Barda Sanctuary, the Alech Hills and the grasslands and coastal *Prosopis juliflora* forests of Porbandar District, was estimated to support 26–35 lions. The wild prey density of Barda Sanctuary was low, nilgai $(0.3\pm0.02/\text{km}^2)$ and wild pig $(3.4\pm2.8/\text{km}^2)$ being the only wild ungulates recorded on the transects. Currently, with a sizeable leopard density in Barda $(7\pm3\,\text{SE}/100\,\text{km}^2)$, reintroduced lions cannot be sustained exclusively by wild prey. The existing habitat connectivity between Gir and Barda was found to be extremely tenuous and unfavourable for regular lion movements. The majority (98%) of the pastoralists living inside Barda Sanctuary were willing to resettle outside.

The Gujarat Forest Department should first overtly decide their conservation goals. If the objective is to establish another separate free ranging lion population in Barda as a security against disease-caused epidemics and natural calamities in Gir; then natural movement corridors between Barda and Gir landscape are not desirable. The Barda population then needs to be artificially managed as a separate meta-population, with supplementation and department-mediated exchanges of individuals from Gir after appropriate health checks. Alternatively, if Barda is desired to be a meta-population of Gir to enhance the long-term viability of the lions, then it would be judicious for the government to allocate and spend funds for restoring habitat corridors between Barda and Gir. In this case, the long-term viability of the lions in the Saurashtra landscape is enhanced by adding Barda to the existing meta-population structure of the Gir lions.

The research team also identified habitat refuge patches in the agro-pastoral landscape outside Barda Sanctuary that are

essential for supporting breeding lion nuclei in the future. They proposed that the habitat patches of extent >4 km² be legally protected and recommended that they be considered for 'conservation reserves' while smaller habitat patches are made 'eco-sensitive' so as to promote landscape-scale lion conservation without compromising traditional livelihood needs.

A soft release of a few lions, concurrent with incentive-driven voluntary resettlement of pastoralists from inside Barda Sanctuary to create an inviolate area; building up prey by restocking; and managing conflicts with appropriate compensation was considered to be a feasible strategy for making Barda a potential new home for lions. Restoring habitat corridors might require extensive investments and a policy change. This would be desirable only if Barda is to be managed as a natural meta-population with the Gir landscape.

The success of a Barda reintroduction should be examined by the following indicators:-

- (i) Establishment of a population of about 15-20 lions that are breeding naturally with a good recruitment rate.
- (ii) full resettlement of nesses from inside Barda Sanctuary.

- (iii) building up natural prey within Barda Sanctuary by restocking programmes to over 10 wild prey/km².
- (iv) landscape-scale conservation through legislation (declaring community reserves and eco-sensitive areas) and eco-restoration. On the other hand.

The project could be considered to be a failure if:-

- (i) An inviolate space of about 200 km² in and around Barda Wildlife Sanctuary is not established within 5 years.
- (ii) Lion habitats are not secured in the Barda landscape by being declared conservation reserves and/or ecosensitive zones.
- (iii) The density of the wild prey population is <5/km² after 5 years.
- (iv) There are fewer than 8 breeding lions after 5 years, with no natural births and a high mortality (>70%) of reintroduced lions due to human-induced causes. The team concluded that if these occur, then the project probably would need to be rolled back and reconsidered in terms of policy and alternative strategies.



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PATTERN OF BIOMASS PRODUCTION BY WETLANDS AND ITS USE BY WILD UNGULATES IN KAZIRANGA LANDSCAPE



Funding Source Department of Science & Technology

Investigators Dr. S.A. Hussain, Dr. Ruchi Badola and

Dr. Gopi G.V.

Researchers Chongpi Tuboi and

K.M. Selvan

Date of Initiation May, 2013

Date of Completion May, 2016

Objectives

The project has the following objectives:-

- (i) Mapping the wetlands of Kaziranga Tiger Reserve in terms of location, area and seasonality.
- (ii) Determining the biomass productivity of selected wetlands across various seasons with different levels of weed infestation, siltation and other disturbances.
- (iii) Ddetermining the use of these wetlands by large herbivores in terms of biomass consumed and time spent.
- (iv) Determining the impact of biomass extraction by local people in the fringe areas of the reserve.
- (v) Providing management measures for maintaining optimal productivity of the wetlands of the Brahmaputra floodplains, specifically management of the wetlands of Kaziranga Tiger Reserve, on the basis of the study.

Progress & Outputs

IRS LISS IV remote sensing data were procured, and a land useland cover map of the area is being prepared. Change in terms of land mass, flood dynamics, vegetation community structure and weed infestation will be determined once the base map is prepared. To examine the biomass productivity, 9 large herbivore-proof enclosures (10×10 m) and 6 enclosures (8×8m) were constructed, representing different inundation regimes and weed infested areas. Of these, 6 plots were constructed in areas inundated for >6 months, 5 plots in areas inundated >15 days to <6 months and 4 plots in areas inundated for >15 days to <6 months but infested with weeds so as to examine the effect of weed removal on the productivity. For the area inundated for >15 days to 6 months, it was 777.98±181.4 g/m² and for the area inundated for >6 months, it was 545.6±125.82 g/m².

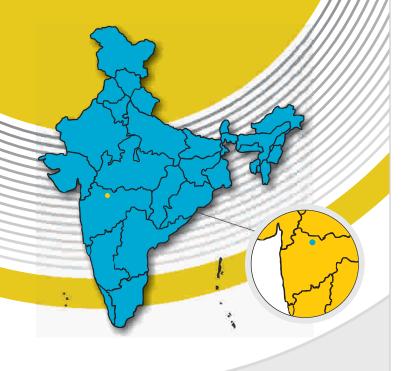
Data collection is in progress at the experimental plots to examine the impact of controlled burning, and weed removal is in progress. To examine the succession process, a 8×6×3 m³ greenhouse has been constructed, and soil cores from 0-15 cm, 15-30 cm and 30-45 cm depth were placed in earthen pots to accelerate the germination of seeds present in the soil cores. To examine the siltation rate of wetlands in the Kaziranga landscape, 50×50 cm silt traps (n=40) are being placed in selected wetland sites. Soil samples were collected from plots in different inundation regimes so as to examine the nutrient content to relate it with the biomass productivity.

To determine the use of the wetland by large herbivores, pellet samples of 3 cervid species, viz. swamp deer (Rucervus duvaucelii), sambar (Rusa unicolour) and hog deer (Axis porcinus) were collected. A total of 371 pellets have been collected so far. Dung samples of the mega herbivores, viz. Asian elephant (Elephas maximus), Indian one horned



rhinoceros (*Rhinoceros unicornis*) and wild buffalo (*Bubalus bubalis*), were collected. A total of 184 dung samples have been collected for micro-histological analysis to study the food habits. A total of 70 forage samples have been collected and reference slides prepared against which plant remains in dung can be matched. To determine the amount of time spent by each species in the wetlands, monitoring the diurnal activity of 5 large herbivores has been initiated. Twenty-six villages in the fringe have been identified on the basis of their location with respect to the park and demographic data. The biomass extraction by the local people will be quantified in the coming field work period. A set of questionnaires have been prepared, and data collection will be done by 2 researchers during the monsoon.

TRACKING THE GREAT INDIAN BUSTARD ARDEOTIS NIGRICEPS AND MAPPING ITS POTENTIAL HABITAT ACROSS THE DECCAN LANDSCAPE, MAHARASHTRA, INDIA



Funding Source Maharashtra Forest

Department

Investigators Dr. Bilal Habib,

Dr. Gautam Talukdar, Shri R. Suresh Kumar and Shri Mukul Trivedi

Researcher Vaijayanti Vijayaraghavan

Date of Initiation January, 2014

Date of Completion January, 2016

Objectives

The objectives of the project are to:-

- (i) Study the movement patterns and spatial habitat use of the great Indian bustard (GIB).
- (ii) Predict and locate potential bustard habitats in the Deccan through a landscape level approach as well as determine the present status and distribution of the GIB.

Progress

The first GIB was fitted with a satellite transmitter on 25 December 2013. The bird was tracked, and after initial data analysis, it was evident that the bird was using different areas within Warora for foraging. The spatial habitat is being studied on the basis of visual sightings and secondary information on the locations of GIBs. A 5×5 km² area in which GIBs have been regularly sighted for the last 9 years has been identified for carrying out the study. The locations that were visited by the GIBs were identified, and the habitat was characterized. The neighbouring habitats were also





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EVALUATING LANDSCAPE
USE BY DISPERSING/
STRAY TIGERS AND
MODELLING POTENTIAL
CONNECTIVITY
BOTTLENECKS



Funding Source National Tiger Conservation
Authority

Investigators Dr. Bilal Habib,
Dr. Parag Nigam and

Dr. Parag Nigam and Dr. Gautam Talukdar

Researcher Indranil Mondal

Date of Initiation August, 2013

Date of Completion August, 2014

Objectives

The project has the following objectives:-

- (i) Evaluation of landscape use by dispersing/stray tigers in India.
- (ii) Qeneration of connectivity maps for the Tadoba Andhari Tiger Reserve (TATR) landscape complex and identification of the major barriers and bottlenecks in connectivity.

Progress

Extensive location data have been collected for tigers moving outside protected/forested areas, along with data on human-tiger conflict from the human dominated areas around TATR in the state of Maharashtra.

Preliminary analysis of landscape connectivity has been done for the TATR landscape complex to understand selected models. The team is in the process of establishing the environmental data and other parameters that will be used in the data analysis, such as land use data, vegetation data and data on distance from villages, transportation lines and water sources. Generation of these data sets from satellite data is in progress.



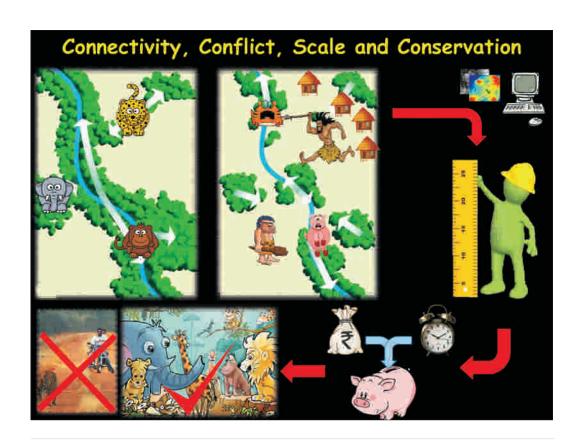


Figure 1: This figure represents the premise of this research project. It indicates that loss of habitat connectivity for wild animals when studied using advanced spatial technology and at an appropriate scale, can reduce both time and time spent by the wildlife managers on prevention or mitigation of human animal conflict.

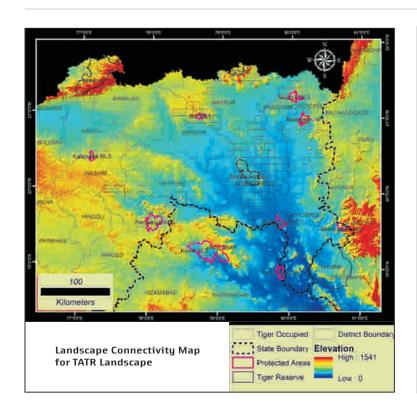
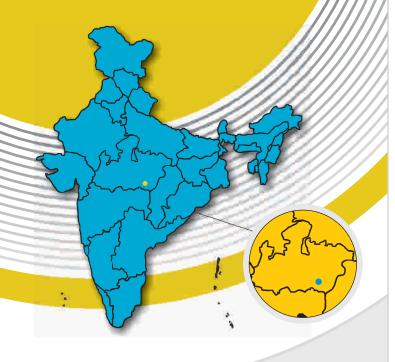


Figure 2: This map shows the potential movement corridors used by tiger in the study area. Red colour represents areas which are most suitable for movement, followed by orange, yellow and green. Blue represents areas that are least suitable.

ECOLOGY OF TIGERS IN PENCH TIGER RESERVE, MADHYA PRADESH, PHASE-II



Funding Source Grant-in-Aid

Investigators Dr. K. Sankar,

Shri Qamar Qureshi, Dr. Y.V. Jhala, Dr. Rajesh Gopal and Shri Alok Kumar

Researcher Anindita Bidisha Chatterjee

Date of Initiation April, 2013

Date of Completion March, 2016

Objectives

The project has the following objectives:-

- (i) Estimation of population dynamics, reproductive rate, survivorship, growth rate and longevity of tigers.
- (ii) Estimation of the density, distribution, growth rate, group size and composition of major prey species of the tiger.

Progress

A camera trap based mark-recapture technique was used to estimate the population of tigers in the study area between December 2013 and March 2014. A total of 83 pairs of camera traps were deployed in 4 km² grids, covering an area of 410 km², between December 2013 and March 2014 (total, 9072 trap nights). Each 4 km² grid was sampled by at least 1 pair of cameras. The camera trapping devices were placed opposite to each other to photograph both flanks of an animal simultaneously. Individual identification of tigers was done based on an examination of the position and shape of the stripes on the limbs and forequarters, and the sex of a tiger was identified by its relative body size and genitalia.

The research team used a line transect based density method to estimate the abundance of the prey species of the tiger. A total of 41 line transects (total effort, 169.09 km) were walked in Pench Mowgli Wildlife Sanctuary (183 km²) and Karmajhiri Range (Pench National Park). A total of 12 potential prey species were recorded on the line transects. Seven ungulate species (chital, sambar, nilgai, wild pig, gaur, chowsingha and barking deer), 2 primates (common langur and rhesus macaque), 2 birds (Indian peafowl and red spurfowl) and 1 small mammal (black naped hare) were recorded along the line transects.

Outputs & Outcomes

Between December 2013 and March 2014, a total of 2472 photographs of tigers were obtained from a total effort of 9072 trap nights. A preliminary identification of the data obtained from a trapping exercise of 50 nights showed a total capture of 44 individual tigers. The research team captured 8 adult tigers and 5 sub-adult tigers in Gumtara Range. In Karmajhiri Range, the team got photo captures of a total of 24 tigers, of which 20 were adults and 4 sub-adults. The team also got photo captures of 5 adult and 2 sub-adult tigers in the sanctuary. In all, 473 photographs of 7 adult male tigers and 1176 photographs of 21

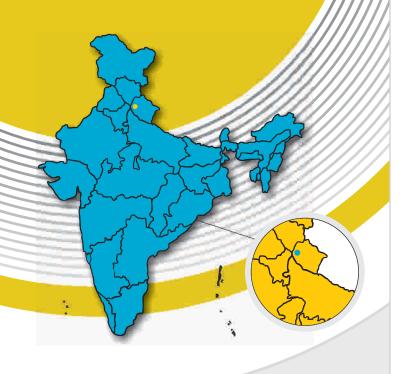
adult and 9 sub-adult female tigers were obtained. The research team was not able to identify the gender of 7 individual tigers from 80 photographs (5 adults and 2 sub-adults).

The density of each prey species in the study area was calculated using the DISTANCE 6.0 software package. The chital density was estimated to be the highest among the ungulates, followed by wild pig, sambar and nilgai. Among all the prey species, the calculated density was highest for the common langur. The density of gaur, chowsingha, Rhesus macaque and red spur fowl could not be calculated due to poor sightings on the line transects.



Camera Trap Image

INDO-NORWEGIAN PILOT PROJECT ON CAPACITY BUILDING IN BIODIVERSITY INFORMATICS



Funding Source

Norwegian Institute for Nature Research (NINA),

Norway

Investigators

Dr. V.B. Mathur,

Dr. G. Talukdar, Dr. S. Satyakumar and Dr. Bivash Pandav

Researcher

Rupa

Date of Initiation

October, 2013

Date of Completion

October, 2014

Objectives

The project has the following objectives:-

- Using camera trap data in decision making and showcasing the benefits of data sharing adapted to various users including decision makers, researchers and civil society.
- (ii) Building capacity so as to enable free sharing, access and dissemination of the biodiversity data in India to be used in policy making and evidence-based decision-making.

Progress

The following works were carried out during the reporting period:-

- (i) Standardization of camera trap data using the Audubon core template.
- (ii) Geo-tagging of camera trap images using Geosetter software.
- (iii) Compiling a total of 300 tiger images and 15 snow leopard images with associated metadata in the WII database.

Outputs & Outcomes

Development of a web portal for hosting geotagged camera trap images is in progress.

Development of a web portal for hosting geotagged camera trap images is in progress.

Milestone

A best practices guide for camera trapping is being developed.



Capacity Building in Biodiversity Informatics Indo-Norwegian-GBIF Pilot Project











Introduction:

- Large volumes of camero-trap images are held in various institutions/individuals.

 There is a great need for a standardized metadata regime and a national infrastructure for data management (spatial non spatial and multimedia blodiversity data)
- The pilot project arms to build capacity to enable free strating access and dissemination of biodiversity and ecosystem date in India which can then be used in policy and evidence-based decision-making.





Study Area:

- Systematic camera trap exercises are being done in Rajaji National Park for a decade.
- Rajoji fiational Park was selected as a pilot site to demonstrate camera trap data mobilisation, access, policy and decision making.



Objectives:

- L. Capacity Building for data digitization and publishing of multimedia biodicersity data
- 2. Development of Web Portal for Camera trap data
- NANA-GBIF-Wil Best Practices Guide, Publishing blodiversity data associated with multi-media objects, with a focus on camera traps.
- 4. Data repairation from Natural History Museums.





Methods:



Setting up camera traps in field and record GPS coordinates .

Downland intages

Geotag images

Extract image Bit's EXII metadata Assign Unique Identifier to each

Fill out Autubon Core metadata and multimedia data sheets

Unland to Web Portal





Screen capture of Web Portal showing camera trap image of tiger

The Best Practice Guide (BPG)

- An implementation of user needs, user experiences, global standards, best practices and technical framework for data publishing of Camera trap data for decision making.
- Based on synergies from experiences from camera trapping projects in India. Norway and South-Africa.
- Implemented the global standards, best practices and technical framework for data publishing.
- · Will be maintained by GBIF in future.

Data repatriation from Natural History Museum, Norway

University Museum of Bergers

Zoological collection:18 reptile specimens. Bryophytes collection: 4t specimens

163 Mammal specimens ...
1627 Bird specimens ... 34 Fish specimens ... 508 Rove beetles specimens ... 89 vascular plants ... 6 Iving plants ... 657 Cyperoceae family

and Archaeology, NTRIU in

1 cridarian, 122 mollusits imentily marine), 24 birds, 4 mammole and 3 reptiles. Bryophyte collection 352 mosses specimens.

mass this entire Museum

1 bumblebee, 3 springtails, 25-butterflies, 4 crustaceans and 13 mollusis without collection data.

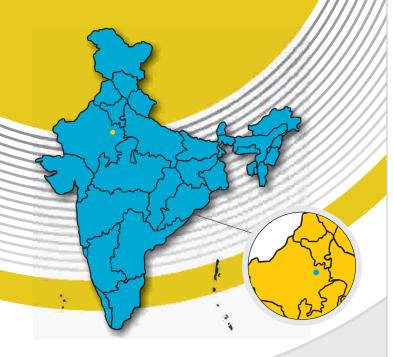
Conservation Implications:

- The availability of image data in public domain is expected to promote further value-additions such as: 1. Assessing status of many rare, elissive and data
- deficient species
 Data towards managing human-animal conflicts
 Evaluating habital connectivity.
- This initiative will help engage citizen scientists and naturalists to share primary blodiversity multimedia data.
- Data repatriation will help researchers to access Blodiversity data readily without going through the present cumbersome and expensive process





ECOLOGY OF LEOPARD IN SARISKA TIGER RESERVE, RAJASTHAN, PHASE-II



Funding Source Grant-in-Aid

Investigators Dr. K. Sankar and Shri Qamar Qureshi

Researcher Dibyadeep Chatterjee

Date of Initiation April, 2013

Date of Completion March, 2016

Objectives

The objectives of the project are to:-

- (i) Monitor trends in the breeding section of the leopard population.
- (ii) Estimate and monitor the survival of breeding leopards over time.
- (iii) Eestimate the densities of the available prey and evaluate the dietary competition between leopards and tigers.

Progress

A photographic capture-recapture technique was used to estimate the population and density of leopards in the study area. The study area was divided into two blocks of 80 km², and each block was subdivided into 2×2 km² grids. A pair of camera traps was placed in each 2×2 km² grid. At each site, a pair of passive infrared digital camera traps was placed opposite each other along a road/trail/stream so as to photograph both flanks of leopards. Two nights were considered as a single occasion. There were 62 occasions and a total effort of 4620 trap nights in summer (2013) and 56 occasions and 4140 trap nights in winter (2013-2014). Individual capture histories of leopards were developed in a standard "X-matrix format". The density was estimated using the likelihood-based spatially explicit capturerecapture (SECR) model in DENSITY 4.4. In total, 40 trapping stations were used, covering a minimum convex polygon (MCP) of 118.7 km² and an effective trapping area of 231.5 km². Line transect sampling and scat analysis were carried out to estimate the prey availability, prey selection and food habits of leopards. In total, 28 line transects were walked thrice in summer and 24 transects were walked in winter in the study area. The total effort by walk was 115 km and 134 km in summer and winter, respectively. The scats collected were washed, dried and analysed for prey remains. Prey remains such as hairs and bone were used to identify the prey species.

Outputs & Outcomes

In summer (2013), camera trapping was done for 124 days (62 occasions) in two 80 km² blocks. A total of 58 leopard photos of 20 individual leopards were obtained, among which 13 were recaptured individuals from the previous camera trapping session (summer, 2012). Seven adult male, 9 adult females and 4 sub-adult female leopards were identified among the 20 individuals. The MCP area of the sampled area is 122.98 km², and the effective trapping area is 231.5 km². The data were analysed using CAPTURE and DENSITY 5.0. The selected model was heterogeneity (Mh) estimation. The estimated population of leopards in the study area during summer (2013) was 22 individuals, with a standard error (SE) of 3.3. The estimated density of leopards was 10.03/100 km², with SE 1.96 under MCP using a half MMDM model. In winter (2013–2014), camera

trapping was carried out for 112 days (56 occasions) in two 80 km2 blocks. A total of 49 leopard photographs were obtained of 22 identified individuals, among which 16 were recaptured individuals from the previous camera trapping session (winter, 2012–2013) and 6 were new individuals. Nine adult male, 10 adult female and 3 sub-adult female leopards were identified among the 22 individuals. The estimated population of leopards in winter (2013–2014) was 25, with SE 2.4. The estimated density of leopards during winter (2013–2014) was 15.63/100 km2, with SE 1.77 under MCP using the half MMDM model.

The abundance of prey species was estimated through line transects using DISTANCE 5. The total number of walks was 84 and 72 with a total effort of 115 km and 134 km, in summer (2013) and winter (2013-2014), respectively. Peafowl was found to be the most abundant prey species in summer, followed by common langur, nilgai, brahminy cattle, grey francolin, chital, sambar, wild pig and hare. Peafowl was found

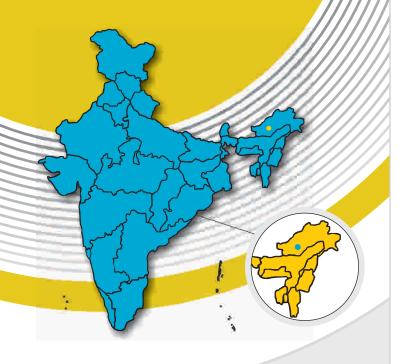
to be the most abundant prey species in winter, followed by brahminy cattle, nilgai, chital, sambar, wild pig, grey francolin and hare.

Nine prey species were identified through 398 leopard scats. Sambar contributed in the most to the leopard's diet, followed by chital, nilgai, domestic cattle, rodents, common langur, birds, hare and wild pig. The prey species composition in leopard scat samples was compared with tiger scat samples (n=170) from the same study area. A total of 6 prey species, namely sambar, chital, nilgai, wild pig, peafowl and domestic cattle, were recorded in the tiger scats. Of these, sambar contributed the most to the tiger's diet, followed by wild pig, nilgai, domestic cattle, chital and peafowl. Chital and sambar were found to be the main prey species for leopards and tigers in the study area. Similar findings had been made in Sariska by earlier studies.



Camera Trap Image

ECOLOGY, TAXONOMY
AND CONSERVATION OF
FISH DIVERSITY IN
SUBANSIRI RIVER
BASIN OF
ARUNACHAL PRADESH,
NORTH-EAST INDIA



Funding Source Department of Science & Technology, New Delhi

Investigators Dr. J.A Johnson,

Dr. J.A Johnson, Dr. K. Sivakumar and Dr. Gopi, G.V.

Researcher Sutanu Satpathy

Date of Initiation October, 2013

Date of Completion October, 2016

Objectives

The objectives of the project are to:-

- (i) Investigate the fish species distribution and abundance in different types of streams, rivers and river basins along the altitudinal gradient.
- (ii) Inventory the existing aquatic habitats and fish communities in headwater streams.
- (iii) Assess the habitat condition and macro- and microhabitat utilization patterns of fishes in streams of the Subansiri river basin.
- (iv) Identify the human induced perturbations in the resource availability and trend of resource usage by the fish assemblages in different streams and rivers.
- Identify the rare, endangered and economically important cultivable species in the rivers and provide options for conservation of threatened species.

Progress

The following activities were undertaken according to the schedule. A Junior Research Fellow was appointed in March 2014. During the reporting period, equipment such as binoculars, a GPS, a vernier caliper, a spotlight, fishing gear and a plankton sampler were procured. The chemicals, containers and glassware necessary for field sampling were also purchased. Information regarding the study area, the drainage maps, toposheets and information on the fishery resources of the Subansiri river were obtained before the study was planned. Permission was obtained from the Chief Wildlife Warden, Arunachal Pradesh and Inner Line permits were obtained for undertaking field sampling. Currently, field sampling and site selection are being done in the study area as part of a reconnaissance survey.

Outputs & Outcomes

As this project was initiated just 6 months back, it is too early to visualize the outcomes.

Milestone

The main part of the work will be covered in the next 24 months (Phase II of the project as proposed in the proposal), from May 2014. During this period, regular seasonal sampling of habitat assessment, fish sampling and documentation of other variables will be carried out. Simultaneously, assessment of the species diversity, micro-habitat utilization and patterns of endangered species will be performed during this period. During the third phase (last 6 months of the project), analysis and interpretation of data, preparation of manuscripts and writing reports will be carried out.



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DEVELOPMENT OF KNOWLEDGE
MANAGEMENT SYSTEM FOR
CONSERVATION OF COASTAL AND
MARINE BIODIVERSITY IN THE EAST
GODAVARI RIVER ESTUARINE
ECOSYSTEM, INDIA WITH RESPECT
TO CLIMATE CHANGE AND PAYMENT
OF ECOSYSTEM SERVICES



Funding Source UNDP-GEF Marine Programme

Investigator Dr. K. Sivakumar

Co-Investigators Dr. J.A. Johnson,

Dr. Gopi G.V., Dr. Panna Lal, Shri Ritesh Kumar, (WI-SA); Dr. P. Bhadury, (IISER) and Dr. P.S. Raja Sekhar, (AU)

Researchers Paromita Ray,

Giridhar Malla and Priyamvada Bagaria

Date of Initiation August, 2013

Date of Completion August, 2015

Objectives

The main objective is to establish a Knowledge Management System (KMS) for the East Godavari River Estuarine Ecosystem (EGREE), in Andhra Pradesh.

The objectives include:-

- Assessing and predicting the impact of climate change on the biodiversity, community structure and ecosystem functioning in EGREE.
- (ii) Assessing and predicting the impact of climate change on the distribution pattern and community structure of the primary producers, mangroves, reptiles, birds and mammals with special reference to threatened species in EGREE.
- (iii) Assessing and predicting the impact of climate change on the socio-economic and demographic profile of the coastal communities in EGREE.
- (iv) Preparing a long-term conservation and preparedness plan to safeguard the marine biodiversity and coastal communities of EGREE from the adverse impacts of climate change.

Progress & Outcomes

EGREE has a rich biodiversity, and a part of the EGREE area is gazetted as Coringa Wildlife Sanctuary (CWLS). A literature review (of about 700 research publications published between 1871 and 2012) relating to this region was conducted. There were 3 components of the study: terrestrial, aquatic and landuse/land-cover. The East Godavari estuarine region has been divided into 1×1 km2 grids. For the various parameters being studied under each component, several grids have been chosen according to the requirements and an initial survey of the landscape.

A total of 24 species of mangrove were identified in CWLS. About 14 species of mammal belonging to 6 orders and 10 families were recorded from CWLS, of which *Prionailurus viverrinus*, *Delphinus delphis*, *Stenella longirostris* and *Tursiops truncatus* are Schedule-I species, whereas *Macaca mulatta*, *Macaca radiata*, *Felis chaus*, *Paradoxurus hermaphroditus*, *Herpestes edwardsii*, *Canis aureus* and *Lutrogale perspicillata* are Schedule-II species. *Prionailurus viverrinus* is listed as Endangered in the IUCN Red list, while Lutrogale perspicillata is listed as Vulnerable. A total of 186 species of bird belonging to 16 orders and 44 families have been recorded from CWLS, of which *Circus aeruginosus*, *Elanus caeruleus*, *Haliastur indus*, *Milvus migrans*, *Accipiter badius* and *Pandion haliaetus* are Schedule-I species.

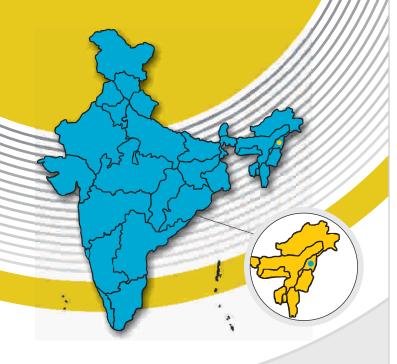
Till now 31 species belonging to 9 orders and 21 families have been identified. The Perciformes seem to be the most diverse



order, with 11 families and 13 species, whereas the Siluriformes (catfishes) and Pleuronectiformes (flatfishes) are represented by 2 families each. The families Scieanidae and Mugilidae (mullets) seem to be the most diverse in terms of species. However, most of them are still to be identified. Apart from Mystus gulio, the sciaenids and mullets seem to be the most common fishes. A draft climate change adaptation plan for EGREE is being prepared, and it is planned to synchronize this plan with the existing management plan of EGREE.



SATELLITE TRACKING OF AMUR FALCONS FROM NAGALAND, INDIA



Funding Source Raptors MoU,

Convention for Migratory

Species

Investigator Shri R. Suresh Kumar

Date of Initiation November, 2013

Date of Completion October, 2014



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Objectives

The objectives of the project are to:-

- (i) Deploy modern technology in the form of lightweight satellite tags fitted to a small number of Amur falcons trapped in Nagaland to track their amazing migration journeys.
- (ii) Better understand the behaviour and ecology of the Amur falcon during its presence in Nagaland, along the migration routes and in the wintering areas in Africa.
- (iii) Wtilize web-based tools to actively apply the information gained to raise awareness of the international importance of the Amur falcon and to promote falcon conservation activities, particularly amongst local communities in Nagaland.



RESEARCH ACADEMIC GTRAINING CAPACITY BUILDING PROFESSIONAL SUPPORT VISITORS GOVERNANCE PUBLICATIONS TALKS & MEETINGS ACCOUNTS



travelled separately. They arrived at the eastern shores of Somalia within 10 days, including 3 days' travel over the Arabian Sea. After arriving in Africa the behaviour of the falcons changed with. There were many stopovers, and the pace of their migration slowed down. Two of the 3 falcons made the return migration and flew across India in late April and are currently at their breeding grounds in northern China.

Outputs & Outcomes

This study is currently in progress. Popular articles describing the findings of this work have been published in the wildlife magazine *Saevus* and *MISTNET* published by the Bombay Natural History Society.

Milestone

This is the first satellite tracking study to be conducted on Amur falcons from India and has generated valuable information on the passage migration of these falcons through India and their stopover sites. This study has also led to several research questions such as why they roost in such large numbers in Nagaland and not elsewhere in India.

 (iv) Demonstrate the value and effectiveness of international collaborative actions under the auspices of the CMS Raptors MoU to promote the conservation of migratory birds of prey.

Progress

In November 2013, a total of 28 Amur falcons were trapped using mist nets at the Doyang roost site in Wokha District of Nagaland. The birds were sexed (3 males, 5 females and 20 sex unknown) and weighed, and selected morphometric measurements were recorded. Before release, all the birds were ringed with metal rings on the left and colour coded plastic rings on the right. Further, 3 of the heaviest birds (1 male and 2 females) were fitted with Argos satellite transmitters (5 g, Solar PTT, Microwave Telemetry) and released on 7 November 2013. After release, the 3 birds started on their migration and







ACADEMIC PROGRAMME

XIII M.Sc. (Wildlife Science)

The XIII M.Sc. batch students returned to WII in April 2013 for

their dissertations on completion of field work. The students then defended their work on 20 and 21 June 2013. This was followed by a viva-voce. All the students successfully completed their study, and Stotra Chakrabarti scored the highest marks for his dissertation.

XIII M.Sc. (Wildlife Science) Course Dissertation Supervised

Name of the student	Proposed dissertation title	Supervisor	Co-supervisor	External co-supervisor
Stotra Chakrabarti	Computing biomass consumption from prey occurrence in tropical felids	Dr. Y.V. Jhala	Shri Qamar Qureshi	
Deepak C.K.	Effect of inter-habitat matrix on tropical ever- green forest remnants: An empirical test of matrix-tolerance hypothesis on butterflies	Dr. Gautam Talukdar	Dr. Bilal Habib	Dr. Krushnamegh Kunte (NCBS)
Anupya Baburam	Age estimation of a breeding population of olive ridley turtles (<i>Lepidochelys olivacea</i>) along the Odisha coast, eastern India, using Skeletochronology	Dr. Bivash Pandav	Shri R. Suresh Kumar	Dr. Pravati K. Mahapatra (Utkal University, Odisha)
Vibhav Srivastava	Evaluation of population estimation sampling techniques and assessment of genetic diversity of Indian one-horned rhinoceros (<i>Rhinoceros unicornis</i>) population in Dudhwa National Park, Uttar Pradesh, India	Dr. S.P. Goyal	Shri Qamar Shri Udayan Qureshi Borthakur (Aaranyak)	
Nitya Prakash Mohanty	Evaluating the impact of introduced spotted deer <i>Axis axis</i> on forest floor herpetofauna of Andaman Islands	Dr. Karthikeyan Vasudevan	Dr. K. Sivakumar	
Aditya Malgaonkar	Assessing the role of matrix in influencing edge effects on herpetofauna in a fragmented tropical forest	Dr. Bilal Habib	Dr. Karthikeyan Vasudevan	
Nishant Kumar	A study of resource selection by black kites (<i>Milvus migrans</i>) in the urban landscape of National Capital Region, India	Dr. Dhananjai Mohan	Dr. Y.V. Jhala Shri Qamar Qureshi	
Frank S.J. Dhanraj	Resource availability and use by co-occurring large herbivores in a coastal landscape of Point Calimere Wildlife Sanctuary, Tamil Nadu	Dr. Gopi G.V	Dr. S.A Hussain Dr. K. Sankar	
Satemmenla	A study on trends of bush meat consumption and traditional hunting on wild fauna by an indigenous community living near a protected area in Nagaland	Shri Qamar Qureshi	Dr. Y.V. Jhala	
Debabrata Phukon	Assessment of livestock diseases as an indicator of risk to greater one-horned rhinoceros (<i>Rhinoceros unicornis</i>) in Manas National Park, Assam	Dr. Parag Nigam	Dr. K. Ramesh	
Anilitty A.S.	Effect of habitat structure on odonate assemblages in Kalakad-Mundanthurai Tiger Reserve, Tamil Nadu	Dr. V.P. Uniyal	Dr. J.A. Johnson	
Sharmila Jayaram	Density, distribution and factors influencing sea stars in selected islands of Lakshadweep, India	Dr. S.A. Hussain	Dr. Gopi G.V	Dr. Deepak Apte (BNHS)
Subish Sebastian	An assessment of recreational value of Periyar Tiger Reserve and distribution of tourism income among stakeholders	Dr. Ruchi Badola	Dr. S.A Hussain Dr. V.K. Uniyal	

XIV M.Sc. (Wildlife Science)

The XIV M.Sc. course was started in June 2013 with 13 students. Of these, 8 students were given full fellowships through the Grant-in-Aid funds of WII, and 5 students were self-sponsored.

The classes for the first semester of the course were started as scheduled, and they were completed in December. The classes

for the second semester started in January, and the semester is in progress.

Status of Doctoral Research In WII

Awarded

Kausik Banerjee, 2013. Ranging patterns, habitat use and food



habits of the satellite lion *Panthera leo persicα* populations in Gujarat, India. Forest Research Institute University, Dehradun. Supervisors: Dr. Y.V. Jhala and Shri Qamar Qureshi.

Muthamizh Selvon, 2013. **Ecology of sympatric large carnivores in Pakke Tiger Reserve, Arunachal Pradesh.** Saurashtra University, Rajkot. Supervisors: Dr. S.A. Hussain, Dr. G.V. Gopi and Dr. Bilal Habib.

Parabita Basu, 2014. Assessment of landscape pattern for modelling habitat suitability for lions and prey species in Gir Protected Area, Gujarat. Forest Research Institute University, Dehradun. Supervisors: Shri Qamar Qureshi and Dr. Y.V. Jhala.

Sabuj Bhattacharyya, 2013. Habitat ecology of Royle's pika, Ochotona roylei Ogilby along altitudinal gradient with special reference to foraging behavior in Western Himalaya, Uttarakhand. Saurashtra University, Rajkot. Supervisor: Dr. B.S. Adhikari.

Tuboi, C., 2013. Assessment of water quality and biomass productivity of the tropical floating meadows of Keibul Lamjao National Park, Manipur. Saurashtra University, Rajkot. Supervisor: Dr. S.A. Hussain.

Samina Amin Charoo, 2013. **Asiatic black bear, Ursus thibetanus abundance, habitat occupancy and conflicts with humans in and around Dachigam National Park, Kashmir.** Saurashtra University, Rajkot. Supervisor: Dr. S. Sathyakumar.

Lalit Kumar Sharma, 2013. Ranging patterns of Asiatic black bear, Ursus thibetanus with reference to food availability in Dachigam National Park, Kashmir. Saurashtra University, Rajkot. Supervisor: Dr. S. Sathyakumar.

Thesis Submitted

T. Thounaojam Sanggai Leima, 2013. A study on the people and protected area interface in Keibul Lamjao National Park Manipur. Ph.D. thesis submitted to the Forest Research Institute University, Dehradun. Supervisors: Dr. Ruchi Badola and Dr. S.A. Hussain.

Tapajit Bhattacharya, 2013. **Developing spatial database and habitat modelling for ungulates in Khangchendzonga Biosphere Reserve, Sikkim.** University of Calcutta, Kolkata. Supervisor: Dr. Goutam Kumar Saha. Co-supervisor: Dr. S. Sathyakumar.

Registered

Bidyut Bikash Barman, 2013. Spatio-temporal abundance and resource selection of Indian wild ass, *Equus hemionus khur* and nilgai, *Boselaphus tragocamelus* with special reference to crop-depredation and people's attitude in Little Rann of Kachchh, Gujarat. Saurashtra University, Rajkot, Gujarat. Supervisors: Dr. Sushant Chowdhury, Dr. Qumar Qureshi and Dr. Nita Shah.

Aseem Shrivastava, 2013. **Effect of landscape characteristics on butterfly communities in Dehradun, Uttarakhand.** Saurashtra University, Rajkot, Gujarat. Supervisor: Dr. V.P. Uniyal.

Pritha Day, 2013. **Diversity assessment and molecular characterization of the Geometridae moths (Lepidoptera: Heterocera) in Nanda Devi Biosphere Reserve, Uttarakhand.** Saurashtra University, Rajkot, Gujarat. Supervisor: Dr. V.P. Uniual.

TRAINING PROGRAMMES

XXXIV P.G. Diploma Course in Advanced Wildlife Management, Dehradun

1 September 2012 to 30 June 2013. The 10-month course was commenced on 1 September 2012 with 20 officer trainees. The Management Term Paper Exercise was held at Bandhavgarh Tiger Reserve in Madhya Pradesh during 3-11 April 2013. The trainees were assigned specific topics on various aspects of protected area management. The Management Term Papers were presented at a seminar by officer trainees on 16 and 17 April 2012, followed by an interaction and discussion among faculty members and officer trainees. The Management Plan Exercise was held at Periyar Tiger Reserve in Kerala between 6 May -and 4 June 2013. The officer trainees conducted field surveys and exercises to collect first-hand information on a tiger reserve, its problems and management practices. The officer trainees wrote individual Tiger Conservation Plans during 7-19 June 2013.

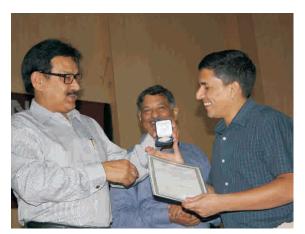
The *viva-voce* examination for officer trainees was held at WII on 24 June 2013. All the officer trainees have successfully completed the course, and 7 of them were awarded the Honours Diploma for securing 75% marks or more. Dr. R.B.S. Rawat, Principal Chief Conservator of Forests, Uttarakhand graced the valedictory function as the chief guest. He presented the diplomas, prizes and awards to the officer trainees.



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The following officer trainees have secured awards and prizes: WII's Gold Medal for the Top Trainee was given to Ms Yasoda Bai R. The Wildlife Preservation Society Silver Medal for the Second in Merit was given to Mr. Suneet Bhardwaj. The Silver Medal for the Best All Round Wildlifer was given to Ms Yasoda Bai R. The N.R. Nair Memorial Silver Medal for Best Management Plan was awarded to Ms Yasoda Bai R. The Best Management Term Paper A.K. Chatterjee Silver Medal was awarded to Ms Shivani Donga and Md. Jahidul Kabir. The Top Trainee in Wildlife Biology Prize (book prize) was given to Mr. Kamdi Hemant Bhaskar. And the Silver Medal for the Best Foreign Trainee was bagged by Md. Jahidul Kabir.

XXXV P.G. Diploma Course in Advanced Wildlife Management

1 September 2013 to 30 June 2014. This course was conducted to train officials in the field of wildlife management. Twenty officer trainees of the rank of Deputy Conservator of Forests/Assistant Conservator of Forests/Assistant Veterinary Surgeon and equivalent levels joined the 10-month course. Fourteen of them represented different states of the country, viz. 1 each from Kerala, Himachal Pradesh, Meghalaya, Tripura and Uttar Pradesh; 2 each from Mizoram and Odisha; and 4 from Andhra Pradesh. Two IFS officers of the 2011-2013 batch, who completed their professional forestry training of 2 years at Indira Gandhi National Forest Academy, Dehradun in August 2013 joined the course as Hari Singh Fellows. They were deputed by the Government of India to undergo training in the aforesaid course at WII. In addition, 6 foreign nationals (1 from Vietnam, sponsored by the Global Tiger Forum, and 5 from Peoples' Republic of Bangladesh, sponsored by their own government) also joined the prestigious course.

The syllabus adopted for the present P.G. Diploma Course is based on a revised modular pattern. The course is divided into four sub-components, *viz*. Conservation Biology, Tools and

Techniques for Conserving Wildlife, Advanced Wildlife Management Practices and Integrated Wildlife Management Planning. It had 16 distinct modules.



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Prior to the start of the module, the registration formalities of officer trainees, familiarization with WII's facilities and the inaugural/interaction session were held on 2 September 2013. The officer trainees undertook their Orientation Tour at Kalagarh, Corbett Tiger Reserve and adjoining areas during 23–28 September 2013. They also attended the Annual Research Seminar of WII on 30 September 1 October 2013.

The Orientation Tour was held in Corbett Tiger Reserve from 23-27 September 2013. The High Altitude Ecology Tour was held at Kedarnath Wildlife Sanctuary and Nanda Devi Biosphere Reserve in Uttarakhand from 26-31 October, 2013. For the Techniques Tour the officer trainees were taken to Rajaji National Park in Uttarakhand from 1-14 December, 2013. The officer trainees were oriented about the Shivaliks, Bhabar tract and vegetation of park and connectivity issues of the park. The officers themselves carried out many exercises to understand the intricacies of different techniques. For the Wetland Tour the officer trainees visited Keoladeo National Park in Rajasthan and National Chambal Wildlife Sanctuary in M.P. from 8-12 January, 2014. During the Management Tour (Indian Component) the officer trainees visited several Protected Areas in Gujarat from 17-27 February, 2014. For the Management Tour (Foreign Component) the officer trainees visited several PAs in South Africa from 11-26 March, 2014. The purpose of the visit was to get a regional perspective and to study a wide range of wildlife and protected area management practices and also observe various conservation models in action. The officer trainees visited the Johannesburg Zoo, Pertoria Zoo, Kruger National Park, Table Mountain National Park, Penguin Colony and Cape of Good Hope in Capetown, Southern African Wildlife College, Moholoholo Wildlife Rehabilitation Centre, Cheetah Breeding Project, and Mapungubwe National Park.



XXIX Certificate Course in Wildlife Management

1 November 2013 to 31 January 2014. The maximum capacity of the course was only 20 seats. All 20 international officers of the rank of Forest Range Officer and equivalent levels joined this important course. Wildlife Management & Nature Conservation Division Dhaka, Bangladesh sponsored 14 participants from Bangladesh, and Department of Wildlife and National Parks, Peninsular Malaysia sponsored 2 participants from Malaysia. The Global Tiger Forum sponsored 1 participant each from Bhutan, Bangladesh, Vietnam and Nepal.

Apart from being provided inputs in the classroom, the officer trainees were taken to Kanha National Park during 16–30 November 2013 for their Techniques Tour. The objective of the tour was to provide first-hand experience of various management practices related to habitat management for endangered species, wildlife protection, control of human activities, wildlife interface conflicts and tourism. They were taken to Rajaji National Park during 5–7 December 2013 for their Wildlife Management Tour. They also visited Subir Raha Oil Museum, Dehradun, Ecotourism Centre, Dhanaulti and Assan Conservation Reserve for their Visitor Use Management Tour.

The participants were taken for the Wetland Tour during 4-11 January 2014. During the tour, the participants visited Bhitarkanika, Chilika, Rushikulya and Nandankanan Zoo, in Odisha. The objective of the Wetland Tour was to expose the participants to various management practices of coastal wetlands, mangrove habitat management and management of saltwater crocodile and olive ridley sea turtle populations. The participants were provided experiences of waterfowl and migratory birds, census techniques, population estimation, protocols for saltwater crocodiles and olive ridley turtles and strategies for conservation.

The management tour was conducted at Sunderban Tiger Reserve, in West Bengal, and Kaziranga National Park and the Pygmy Hog Breeding Centre and Rescue Centre, in Assam, during 12–20 January 2014. The objective of the tour was to familiarize the participants with management activities, population management, visitor use management and socioeconomic activities undertaken by the protected areas. The participants got a chance to see the best practices and take home the experience and a message. The participants returned and made presentations, sharing their learning from the Wetland and Management tours. The participants were evaluated through a written exam, assignments, presentations, classroom and field interaction and a viva-voce.

The valedictory function was organized on 31 January 2014 at WII. Shri Vinod Rishi, former Additional Director General

(Wildlife) chaired the function. He presented awards and certificates to the successful candidates. All the participants have successfully completed the certificate course. Thirteen of them were awarded the Honours Certificate for securing 75% marks or more in aggregate. The following participants received the awards:



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The Wildlife Conservation Gold Medal and WII's Silver Medal for Wildlife Management & Tour were awarded to Md. Golam Rabbi. WII's Silver Medal for Best All Round Wildlifer was bagged by Sheikh Mohammed Rabiul Alam.







ORGANIZED BY WII

Meeting of the Regional Steering Committee on Conservation of Vultures, New Delhi

3 April 2013 In the regional declaration on the conservation of South Asia's critically endangered vulture species adopted on 4 May 2012 at the end of the symposium held in New Delhi, the Regional Steering Committee (RSC) was constituted. The Secretary, Environment & Forests, Government of India, being the chair of the National Committee of IUCN-India, was nominated as the first chair of the RSC for a period of 2 years. The RSC is an umbrella body to guide and oversee vulture conservation and recovery efforts in 4 range countries, namely Bangladesh, India, Nepal and Pakistan.

A meeting of the RSC was held at New Delhi. The meeting was chaired by the RSC Chair, Dr. V. Rajagopalan, Secretary, Environment & Forests and was co-chaired by Dr. S.S. Garbyal, Additional Director General (Wildlife) and Ms Aban Marker Kabraji, Regional Director, IUCN-Asia, Bangkok. The meeting was attended by government and non-governmental organization members from Bangladesh, India and Nepal. During the meeting, initiatives undertaken by the range countries for vulture conservation and the status of notification of national committees of the 4 countries were taken stock of. The participating members presented country updates for vulture conservation. India, Nepal and Pakistan have constituted national committees for vulture conservation. Bangladesh is in the process of constituting the same. A presentation was made by SAVE on its initiatives for conservation of critically endangered vulture species. During the meeting, discussions were held on Vulture Safe Zones, i.e. landscapes free from toxic non-steroidal anti-inflammatory drugs (NSAIDs); creating awareness for vulture conservation; a regulatory mechanism for unorganized drug companies producing NSAIDs; and preparation of a proposal for GEF 6 for vulture conservation.

The meeting ended with a discussion on identifying time lines for the national plan for vulture recovery and for preparation of a regional document. It was decided that the next meeting of the RSC would be held in November 2013 in India.

Next Generation Approaches for Mainstreaming Biodiversity in Impact Assessment for Promoting Responsible Growth, Calgary, Canada

11-12 May 2013 The course was organized in response to a request from the International Association for Impact Assessment (IAIA) for conducting pre-meeting training courses in conjunction with its annual meeting during 13-16 May 2013.

The course was the tenth in the series of international courses conducted and coordinated by Dr. V.B. Mathur and Dr. Asha Rajvanshi.

The 2 day course was targeted at mid-career EA professionals, business groups, the conservation community, decision—makers, government officials, donor agencies and economists with the following objectives:

- (i) Enhancing the conceptual understanding of the need to mainstream biodiversity in development.
- (ii) Renewing the "professionalism" of impact assessment professionals, planners, developers, decision-makers and academia for advancing IA practice to promote responsible growth.
- (iii) Sharing global experiences of successful biodiversity planning and mainstreaming in key sectors.
- (iv) Building the capacity of the EA community to adopt new generation mainstreaming tools for linking biodiversity resource security and development.
- (v) Facilitating sharing and peer-based learning among IA professionals.

Project Review Meeting on (a) Preparation of the Fifth National Report to Convention on Biological Diversity (CBD) and (b) Revision of National Biodiversity Strategy and Action Plan (NBSAP), New Delhi

10 June 2013 A project review meeting on (a) Preparation of the Fifth National Report to Convention on Biological Diversity (CBD). (b) Revision of the National Biodiversity Strategy and Action Plan (NBSAP) was held at the Ministry of Environment & Forests, New Delhi on 10 June 2013 under the chairmanship of Shri Hem Pande, Additional Secretary, MoEF. The Chairman appreciated the progress made in the preparation of the Fifth National Report to Convention on Biological Diversity (CBD) and in the revision of the National Biodiversity Action Plan.





International Training Workshop "Promotion of Metadata Use and Data Paper Publication", Pune

19–21 June 2013 In order to sensitize data holders and impart skills to participants and motivate them to publish data papers, a regional training workshop, "Promotion of Metadata Use and Data Paper Publication", was organized.

The workshop provided inputs on the following themes:

- (i) Biodiversity data publishing through the Global Biodiversity Information Facility (GBIF) network.
- (ii) An integrated publishing toolkit.
- (iii) Documenting metadata.
- (iv) Authoring and publishing a data paper.

It was jointly organized by the GBIF; Bharati Vidyapeeth; and WII. In all, 21 participants took part in the workshop. Dr. G. Talukdar, Shri Dinesh Pundir and Smt. Alka Aggarwal imparted hands-on training to the workshop participants from India and abroad on preparation of data sets for IPT publishing.

One-Week Compulsory Training Course, "Human-Wildlife Conflict: Issues and Mitigation", Dehradun

22-26 July 2013 This course was conducted at WII as per instructions from the Ministry of Environment & Forests, Government of India. The course was for in-service IFS officers of various seniorities. A total of 21 officers, from various states, attended the course. The inputs were provided by WII faulty members and eminent resource persons such as Shri S.S. Bist, Dr. Vidhya Athreya, Dr. Shrikant Chandola, Shri Ajai Saxena and Shri D.V.S. Khati. The participants also shared their experiences and case studies from the field.



A field trip to Narendra Nagar Forest Division was also organized to familiarize the participants with some of the approaches being tried out in the field. Overall, the programme could sensitize the officers about their role in human-wildlife

conflict. The course ended with a panel discussion on the topic "Improvement in the Working of Forest Department: Need for Career Development through Training and Improvement of Skills".

National Stakeholder Consultation on Preparation of Fifth National Report to the Convention on Biological Diversity and Updating National Biodiversity Action Plan in New Delhi

30 July 2013. A national stakeholder consultation on preparation of the Fifth National Report (NR5) to the Convention on Biological Diversity and updating the National Biodiversity Action Plan was held on 30 July 2013 at the WWF auditorium, New Delhi. Over 130 representatives from 82 organisations participated in this meeting, in which the "Zero-Draft" of NR5 was discussed.



School in Herpetology, Dehradun

17–31 August 2013. An intensive course in herpetology (study of amphibians and reptiles) called the "School in Herpetology" was conducted at WII. It was the sixth course in the series, conducted since 2007 in different parts of the country. This unique programme was supported by the Science Engineering and Research Board, Department of Science and Technology, Government of India. This course targeted doctoral students and young faculty members in universities in India and neighbouring SAARC countries. The course was designed to help students pursue careers in herpetology. In all, 25 participants, comprising 21 students from India, 2 from Sri Lanka and 2 from Nepal were selected for the course. The selection of these participants was made after the course was advertised. A total of 223 online applications were received.

The inaugural lecture was delivered by Prof. K.S. Krishnan, National Centre for Biological Sciences, Bangalore. Apart from



eminent herpetologists from India, some herpetologists from USA, France and Japan were invited as resource persons. During the course, alumni of the course were also invited to provide evening talks. Eight such alumni participated in the course. The students were also trained in laboratory techniques such as preservation, curation, morphometry, behavioural observation of larvae and regeneration experiments. A field trip was organized to Dhanaulti. The participants were exposed to field techniques in herpetology and photo-documentation. During the field trip, the participants used various field techniques and recorded amphibians and reptiles in the field.

IX Internal Annual Research Seminar, September 24, 2013 and XXVII Annual Research Seminar of WII, Dehradun

September 30, 2013 to October 1, 2013. The IX Internal Annual Research Seminar (IARS) was conducted on 24 September 2013. The IARS was chaired by Shri Vinod Rishi, Former, ADG (WL), MoEF, Government of India, New Delhi. During the IARS, a total of 14 presentations were made in 3 technical sessions, viz., Diversity, Distribution and Population Assessment; Molecular Genetics and Captive Management; and Animal--Habitat Interactions and Impacts of Climate Change. The presentations were based on recently initiated and ongoing research studies and were made by research fellows of WII. The following were adjudged the 3 best oral presentations, and the research personnel were awarded book prizes:

Best Presentation Awards

Rank	Name	Title of presentation
I	Shivam Shrotriya	Predicting distribution of wolves in Trans- Himalayan and Himalayan Landscape, India
П	Preeti	Pollinator diversity in 3 selected forest

	Shirish Virkar	types of Dehradun Forest Division, Uttarakhand
III	Pritha Dey	Preliminary study on diversity of moths (Lepidoptera: Heterocera) in Nanda Devi Biosphere Reserve, Uttarakhand
III	Nilofer Begum	Pedigree analysis for captive management of select threatened primates

The XXVII Annual Research Seminar (ARS) was conducted on 30 September and 1 October 2013 at WII. Prof. R. Sukumar, Chairman, Training, Research and Academic Council (TRAC), chaired the ARS. A total of 22 presentations were made in 4 technical sessions, *viz.* Landscape Ecology; Tools and Techniques in Wildlife Conservation; Conservation Breeding and Phylogenetics; and Species Ecology. The presentations were based on ongoing or completed research studies. They were made by research fellows and faculty members of WII. In addition, 18 poster presentations were also made by the researchers. The oral and poster presentations were evaluated by a panel of judges.

About 330 delegates attended the ARS, including the Principal Chief Conservators of Forests, Chief Wildlife Wardens and other senior officials representing state forest departments, delegates representing NGOs, scientists, wildlife experts, faculty members, researchers, students, P.G. Diploma Course officer trainees of WII and IFS probationers from the Indira Gandhi National Forest Academy, Dehradun.



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A panel of eminent scientists and wildlife managers evaluated the relevance and quality of research made through the oral and poster presentations. The following presentationswere adjudged the best presentations, and the researchers were awarded book prizes:



Poster Presentation Award

Rank	Name of the presenter	Title of the poster presentation
I	Anilitty, A.S.	Effect of habitat structure on odonate species richness in streams of Kalakad Mundanthurai Tiger Reserve, Tamilnadu
I	Subish Sebastian	Recreational value of Periyar Tiger Reserve
II	Anupya D. Baburam	Age estimation of olive ridley sea turtle Lepidochelys olivacea using skeletochronology
II	Nishant Kumar	A study of resource selection by the black kites in the urban landscape of National Capital Region, India.
III	Pooja Chourasia	Ecology of leopard <i>Panthera pardus fusca</i> in Sariska Tiger Reserve, Rajasthan

Best Presentation Awards

Rank	Name	Title of Presentation
l	Laskhmina- rasimha, R.	Conservation breeding of western tragopan in Himachal Pradesh: Towards establishing a reserve and model population
II	Stotra Chakrabarti	Scats, information in disguise: Computing biomass consumption from prey occurrences in scats of tropical felids
III	Hari Krishnan, S.	Patterns in body-size, species co- occurrence and distribution of terrestrial herpetofauna of Andaman & Nicobar Islands
IV	Parabita Basu	Potential lion habitat and connectivity in Gujarat
V	Manjari Malviya	Correlates of physiological stress in reintroduced tiger: Preliminary findings from Sariska and Panna tiger reserves

In the concluding session, Dr. R. Sukumar, Chairman, TRAC, said that the quality of work and presentations made during the ARS were commendable. He said that the suggestions made by colleagues at ARS would be appropriately discussed at the TRAC meeting. He observed that the science profile of WII was being raised and the quality of work had further improved. He reiterated that there is a need to move from describing patterns to understanding processes in their research work. Although patterns are useful for short term conservation, for a sensible

conservation policy, there is a need for long-term research in understanding ecological processes.

Second Training Programme on Wildlife Conservation, Dehradun

14-23 October 2013. The second training programme on wildlife conservation for professionals who do not have any formal training in wildlife science/conservation was organized at WII. A total of 15 participants from 11 states, from various walks of life, participated in this self-sponsored training programme. The training programme involved 5 days of classroom sessions at WII, followed by 5 days of camping in the forests of Lansdowne Forest Division. The participants were briefed about



the science behind wildlife conservation, wildlife conservation issues in India, use of modern tools and techniques in saving endangered species, the trade in wild animals and plants and the management of forests for biodiversity conservation during the classroom sessions at WII. The participants visited the Forest Research Institute and Wadia Institute of Himalayan Geology during their stay at WII. As part of the field training, the participants were exposed to 2 protected areas (Benog Wildlife Sanctuary and Rajaji National Park) and a managed forest (Lansdowne Forest Division). The participants were taken on long jungle walks and familiarized with animal tracks and signs. The participants were also briefed about the nuances of field conservation and issues in protected area management during the field visit.

One-Week Training Workshop on Biodiversity Conservation for Women Scientists, Dehradun

11-15 November 2013. The workshop was sponsored by the Department of Science and Technology under the scheme "National Training Programme for Scientists & Technologists Working in Government Sector". As a part of this scheme, the DST has initiated training programmes exclusively for women



scientists/technologists. The scheme has proved to be a very popular and meaningful initiative in building and empowering



Implementation Plan of Kailash Sacred Landscape Conservation and Development Initiative

11-16 November 2013. WII executed the Implementation Plan of Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI), facilitated by the International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal and supported by the GIZ and DFID-UKAID, under which the following 3 sequential workshops were organized at the Zilla Parishad Auditorium, Pithoragarh:

(i) Project Consultation Workshop, Pithoragarh

11-12 November 2013. To initiate the execution of the Implementation Plan-KSLCDI, this workshop brought the prominent stakeholders (forest department, Pithoragarh District Administration, Project Director, District Rural Development Agency, heads of concerned departments and

partner organizations (GBPIHED and CHEA)) together for the development of the landscape. Dr. L.M.S. Palni, Former Director, GBPIHED, Kosi-Katarmal, Almora inaugurated the workshop and addressed the participants about the Kailash Sacred Landscape as a whole. The participants, including the representative of Eco Task Force, Pithoragarh, made presentations highlighting developmental activities undertaken by the respective departments.

The workshop was able to establish contact with the district administration and garner their confidence and support for smooth implementation of KSLCDI in the landscape.

(ii) Workshop on Participatory Natural Resource Management (PNRM) in Context of Van Panchayat, Pithoragarh

13 November 2013. This was the second workshop in a series focused on PNRM in the context of van panchayats. The sarpanchs and representatives of 15 van panchayats located across the "horizontal transect" in KSL-India were invited along with Range Officers from Pithoragarh Forest Division. The workshop was chaired and inaugurated by Dr. Neeraj Khairwal, IAS, District Magistrate, Pithoragarh, and Dr. R.S. Bisht, Chief Conservator of Forests (Research), Uttarakhand Forest Department gave the keynote address on van panchayats. In all, 45 villagers/representatives of van panchayats took active part in the workshop.

The District Magistrate, Pithoragarh interacted with the participants one-to-one and assured them of full support from the line agencies for effective implementation of KSLCDI and its synergies with the Biodiversity Conservation and Rural Livelihood Improvement Project (BCRLIP) and other similar projects implemented by the state government in the landscape.

(iii) Workshop on Capacity Building of Forest Frontline Staff in Field Techniques and Wildlife Management, Pithoragarh

14–16 November 2013. This, the third workshop, was primarily focused on building the capacity of frontline staff members of Pithoragarh Forest Division. Six RFOs/Deputy Rangers and 20 Forest Guards attended the workshop, besides 6 KSLCDI project biologists working with WII, 3 Project Assistants with WII and 6 newly recruited staff members of BCRLIP, Pithoragarh Forest Division. A field visit to an adjacent forest area was organized for demonstration of field techniques related to vegetation and animals, especially the use of modern gadgets in recording evidence of wild animals.

Biodiversity Inclusive Impact Assessment: A Premeeting Training Course at South Asian Environmental Assessment Conference (SAEAC), Islamabad, Pakistan PUBLICATIONS



2-3 December 2013. Countries in the South Asian region that are currently on a rapid development trajectory have the responsibility to navigate development that reflects greater convergence of economic security, human well-being and ecological sustainability objectives. This course aimed to promote impact assessment practice in delivering successful outcomes for biodiversity by revisiting the EIA and SEA framework to identify key "insertion points" for integrating biodiversity with impact assessment. The course also aimed to review next generation impact assessment approaches for maximizing biodiversity benefits from economic development initiatives.

The course had the following objectives:-

- (i) Advancing IA practice to promote responsible growth and delivering successful outcomes for biodiversity.
- (ii) Sharing experiences of successful biodiversity planning and mainstreaming in key sectors
- (iii) Reviewing next generation impact assessment approaches for maximizing biodiversity benefits from economic development initiatives.
- (iv) Developing a mitigation hierarchy for encouraging green growth and development.
- (v) Facilitating sharing and peer-based learning among IA professionals.

The course was organized by South Asian Environmental Assessment Conference (SAEAC). It was conceived, coordinated and delivered by Dr. Asha Rajvanshi with inputs from 2 other cotrainers, *i.e.* Dr. Malvika Onial, consultant at WII, and Shri Ashok Ghose, Principal Advisor, National Accreditation Board for Education and Training, Quality Council of India.

Consultative Workshop on Integrating Biodiversity Conservation and Climate Change Mitigation Strategies in Development Planning

17 December 2013. This consultative workshop was organized in partnership with Uttarakhand State Biodiversity Board.

The objectives of the workshop were to:-

 Enhance the understanding of climate change mitigation strategies of the National Action Plan on Climate Change (NAPCC) and Uttarakhand State Action Plan for Climate Change (USAPCC).

TALKS & MEETINGS

- (ii) Enhance understanding of the National Biodiversity Action Plan (NBAP) and the process of updating it.
- (iii) Identifying means of integrating biodiversity conservation and climate change mitigation strategies in development planning. Shri R.S. Tolia, Former Chief Secretary, Government of Uttarakhand delivered the keynote address, and Shri Jai Raj, Additional PCCF, Government of Uttarakhand explained the process of preparation of the USAPCC.



Attachment of Officer Trainees of Indian Revenue Service (Customs & Central Excise) Group-A 64th Batch with Wildlife Institute of India, Dehradun

6-17 and 20-31 January 2014. Young officer trainees of the Indian Revenue Service got an opportunity to join this course, held at WII. The training module

aimed to sensitize young officer trainees of the Indian Revenue Service (Customs & Central Excise) of the 64th batch to the wildlife trade in the country and their role in checking it. The course was attended by 87 officer trainees in 2 groups.

The various sessions included an introduction to the importance of biodiversity and its conservation, the status of endangered species and special inputs on the illegal trade in wildlife articles including butterflies, shahtoosh, rhino horn, skins and tiger bones. Inputs were provided about the role of wildlife forensics in dealing with wildlife cases. The officer trainees were also given basic information about implementation of the Wildlife (Protection) Act, 1972, CITES and other international conventions. The trainees were provided an opportunity to

interact with the IFS officer trainees at Indira Gandhi National Forest Academy, Dehradun to improve inter-service coordination.

Apart from being provided classroom inputs, the participants were also taken to Rajaji National Park and Corbett Tiger Reserve. Jungle safaris in the Dhikala and Bijrani areas of Corbett Tiger Reserve sensitized them towards flagship and keystone species. The young and enthusiastic officer trainees had the privilege of interacting with the top officials of the tiger reserve.

Though this small module is not sufficient for them to complete the journey in the wild and it is just a window towards wildlife, it will definitely sensitize the trainees to become a part in conservation and ambassadors in spreading this message everywhere. All the officer trainees took a keen interest in understanding various aspects of wildlife conservation during both classroom and field activities.



Meeting of the Team Leaders and Members of the Regional Expert Committees on Independent Management Effectiveness Evaluation (MEE) of Tiger Reserves (2014-2015), New Delhi

17 January 2014. A meeting was organized to discuss matters relating to independent Management Effectiveness Evaluation (MEE) of tiger reserves (2014–2015) in India. Presentations were made by Dr. V.B. Mathur on the MEE framework and MEE indicators, and the work programme for MEE was finalized.

One-week Refresher Training Course for Indian Forest Service Officers on Management of Coastal and Marine Biodiversity in India: Challenges and Prospects, Port Blair

20-24 Jαnuary 2014. The training course was conducted by WII at Port Blair in collaboration with the Andaman & Nicobar Forests

Department, Indira Gandhi National Forest Academy, Dehradun and GIZ-India on behalf of the Ministry of Environment & Forests, Government of India.

In India, there are multiple governance frameworks and structures in the administration of the coastal and marine environment. While these are intended to have positive outcomes, overlapping jurisdictions, contradictory mandates and limited coordination hinder multiple agencies from working effectively in coastal India. Management agencies in India still having a limited understanding about the management of multiple use coastal and marine areas. Given this situation, the challenge lies in reconciling livelihood needs and development vis-à-vis conservation. Therefore,

This special capacity building course was conducted to address the following issues:- (a) How effective are administrative/ governance/legal frameworks for conservation of marine and coastal biodiversity and are these frameworks promoting integration of biodiversity conservation and livelihood enhancement? (b) What are the existing and potential threats for conservation of coastal and marine biodiversity? (c) What are the current policy and governance challenges to coastal and marine biodiversity conservation? (d) What is the role of the community in the governance and management of marine protected areas and ecologically sensitive coastal areas?

A total of 19 participants of the rank of Conservator of Forests to Additional Principal Chief Conservator of Forests from all over the country participated in the course, which was highly commended by them.

Training Programme on Forest and Wildlife Conservation for Senior Defence Officers, Corbett Tiger Reserve, Uttarakhand,

7-9 February 2014. The course was organized by WII and sponsored by the Ministry of Environment & Forests, Government of India. A total of 11 officers including 7 from the Indian Army and 4 from the Indian Air Force attended the programme. All the officers were of the rank of Brigadier/Air Commodore.

The participants were sensitized to the issues and challenges in the management and conservation of wildlife. The programme consisted of classroom sessions and field visits. The officers were given an overview of various habitats in the country and their flagship species. Several unique, rare and endangered habitats as well as species were highlighted, and the issues related to their conservation were briefly discussed. The participants visited the Dhikala and Bijrani zones of Corbett Tiger Reserve as part of the field visit. They could observe the forest in its pristine form and appreciated the difficulties involved in conserving forests and wildlife. Shri A.S. Negi and



Dr. H.S. Pabla, both eminent retired forest officers, provided inputs to the participants and accompanied them to the field.

Two-day Training Workshop on Management Effectiveness Evaluation of Protected Areas

10-11 February 2014. WII organized a 2-day training workshop for IFS officers, "Management Effectiveness Evaluation of Protected Areas". A total of 15 IFS officers from 9 states participated in this workshop.

Consultative Workshop on Mainstreaming Gender in Biodiversity Conservation, Dehradun

18 February 2014. This consultative workshop was organized at WII. The workshop was organized to understand the rationale for gender considerations and to prepare a road map for mainstreaming gender in biodiversity conservation.



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Consultative Workshop on Technology Needs Assessment for Biodiversity Conservation, Dehradun

18 February 2014. This consultative workshop was organized at WII. The workshop focused on the global Aichi Biodiversity Targets and India's proposed national biodiversity targets and discussed the current use of technology in biodiversity conservation.



Regional Workshop on Forestry and Wildlife Conservation Issues for Media Personnel, New Delhi

24-25 February 2014. In the current situation, the media have not only kept the concern for the environment in the limelight but have also influenced policy makers to chart out appropriate conservation strategies. The more recent issues are the Kedarnath tragedy and the tiger crisis in the country. The media have not only highlighted these issues but also carried out investigative journalism related to them. WII provided a platform to generate ideas on informative news reporting about the current environment crisis. WII organized this workshop at the India Habitat Centre to enable the participants to articulate wildlife and forests issues to people in a manner that contributes to the cause of wildlife and forest conservation in the country.

The workshop had the following objectives:

- Generating a comprehensive understanding of the subject and getting information on the current situation and challenges.
- (ii) Providing an opportunity to interact face to face with experts and exchange information and ideas to foster the involvement of the media in raising awareness about wildlife and forest conservation issues.
- (iii) Networking and developing a specialized wildlife journalism group.



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The workshop was divided into 7 sessions, *i.e.* Conservation in India: A New Way Forward; Managing Human-Wildlife Conflicts; Defending Nature with Moving Images; Panel Discussion on the Relocation Agenda: The Implementation of the Forests Rights Act and the Challenges Ahead; Emerging Issues in Forest Conservation in India; Climate Change REDD+ (Reducing Emissions from Deforestation & Forest Degradation):



Challenges for India; Panel Discussion on Illegal Wildlife Trade: Issues and Challenges; and Panel Discussion on Conservation and Media. The eminent resource persons included senior officials from the Ministry of Environment & Forests, a Supreme Court lawyer, a wildlife conservationist, a writer, a naturalist, scientists from the Indian Council of Forestry Research and Education (ICFRE) and the Forest Research Institute (FRI), representatives of WWF-India and Bharti Vidyapeeth Institute of Environment Education & Research, Pune, a tiger conservationist, a wildlife campaigner from Wildlife Protection Society of India (WPSI), etc. A total of 27 participants attended the workshop. They included senior correspondents from TV channels, Indian Information Service probationers, editors, media professionals and freelance journalists.

ATTENDED BY WII PERSONNEL

Workshop on Panna Tiger Reintroduction, Panna

10–11, April 2013. The objective of the workshop was to review the status of the Panna Tiger Reintroduction Programmes and future strategies. It was organiszed by the Madhya Pradesh Forest Department. In a bid to understand the lessons learned from the Panna tiger reintroduction, the 2–day workshop was organized at Panna National Park. Dr. H.S. Panwar, former Director, Wildlife Institute of India WII chaired the workshop. Participating in the meeting were Shri P.R. Sinha, Director, WII; the Chief Wildlife Warden of Madhya Pradesh; the Field Director, Panna National Park; Tiger Biologists and other Forest Department officials; and tiger biologists participated the meeting. During the workshop, the 'Panna Reintroduction Programme' was presented by the project team, and its future strategies were discussed. Dr. J.A Johnson attended the workshop.

Seminar on Issues of Wildlife Conservation in India with Special Reference to Mizoram, Aizawl

24-25 April 2014. The objective of the seminar was to delineate conservation action for wildlife in Mizoram. It was organized by the Environment and Forest Department, Government of Mizoram and Mizoram University. Dr. Abhijit Das delivered a plenary lecture, "Herpetofaunal Conservation Biogeography in Northeast India".

Brainstorming Workshop and Launch of KSLCDI, Almora

g-12 May 2013. The workshop was organized by G.B. Pant Institute of Himalayan Environment & Development, Kosi-Katarmal and ICIMOD, Nepal. The objectives of the workshop were to discuss various issues related to components of the

KSLCDI project with partner institutes including the future strategy to achieve the goals. Dr. B.S. Adhikari attended the workshop.

Thirty-Third Annual Conference of the International Association of Impact Assessment (IAIA), "Impact Assessment: The Next Generation", Calgary, Canada

13-16 May 2013. Dr. Asha Rajvanshi and Dr. Vinod B. Mathur attended this conference to provide inputs and to chair technical sessions. They were also the panelists for session 12.1, "Addressing project impacts to biodiversity: Critical roles for IAIA" under the IAIA section "Biodiversity and Ecosystems" and co-chaired session 8.1.2, "Hydropower projects: Tumultuous journey or a peaceful march from approval?" under the IAIA section "Biodiversity and Ecology".

Meeting of Field Directors of Tiger Reserves Convened by National Tiger Authority, New Delhi

27 May 2013. Dr. V.B. Mathur attended this meeting, in which independent experts of regional Management Effectiveness Evaluation (MEE) teams were briefed about the MEE process and outcomes.

Global Snow Leopard Forum, Moscow, Russia

28–31 May 2013. As a member of the Government of India delegation, Dr. S. Sathyakumar participated in the Global Snow Leopard Forum. He presented the country plan for snow leopard conservation at the workshop and provided inputs in the various group discussions.

Twenty-Sixth Biannual Research and Training Workshop, Chonburi, Thailand

19–23 June 2013. Dr. Ruchi Badola participated in the workshop and presented the progress report of the project 'Economics of Living in the Wild: Cost-Benefit Analysis for the Forest Corridor Linking Rajaji and Corbett National Parks' at the 26th Biannual Research and Training Workshop of the South Asian Network for Development and Environmental Economics (SANDEE).

UNESCO Meeting on the 37th Session of the World Heritage Committee, Cambodia

19-26 June 2013. India is currently a member of the UNESCO World Heritage Committee (WHC). As part of the Indian delegation, Dr. V.B. Mathur attended the 37th Session of the WHC and provided inputs that led to a change in the WHC decision on the nomination of the Great Himalayan National Park (GHNP), India from "deferral" to "referral".



National Workshop on Grassland Management in PAs, Bandhavgarh Tiger Reserve, Madhya Pradesh

4-6 July, 2013. Grasslands in India are predominantly anthropogenic in nature. They have been maintained by various biotic activities. Grasslands in protected areas are vital for maintaining herbivores and prey-predator relationships. In several PAs, grassland habitats have experienced deterioration/degradation. Thus, this priority conservation workshop aimed to identify causes/governing factors for deterioration of grasslands; formulation of strategy, selection of appropriate tools and techniques for restoration of degraded grasslands; and identification of areas of research and development in the field of grassland management in PAs. The workshop was jointly organized by the State Forest Research Institute (SFRI), Jabalpur in collaboration with Madhya Pradesh Forest Department. Dr. P.K. Mathur was invited as one of the resource persons. He provided his inputs and made a presentation on "Grasslands in India - management perspective". He also chaired two technical sessions and assisted in drafting recommendations of the workshop.

National Workshop on Strategies for Conservation and Management of Large Landscapes, New Delhi

7-10 July 2013. Dr. G.V. Gopi participated as a resource person at this national workshop as part of the BCRLI project team.

National Workshop on Conservation and Management of Larger Landscapes, India Habitat Center (IHC), New Delhi

8-9 July, 2013. The workshop aimed to deliberate on the relevance on landscape approach to conservation in India. The Ministry of Environment and Forests (MoEF), New Delhi organized this two-day workshop under the World Bank/GEF supported ongoing "Biodiversity Conservation and Rural Livelihoods Project (BCRLIP)". Dr. P.K. Mathur along with other participating faculty members attended this workshop and provided valuable inputs on landscape approach to conservation and activities undertaken in pilot sites as well as Learning Centers. The workshop was successful in deciding the future pathway for execution of BCRLIP and identification of additional two pilot demonstration field sites. Dr. Mathur was one of the panelists during the workshop.

Workshop on Strategies for Conservation and Management of Large Landscapes, New Delhi

8-9 July 2013. The objectives of this workshop were to take stock of ongoing conservation approaches and to understand their limitations; to present an "approach paper" on the

landscape approach for conservation in India; and to start preparing an outline for a wider application of the landscape based conservation approach. It was organized by the Ministry of Environment & Forests, New Delhi. Shri Hem Pande, Additional Secretary, MoEF chaired the workshop. The participants included Dr. J.R. Bhatt, Advisor, MoEF; Dr. V.B. Mathur, Dean, WII; senior forests officials; and ecologists. During the workshop 3 additional sites were identified for BCRLIP project demonstration sites. Dr. J.A Johnson and Dr. G. Talukdar attended the workshop.

Meeting for Selection of Projects for Funding, London

g-10 July 2013. As a member of the Peer Review Assessment Panel for the DFID/NERC/ESRC Programme on Ecosystem Services for Poverty Alleviation, Dr. Ruchi Badola participated at the meeting for selection of projects for funding.

Meeting of Field Directors of Tiger Reserves Convened by National Tiger Authority, New Delhi

13 July 2013. Dr. V.B. Mathur attended this meeting in which the Chief Wildlife Wardens and Field Directors of tiger reserves participated. The progress of the Management Effectiveness Evaluation (MEE) process was discussed at this meeting.

Meeting on "Gir Learning Center", Gir National Park and Sanctuary, Sasan Gir, Junagadh, Gujarat

20 July, 2013. The meeting aimed to deliberate on the expectations and proposed activities under the Gir Learning Center. The management of Gir National Park and Sanctuary and WII jointly organized this meeting under the ongoing "Biodiversity Conservation and Rural Livelihoods Project (BCRLIP)". Dr. P.K. Mathur along with Shri P.C. Tyagi attended this meeting and provided valuable inputs on proposed activities to be undertaken by the Gir Learning Center.

IRS Series: Evolution, Development and Experiences, Dehradun

12 August 2013. This workshop was organized by the Department of Space at the Indian Institute of Remote Sensing, Dehradun. More than 200 participants attended the workshop. Dr. G. Talukdar participated in the workshop.

Meeting on 'Kailash Sacred Landscape Conservation Initiative - Regional Planning Workshop 2014', ICIMOD, Kathmandu, Nepal

22-26 August, 2014. The workshop brought together concerned members from the partner organization associated with KSLCDI.



The workshop aimed to review the progress of project activities during 2013, prepare the Annual Plan of Operations for 2014, finalize Monitoring & Evaluation Plan till 2016, and consolidate inputs to impact pathways. The International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal in collaboration with Department of International Development (DFID) – UK Aid and German Agency for International Development jointly organized the Regional Planning Workshop 2014. Dr. P.K. Mathur participated in the workshop and made contributions.

Meetings of Apex Academic Committee on REDDplus, Indira Gandhi National Forest Academy, Dehradun

29 August 2013. As a member, Dr. Ruchi Badola participated in the meetings of the Apex Academic Committee on REDD-plus and commented on

- (i) A module on a training workshop for in-service IFS officers, "Climate Change and REDD-plus".
- (ii) A module on building the capacity of in-service IFS officers, "Forests and Climate Change with Special Reference to REDD-plus".
- (iii) A module on building the capacity of officers from other services on climate change with special reference to ecological functions.

Consultation Meeting with Representatives of Other GIZ and KfW Programmes, New Delhi

5 September 2013. Considering that GIZ and KfW could be potential cooperation partners for the ongoing SEA project and could assist with upscaling SEA through co-operation for carrying out awareness raising and capacity development measures and implementation of pilot cases, this consultation workshop was organized for communication and exchange with representatives of other GIZ and KfW programmes. Dr. Asha Rajvanshi, who is co-ordinating the project on behalf of WII, was invited to participate in the meeting. She made a presentation on experiences with SEA in India and the potential of SEA.

National Workshop-cum-Discussion Meeting on "Himalayan Environment & Development", Almora

8-9 September 2013. This national workshop-cum-discussion meeting was organized by the G.B. Pant Institute of Himalayan Environment and Development, Kosi-Katarmal, Almora. Dr. V.P. Uniyal participated and provided inputs on Himalayan biodiversity during the panel session. Dr. G.V. Gopi also participated and provided inputs at the workshop.

Stakeholders' Action Planning Workshop of Saker Falcon Task Force, Abu Dhabi

9-11 September 2013. The objectives of the workshop were to:-

- (i) Bring together range states, partners and interested parties.
- (ii Develop a coordinated Global Action Plan for Saker Falcon. The workshop was organized by Raptors MoU, Convention for Migratory Species, Abu Dhabi.

Four working groups were formed to deliberate on different issues pertaining to the conservation of the species.

The topics of the four working groups were:-

- (i) International Policy and Legislation
- (ii) Knowledge Gaps
- (iii) Sustainable Use.
- (iv) Field Work (Research and Management).

Since very little is known about the saker falcons wintering in India, Shri R. Suresh Kumar was involved in the Knowledge Gaps Working Group. The deliberations resulted in the preparation of an action plan for conservation of the saker falcon.

State Level Workshop on Landscape Approach to Conservation and Site Level Workshop at LRK Wild Ass Sanctuary, Indian Institute of Management (IIM), Ahmedabad and LRK Wild Ass Sanctuary, Gujarat

20 September, 2013. Wildlife Institute of India has been entrusted the responsibility of National Capacity Building in Landscape Approach to Conservation under the ongoing "Biodiversity Conservation and Rural Livelihoods Project (BCRLIP)". The first workshop at IIM, Ahemdabad aimed to involve policy and decision makers besides senior representatives of various line agencies and stakeholders so as to aware them about the need of landscape approach to conservation while second sequential workshop at LRK Wild Ass Sanctuary was organized at the site level specifically involving various stakeholders and to make them aware about the current status of diversity and management, challenges and need of landscape approach for effective management and conservation of various values of the unique ecosystem.

Two sequential workshops were organized by WII in collaboration with Gujarat Forest Department/PA Management. Policy and decision makers, professional field practitioners, scientists, entrepreneurs, representatives of peoples, etc participated in the high level workshop/consultation at IIM. The Hon'ble Forest Minister, Government of Gujarat besides senior



forest officials and representatives of the MoEF, Gol actively participated in the deliberations. Dr. P.K. Mathur attended these two workshops and provided valuable inputs in all technical sessions. Dr. Mathur made a keynote presentation in the site level workshop and chaired one of the sessions.

GBIF Nodes Training Course and Global Nodes Meeting, Seminaris Campus Hotel, Berlin, Germany and Freie Universität Berlin, "Silberlaube", Berlin, Germany

4-7 October 2013. The objectives of the meeting were to:

- (i) Learn lessons on data quality.
- (ii) Development a nodes portal.
- (iii) Mobilization and use of GBIF-mediated data at national and regional scales.

The meeting also tackled the issue of how to improve mechanisms for collaborations at international scales in the context of the GBIF Work Programme 2014–2016. It was organized by GBIF.

The GBIF Nodes Committee held its 12th global meeting and associated activities linked to the 20th meeting of the GBIF Governing Board. The events started with a global training course, based on the recommendations received through the GBIF Nodes Report 2012 (GB19) and an online survey about participants' training priorities and plans, carried out at the end of 2012. The proposed course was focused on securing the position of GBIF Nodes, the social component of node management, on the promotion of data use and on the new tools developed by GBIF. It was designed as a flexible, modular event with different levels of complexity, where participants could sign up for events that better matched their experience and interests.

Twentieth Meeting of the Governing Board (GB20) of GBIF, Auditorium Friedrichstrasse, Berlin, Germany

8–10 October 2013. This was organized by GBIF. The Governing Board gathers once a year for the official Governing Board meeting, which extends over 2 days, followed by the 1-day annual GBIF Science Symposium. The meeting takes place in a member country, based on voluntary hosting proposals, and is organized by the Secretariat in collaboration with the host country. India proposed that it would host GB21 during 6-18 September 2014 in New Delhi. The GBIF Governing Board and GBIF Secretariat agreed, and the proposal was unanimously accepted.

One-Day Workshop on Right to Information, New Delhi

11 October 2013. Shri Aseem Shrivastava, CPIO and Shri Mukul Trivedi, Link Officer for CPIO participated in this 1-day workshop on the Right to Information at the Institute of Secretariat Training & Management, New Delhi.

Mentorship Programme on Germany and Neighboring Alpine Countries, Austria

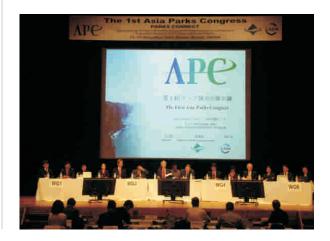
17–27 October 2013. The programme was organized by International Centre for Integrated Mountain Development (ICIMOD), Nepal. The objectives of the mentorship programme were to provide an opportunity for cross-learning through exposure to the Alpine Landscape and interactions with professionals at different facilities in Germany and to build up a better rapport among scientists, researchers and administrators from the 3 Kailash Sacred Landscape (KSL) countries, ICIMOD and GIZ at the personal level for better coordination and cooperation for regional activities and outcomes. Dr. B.S. Adhikari attended the programme.

Summit of Global Snow Leopard Forum, Bishkek, Kyrgyz Republic

21-23 October 2013. As a member of the Government of India delegation, Dr. S. Sathyakumar participated in the Global Snow Leopard Summit. He provided inputs at various group discussions.

First Asia Parks Congress (APC), Sendai, Japan

13-17 November 2013. The Ministry of Environment,
Government of Japan and the IUCN Asia Regional Office,
Thailand jointly organized the Asia Parks Congress. The First APC
aimed to link protected area managers with a wider range of
stakeholders in fast-growing Asia and to find solutions to
challenges in Asian and other national parks and protected





areas in the world. In particular, the Congress discussed the best practices among protected areas in Asia and actions taken towards achievement of the Aichi Biodiversity Targets. The APC prepared a regional perspective for IUCN World Parks Congress 2014. Dr. V.B. Mathur participated in the APC as the Regional Vice Chair of IUCN-WCPA-South Asia and as a member of the Steering Committee of the First APC.

Special Training Course on Geoinformatics for Meteorology and Climatology, Dehradun

18-28 November 2013. This special training course was organized by Indian Meteorological Society at the Indian Institute of Remote Sensing. A total of 30 participants attended the course. Dr. G. Talukdar participated in the course.

Workshop on Towards Competency Based Learning, New Delhi

22-23 November 2013. The main objective of the workshop was to establish a knowledge sharing network' of training providers to explore and implement innovative learning solutions for public sector professionals engaged in developing international cooperation.

Experiences related to competency based learning and the lessons drawn from it were shared. Also, the concept of competence based learning was introduced. An open discussion was arranged regarding this concept. Participants from various government training institutes participated, and Dr. Christine Bigdon and Ms Anita Sharma from GIZ coordinated the entire programme. Dr. J.A Johnson represented WII at the workshop.

South Asian Environmental Conference (SAEAC'13)-Impact Assessment: Raising the Bar on Regional Cooperation under National Impact Assessment Programme (NIAP), Islamabad, Pakistan

4-5 December 2013. Dr. Asha Rajvanshi was the panelist for Session II C (SEA-Is South Asia Ready for It?). She also chaired Session III A (How "Inclusive" Is Biodiversity in EIA in South Asia?). The conference was organized by IUCN, Pakistan.

Second Session of Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)-2, Antalya, Turkey

9–14 December 2013. Over 400 participants attended this meeting, representing IPBES member and non–member governments, UN organizations and conventions,

intergovernmental organizations, non-governmental organizations and various stakeholder groups. The Ministry of Environment & Forests, Government of India deputed Dr. Sujata Arora, Director, Ministry of Environment & Forests, Government of India, New Delhi and Dr. V.B. Mathur, Director, Wildlife Institute of India to participate in IPBES as part of the official Indian delegation.



International Workshop on Land Use Optimization for Coordinating Regional Development with Conservation of Endangered Species, Pondicherry University, Puducherry

16–18 December, 2013. The international workshop deliberated on the need of landscape approach to conservation, particularly in the context of endangered species e.g. large herbivores and carnivore species in Western Ghats. The workshop was jointly organized by Pondicherry University, USFWS, and Indo-US Science and Technology Forum at the Pondicherry University. Prof. Priya Davidar, Pondicherry University was the focal person for planning and smooth conduct of this workshop. Dr. P.K. Mathur from WII was invited as a resource person and he made a presentation entitled "Landscape approach to conservation in India - Lessons Learned, Challenges and the Ways Forward".

National Consultation for Delineation of Boundaries and Preparation of Feasibility Document on Brahmaputra Salween Landscape (BSL) - India, Itanagar, Arunachal Pradesh

2-4 January, 2014. The workshop aimed to delineate the boundary of BSL in India and aimed to facilitate preparation of Feasibility Report for the BSL Conservation and development Initiative.



The ICIMOD, Kathmandu, Nepal has identified seven transboundary landscapes in the Hindu Kush Himalayan region. Brahmaputra-Salween Landscape (BSL) is one of them and landscape straddle across China, India and Myanmar. The workshop was organized by the North Eastern Unit, Itanagar of GBPIHED in collaboration with State Forest Department of Arunachal Pradesh. Participants working in Arunachal Pradesh, Assam, Nagaland besides scientific organizations, associated with Brahmputra - Salween landscape area were invited. Experts from ICIMOD, Kathmandu facilitated the workshop. The Chief Secretary, Arunachal Pradesh and the PCCF (Wildlife) and Chief Wildlife Warden, Arunachal Pradesh addressed the workshop. The workshop participants deliberated on delineation of landscape boundaries based on ecological and biological values besides socio-economic aspects and provided valuable inputs required for the preparation of Feasibility Assessment Report entrusted to GBPIHED. Dr. P.K. Mathur was one of the resource persons of the workshop. He also chaired a session during this important workshop.

Training on GIS in Faunal Studies, Data basing and Digitization of Faunal Collections, Zoological Survey of India, Prani Vigyan Bhavan, Kolkata

21-22 January 2013. This programme was organised by the Zoological Survey of India. In all, 30 participants participated in it. Dr. G. Talukdar participated in the training programme.

3rd Regional Consultation on Trans-boundary Biodiversity Management in Brahmaputra Salween Landscape, Borgos Resort, Kaziranga National Park, Assam

22-25 January, 2014. The Regional Consultation including participants from China, India and Myanmar associated with Brahmaputra - Salween Landscape (BSL) aimed to discuss strategy for conservation and management BSL. BSL is one of the seven trans-boundary landscapes identified by the ICIMOD, Kathmandu, Nepal in the Hindu Kush Himalayan region. BSL straddles across China, India and Myanmar. Prior to the regional consultation, partner organizations in three concerned countries have decided and delineated boundaries relevant to their respective country. The workshop provided opportunity to appreciate management and conservation challenges in three countries and work out strategies and project approach through regional cooperation framework. Dr. P.K. Mathur was one of the resource persons and made valuable contributions towards the success of workshop and this important initiative.

Golden Jubilee International Seminar, Integrated Natural Resources Management (INRM) Issues, Challenges and Perspectives', Raipur

27–31 January 2014. This international seminar was organized at the School of Regional Studies and Research, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh. It was jointly organized by Pt. R.S. University, Raipur and Council for Tribal & Rural Development, Bhubaneswar. More than 100 delegates participated from within the country and Canada, Eritrea, Atlanta, etc. Dr. Pranab Pal, Field Technical Officer participated in the seminar. He presented a paper titled "Biodiversity Conservation for Sustainable Use: Challenges for Future".

Inception Meeting on Khangchendzonga Landscape (KL) Conservation and Development Initiative, Gangtok

28-29 January 2014. The Meeting aimed to deliberate on the concept, need and approach towards Khangchendzonga Landscape Conservation and Development Initiative (KLCDI). KL is one of the seven transboundary landscapes identified by the ICIMOD, Kathmandu, Nepal in the Hindu Kush Himalayan region. KL straddles across Nepal, India and Bhutan. The meeting brought concerned stakeholders including field managers, scientists together so as to deliberate about the requirements of trans-boundary landscape management. The meeting allowed a review of field researches carried out by different state/national level scientific organizations, NGOs and the Forest Department. Meeting also discussed about the landscape boundaries and ecosystems/constituent areas those need to be incorporated so as to make landscape effective from various biological, ecological, socio-economic and management aspects. Dr. P.K. Mathur made contributions as a resource person for the workshop and this important initiative.

Eighth Asian Raptor Research and Conservation Network Symposium, Pune

6-9 February 2014. The objectives of the symposium were to:

- (i) Exchange information concerning raptors among its members.
- (ii) Compile a database on raptors, especially on the status of native Asian raptors. The symposium was organized by Ela Foundation, Pune.

Shri R. Suresh Kumar presented a paper titled "Satellite Tracking the Autumnal Migration of the Amur Falcon *Falco amurensis* from Nagaland, India to Africa" at the symposium.



Workshop, Assessment of Tigers, Co-Predators and Prey-Phase I, Goa

8-12 February 2014. Dr. Bilal Habib coordinated this regional workshop at Goa. A total of 50 officials from the Goa Forest Department attended Phase I of the training workshop.

Meetings on Approval of Management Plans in Context of PAs in Gujarat, GEER Foundation, Gandhinagar, Gujarat

18 and 27 February, 2014. The meetings expected senior professional foresters, wildlife /protected area managers and scientists to provide inputs on draft management plans prepared in context of PAs in Gujarat. It was convened by the PCCF (Wildlife) and Chief Wildlife Warden, Gujarat State. Draft plans of 13 PAs were circulated for review and comments prior to the Meeting. During the Meetings, each draft plan was considered one by one. The concerned Management Planning Officer made a presentation on draft plan while highlighting review of past management, emerging challenges, plan objectives and recommendation for appropriate strategies. In all, 15 different plans were considered and participating members provided valuable comments for improvement and finalization. Dr. P.K. Mathur had first reviewed all draft plans received and provided comments and later also attended the meeting and offered comments for improvement/finalization based on presentations made by planning officers.

IIRS User Interaction Meet (IUIM) 2014, IIRS, Dehradun

20-21 February 2014. The meet was inaugurated by the chief guest, Dr. R.R. Navalgund from ISRO, Bengaluru. The focus of the meeting was to understand the present and future requirements of the industry, skill gaps and strategy to meet the demand-supply gap in human resource development. It was an important forum to get feedback on quality and expectations, which will be important input for designing future courses and taking up research in newer areas relevant to the user community. It provided a unique opportunity for one and all for interaction regarding building capability related to RS applications. Dr. G. Talukdar, Dr. Panna Lal and Dr. Manoj Agarwal attended this meet.

Workshop-cum-Training and Exchange Programme on Ecosystem Monitoring with USDA and USFS, Dehradun

24-28 February 2014. This workshop-cum-training and exchange programme was sponsored by the Ministry of Environment & Forests, Government of India, at the Forest

Research Institute (Deemed) University, Dehradun. Dr. V.P. Uniyal participated and provided inputs at various sessions on long-term ecological monitoring design.

Third Meeting of the Intergovernmental Platform for Biodiversity and Ecosystem Services Bureau (IPBES) and Multidiscipline Expert Panel (MEP), Bonn, Germany

10–14 March 2014. This MEP meeting was attended by 20 MEP members and 17 observers, including 9 bureau members, 4 representatives from UN agencies and 4 MEA representatives. Dr. V.B. Mathur, Director, WII and MEP member participated in this meeting and assisted in the process of selection of experts for implementing the IPBES Work Calendar.



GIZ-WII Project Consultation on Development of Competencies/Trainings at GIZ Office, New Delhi

14 March 2014. Dr. Asha Rajvanshi participated in the workshop and made a presentation, "Developing Case Studies for Handson Training on SEA".

International Workshop on Best Practices for Mainstreaming Biodiversity Conservation in Mining Sector, India Habitat Centre, New Delhi

19–20 March 2014. Dr. Asha Rajvanshi was invited to present the Framework for Integrating Biodiversity Conservation & Sustainability in Mining at Session V of the workshop. The workshop was organized by IUCN-India.

Training Course on Applications of Bioinformatics in Forestry, Forest Research Institute, Dehradun

27–29 March 2014. This was organized by Department of Biotechnology. A total of 25 participants attended the course. Dr. G. Talukdar participated in the training course.



National Interaction-cum-Evaluation Workshop for ENVIS Centres, Gangtok

28–30 March 2014. The workshop was conducted to evaluate the performance of ENVIS centres and look into various scientific, technical, financial and administrative aspects of the activities undertaken by each centre in accordance with its mandate and achieving the short and long-term objectives of the ENVIS scheme. The Sikkim State Council of Science and Technology organized this workshop, which was held at Chintan Bhavan, the convention and exhibition centre in Gangtok. A presentation on the activities of the WII-ENVIS centre, on wildlife and protected areas, was made by Shri R. Suresh Kumar at the workshop.

Research Updates - 2014, One-Day Seminar under Special Assistance Programme (DRS-II), Kolkata

29 March 2014. Dr. S. Sathyakumar was an invited speaker at this seminar, held at the Department of Zoology, University of Calcutta. He delivered a lecture titled "Wildlife of the Himalaya: Conservation through Science".

STUDY TOURS

Study tour of senior officers of Government of Bangladesh, Dehradun

10–18 June 2013. A study tour for senior officers of the Government of Bangladesh was conducted by WII. It was funded by the Strengthening Regional Cooperation for Wildlife Protection Project (SRCWPP) of the Government of Bangladesh. A total of 10 participants from the Department of Forests attended the programme. The first part of the programme was conducted at WII. Interactive classroom sessions on contemporary wildlife issues were held in this part of the programme to familiarize the participants with the Indian situation. The participants also visited the Forest Research Institute, Dehradun to acquaint themselves with its activities.

During the second part of their visit, the participants were taken to various protected areas and zoos in Uttarakhand, Rajasthan and Delhi. They visited Rajaji National Park, Sariska Tiger Reserve, Keoladeo National Park and National Zoological Park. They observed wildlife management practices in the field and appreciated the excellent work being done in protected areas.

Special training course, Geoinformatics for Meteorology and Climatology, Dehradun

18-28 November 2013. This special training course was organized at the Indian Institute of Remote Sensing, Dehradun. It was sponsored by the Indian Meteorological Society. A total of 30 participants took part in the course. Dr. G. Talukdar participated as a resource person.

Management Development Programme (MDP), TERI, New Delhi

29-30 November 2013. The objective of the meeting was to enhance competences and capabilities to meet the emerging needs of managers, decision-makers and other policy specialists who work on environment-related issues. It was organized by WII. The programme provided an overview of the concept of corporate social responsibility (CSR) and its synergy with sustainable business practices. The issues were captured in the light of the de-facto mandatory provision for CSR in the New Company Bill (en route to becoming an act). The programme focused on the new avenues that are being unleashed with the aforementioned provision and how corporations can utilize them in the best possible manner and create a sustainable business value.

Study abroad programme on wildlife management and conservation, Dehradun

18--31 December 2013. A study abroad programme on wildlife management and conservation was organized by WII for students from North Carolina State University. Sixteen undergraduate (Animal Science majors) and DVM students from North Carolina State University, Raleigh, NC attended the 2 week programme. Dr. Parag Nigam provided field inputs during 20-23 December 2013 at Sariska on wildlife health management and wildlife immobilization.

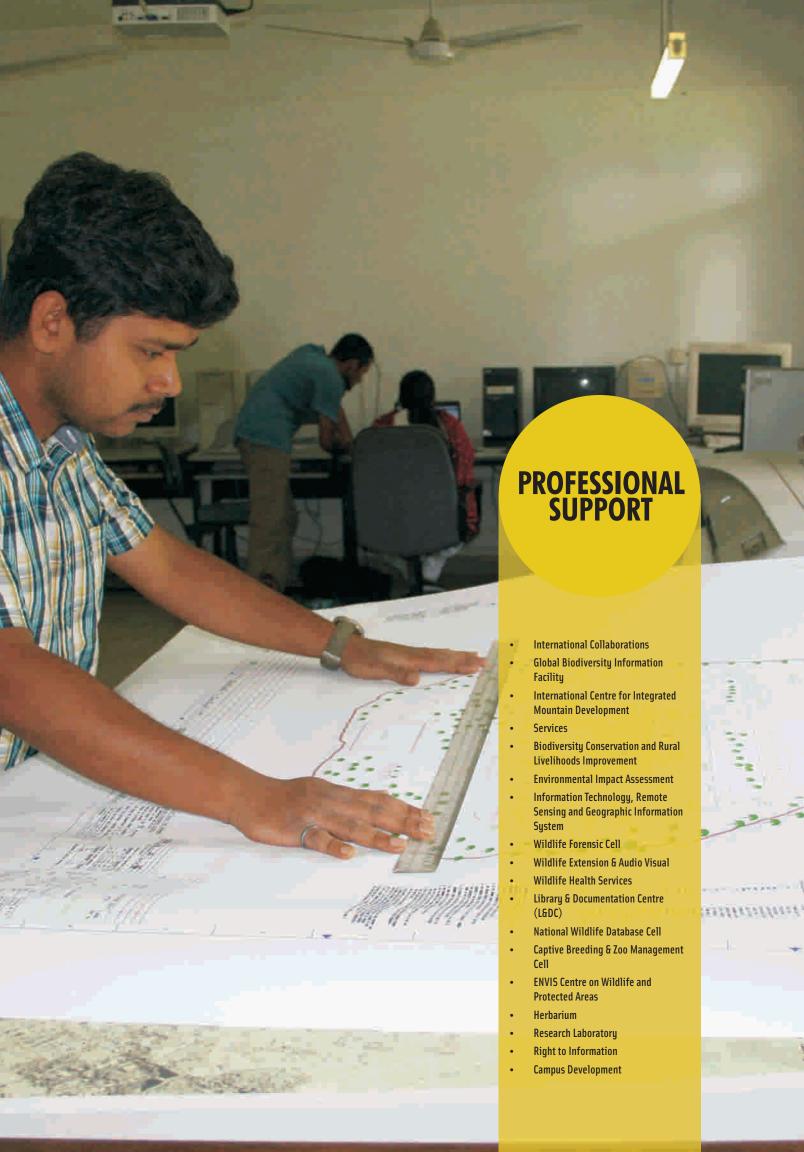
The programme was designed with the objective of educating and familiarizing the students with wildlife management practices in India, exposing the students to the current conservation challenges faced by wildlife managers, discussing strategies to address them and acquainting the students with aspects of Indian culture, traditions and history, integrating these with the wildlife education to enhance their learning experience. The course essentially provided an overview of field strategies, basics of laboratory analysis and interpretation



approaches as well as tools that wildlife biologists use in management and conservation of wildlife.

The course included 3 modules that focused on:-

- (i) Research and Management of Wildlife in a National Park.
- (ii) Wildlife Techniques and Monitoring.
- (iii) Theory lectures on various aspects of wildlife management and conservation, wildlife forensics, wildlife health and human-wildlife conflict issues. Besides receiving theoretical inputs at WII, the participants got field inputs at National Zoological Park (New Delhi), Ranthambore Tiger Reserve, Sariska Tiger Reserve and Keoladeo National Park (Rajasthan) and Wildlife SOS Bear Rescue Centre (Agra). Dr. Pradeep K. Malik coordinated the programme with field inputs from Dr. K. Sankar, Shri Qamar Qureshi and Dr. Parag Nigam. A field demonstration of immobilization and biological sampling procedures was carried out on 2 sambars *Rusa unicolor* and 1 tiger.





International Collaborations

International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal

As in previous years, the Institute continued cooperating/collaborating with ICIMOD while focusing on the conservation and development of Himalayan ecosystems and demonstration of trans-boundary landscape approach besides activities of Himalayan University Consortium (HUC). During the reporting period, the Institute made significant contribution towards the execution of the Implementation Plan of 'Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI)' being the second year of Project implementation. Participating faculty members attended various meetings/workshops at ICIMOD, GB Pant Institute of Himalayan Environment and Development, and at Itanagar, Arunachal Pradesh and Gangtok, Sikkim in context of Khangchendzonga Landscape (KL) and Brahmaputra Salween Landscape (BSL). Dr. P.K. Mathur, Nodal officer for ICIMOD's activities at WII, coordinated various activities/ programmes jointly undertaken with partner organizations and facilitating organization i.e. ICIMOD.

The Director, WII and Dr. P.K. Mathur participated in the country consultation organized by ICIMOD at New Delhi for developing a strategic framework. During the reporting period, WII made a significant contribution towards the development of an implementation plan of the Kailash Sacred Landscape Conservation and Development Initiative and signed a Letter of Acceptance (LoA) for the purpose.

Global Biodiversity Information Facility

The Global Biodiversity Information Facility (GBIF) was established in March 2001, as an open ended international coordinating body to promote compilation, linking, standardization, digitization and dissemination of the world's biodiversity data in the form of a distributed open access system, within an appropriate framework for property rights and due attribution. India has signed the third MoU, for the period 2012–2017, with GBIF.

Efficient access to data about biodiversity is essential for effective conservation and sustainable use, and its use is essential to decision-making in many realms. However, such data are currently distributed, isolated, available in heterogeneous forms and formats and, most seriously, locked up in institutional and individual domains, for want of "national biodiversity information infrastructure". Realizing the importance of sharing data for improving our understanding of

patterns and processes and facilitating informed decision-making, India formulated the National Data Sharing and Access Policy in 2012. The challenge now is to device efficient access to biodiversity data, share it and add value. The experience of the GBIF Secretariat and nodes will be very useful for creating a national biodiversity information infrastructure for strengthening the emerging area of biodiversity informatics. In this context, MoEF and WII will be hosting the 21st Governing Body (GB-21) Meeting of GBIF at New Delhi India during 16-18 October 2014. WII, in collaboration with GBIF, also organized a training workshop, "Promotion of Metadata Use and Data Paper Publication" during 19-21 June 2013 at Bharati Vidyapeeth, Pune, India, which was attended by 21 registered participants from 10 organizations and was highly appreciated.

The Director, WII and Dr. P.K. Mathur participated in the country consultation organized by ICIMOD at New Delhi for developing a strategic framework. During the reporting period, WII made a significant contribution towards the development of an implementation plan of the Kailash Sacred Landscape Conservation and Development Initiative and signed a Letter of Acceptance (LoA) for the purpose.

Services

Assessment of Cumulative Impacts of Hydroelectric Projects on Aquatic and Terrestrial Biodiversity in Alaknanda and Bhagirathi Basins, Uttarakhand

WII had submitted a report titled "Assessment of Cumulative Impacts of Hydroelectric Projects on Aquatic and Terrestrial Biodiversity in Alaknanda and Bhagirathi Basins, Uttarakhand" to the MoEF. The report was reviewed by a committee constituted by MoEF under the chairmanship of Shri B.K. Chaturvedi, Member Planning Commission, which endorsed the findings of the study and recommended the enhancement of eflows to take into account the cultural and religious requirements of people. Dr. V.B. Mathur, Dr. K. Sivakumar and Dr. J.A. Johnson provided inputs at the deliberations of the committee, which led to finalization of the report.

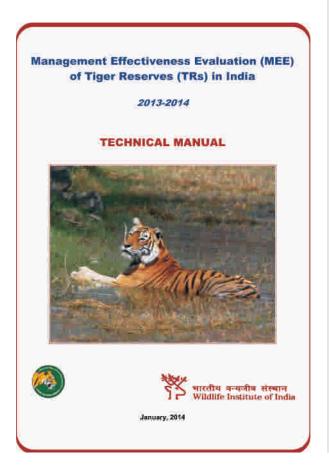
Subsequently, the MoEF set up another committee to look into hydropower development issues in Uttarakhand under the chairmanship of Dr. Ravi Chopra. Dr. S. Sathyakumar and Dr. V.B. Mathur provided inputs at the meetings of this committee.

Management Effectiveness Evaluation (MEE) of Tiger Reserves in India (2013-2014)

The Ministry of Environment & Forests, Government of India assigned WII the responsibility of technical backstopping of independent Management Effectiveness Evaluation (MEE) of 43



tiger reserves in India. WII prepared a technical manual to guide the MEE process.



Global Environment Facility (GEF) Quality Assurance Panel for Country Portfolio Evaluation (CPE): India

The Global Environment Facility (GEF) is a financial mechanism for international cooperation providing new and additional funding to meet the agreed incremental costs of securing global environmental benefits. It works in partnership with the GEF agencies, national governments and civil society. The purpose of GEF Country Portfolio Evaluations is to provide the GEF Council with an assessment of how GEF support has been implemented in India, especially the performance (in terms of relevance, efficiency and effectiveness) and impact of GEF support. Dr. V.B. Mathur, Dean was invited to serve on the GEF Quality Assurance Panel along with Dr. Kirit Parikh, former member, Planning Commission & Chairman, Integrated Research and Action for Development (IRADe). During the reporting period the report titled "GEF Country Portfolio Evaluation for India (1991–2012)" was finalized.

BIODIVERSITY CONSERVATION AND RURAL LIVELIHOODS IMPROVEMENT



Funding Source

International Development Agency and Global

Environment Facility through

World Bank

Project Co-Ordinator

Shri V.K. Uniyal

Date of Initiation

July, 2011

Date of Completion

January, 2017

EXTERNALLY FUNDED IMPLEMENTATION PROJECT

Objectives

The project aims to develop and promote new models of conservation at the landscape scale through enhanced capacity and institution building for mainstreaming biodiversity conservation outcomes. To achieve this, the project has the objective of assisting implementing forest departments to demonstrate the processes and outcomes of the approach. To this effect, building national and regional capacities in landscape level management is a goal.

Progress

WII is one of the implementing agencies in this project, which is coordinated by the Ministry of Environment & Forest (MoEF), Government of India (GOI). In order to formalize the implementation arrangements, a MoU was signed between WII and MoEF on 25 July 2011, which was subsequently revised to firm up financial arrangements within WII, and the revised MoU was signed by the Director, WII on 2 January 2012, the effective date of implementation of the project in WII.

During the financial year 2013–2014, the following tasks were accomplished:

Progress of Ecological Mapping and Biological Indicator Works

- Biological Indicator for Assessing Conservation Objectives:
 Following the primary survey and reconnaissance surveys in the Askot landscape during 2012–2013, a detailed assessment of Gori Valley was undertaken during 2013–2014. Different studies on the mammals, insects, fish and vegetation have been continuing, and the final report of the work done in Phase I will be produced by October-November 2014.
- Ecological Mapping: Data have been collected from the lower valleys and alpine region of the Askot landscape in the context of GIS mapping. Land use-land cover and forest cover data interpretation was completed, and a geospatial layer was created for settlement, drainage, roads, soil, administrative layers and watersheds, along with digitization, under ecological mapping. The socioeconomic study of Gori valley has been completed. The potential distribution maps based on elevation ranges have been finalized. The tasks are progressing and will be completed as scheduled by the end of October 2014.
- Completion of Model Micro plans: Spearhead team
 trainings have been accomplished both at Askot and the
 Little Rann of Kutch (LRK). Three model micro plans for
 LRK and two model micro plans for the Askot landscape
 have been completed and distributed. A micro plan



RESEARCH ACADEMIC GTRAINING CAPACITY BUILDING PROFESSIONAL SUPPORT VISITORS GOVERNANCE PUBLICATIONS TALKS 6 MEETINGS ACCOUNTS

finalization workshop was conducted for the Askot landscape at Dharchula, Pithoragarh for selected micro plan teams during 17–21 November 2013. Based on the model micro plans, the micro plan processes of both sites have been expanded across the landscapes.

Field Learning Centres (FLCs): The Periyar (PTR), Kalakad (KMTR) and Gir FLCs training programmes were evolved through a consultative process and facilitation with the stakeholders of these sites. The WII team interacted with a cross section of the stakeholders, including the forest officers, frontline staff and village forest committee members, on key issues. Subsequently the coordinators from WII conducted workshops in PTR, KMTR and Gir in June-July 2013 to further guide the core teams of the respective sites for preparation of training material.

The KMTR team has prepared draft manuals and resource material on the following, which will be edited and finalized as soon as possible:

- 1. Community mobilization and empowerment
- 2. Micro planning and participatory monitoring
- 3. Management of self help groups

The PTR team has prepared draft manuals and resource material on the following, which are to be edited and finalized:

- 1. Community institutional development and organizational
- Sustainable financing for protected areas and community livelihood
- 3. Private public corporation

The Gir team has prepared draft manuals and resource material on the following, which have been edited and finalized:

- Regional conservation planning for biodiversity conservation
- 2. Multi-sectoral coordination
- 3. Eco-development
- 4. Improved management practices
- 5. Rescue, treatment and rehabilitation
- 6. Community participation

Orientation for Policy Makers: WII, along with the Gujarat Forest Department, conducted the policy level and site level workshops in Gujarat. The policy level workshop was held at IIM Ahmedabad on 19 September and the site level workshop at Bajana, LRK on 20 September. The workshops allowed the issue of landscape management to be discussed at the level of the higher bureaucracy of the Gujarat Government and with the line departments and stakeholders operating at the site.

Representatives from the MoEF, Government of India; the Gujarat Forest Department; the Uttarakhand Forest Department;

the Kerala Forest Department; the World Bank; Gujarat line departments (Salt, Energy and Tourism); and WII marked their presence at the workshop, as did the BCRLIP staff (WII, Gir, LRK, PTR and KMTR), NGOs and the media. A total of 86 participants participated in the workshop.

Core Training Programme: While preparatory work is going on in terms of designing national curricula for different training modules, a workshop on strategies for conservation and management of large landscapes was held during 8-9 July 2013, in which the 2 new sites, namely the Agasthyamalai landscape and the Satpura landscape, were finalized and an approach paper on landscape conservation was distributed for comments. Further, a workshop on landscape mapping and monitoring was organized for the BCRLIP staff during 5-9 August 2013.

Institutional Strengthening of WII: The international expert Dr. Kathy Mackinnon was engaged for institutional strengthening, and she visited WII during 12–30 September 2013. After intensive consultations on course curriculum designs and preparation of learning material, a framework for 3 different training modules was finalized. The course modules are being prepared on the basis of the inputs from the international expert.

Accounts: The Annual Work Plan for 2013-2014 was approved by the Government of India for an amount of Rs.396.79 lakh, against which an amount of Rs.69.79 lakh was released by the Government of India. The total project expenditure for the year was Rs.96.71 lakhs, which included an amount of Rs.28.02 lakhs received as a loan from WII.

The Annual Work Plan for 2014–2015 was prepared for Rs.484.89 lakhs and submitted to the MoEF on 3 March 2014.

Workshops under the BCRLI Project

The following workshops have been undertaken during the year:

- APO finalization workshop at the World Bank office, New Delhi was held during 17-18 April 2013.
- A FLC (KMTR) writing workshop on training manual preparation was conducted by WII and KMTR. The workshop was conducted for the KMTR staff, NGOs and local experts. It was held during 5-6 June 2013.
- A landscape mapping and monitoring workshop was organized by WII for the technical staff and mid level officers of implementing sites. The workshop was held at WII during 5-9 August 2013.
- An orientation workshop for policy and decision makers of the Gujarat Government was organized by WII and the Gujarat Forest Department at IIM, Ahmedabad on 19 September 2013.



- A site level workshop was organized by WII and the Gujarat Forest Department for the field implementation team at LRK, Bajana on 20 September 2013.
- A workshop was organized by MoEF and WB on strategies for landscape conservation at IHC, New Delhi on 8 July 2013.

Cells

Environmental Impact Assessment (EIA) Cell

The EIA Cell of WII continued to provide professional support in capacity building initiatives at WII, sister organizations, other institutions, professional bodies and government and corporate organizations. Networking and collaborations with international agencies also continued to expand and diversify.

International Collaborations

Collaboration With The Deutsche Gesellschaft Für Internationale Zusammenarbeit (giz) For The Project: Strategic Environmental Assessment-increasing Planning Efficiency And Reducing Conflicts Of Interest-relevance, Scoping And Needs Assessment Of Sea In India

Considering the potential usefulness of the strategic environmental assessment (SEA) tool under the present circumstances, the Federal Agency for Nature Conservation (BfN) of Germany has funded a project titled "Land-Use Planning and Strategic Environmental Assessment" within the frame of the CBD COP 11 presidency. The project is being implemented in Collaboration with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and WII. The objective of this project is to raise awareness and develop human capacities in India for better use of integrated planning instruments, in particular SEA. The application of SEA is specially being promoted in the context of land-use/spatial and socio-economic development planning in order to contribute to more environment/nature-compatible planning, also integrating aspects relevant to biodiversity.

This project, the duration of which is 2 years (25 October 2012 to 30 November 2014), is being carried out in 2 phases:

Phase 1 (25 October 2012 to 28 February 2013) - "scoping study" and "needs assessment". The tasks under the first phase have been completed. The results of the scoping study and need assessments were shared in a workshop organized by GIZ on 19 March 2013 at Delhi.

Phase 2 (1 March 2013 to 30 November 2014). This phase focuses on the "implementation of capacity development (CD) measures".

The elements of the customised awareness raising/capacity development programme are being implemented in Phase 2 and consist of the following work packages.

- (i) Setting up a core group of takers/ambassadors for SEA, who will accompany and support the SEA Capacity Development (CD) programme over its full duration and steer the implementation of CD measures.
- (ii) Exploring the potential for cooperation with the GIZ and KfW programmes in order to create a basis for the implementation of pilot projects and upscaling them.
- (iii) Carrying out information side-events for the expert appraisal committees of different sectors and other decision makers (e.g. in pilot states) and presenting the overall concept and practical international and Indian experiences/case studies.
- (iv) Developing 2 customized sector-specific short-term training modules (3 days).
- (v) Developing a strategy for upscaling and starting its implementation, including *e.g.*
 - (a) Cooperation with other GIZ programmes, such as biodiversity/marine coastal zone protection, IGEP (new land-use project) and Natural Resources Management for further implementation and upscaling;
 - (b) Presentation of the SEA approach at appropriate functions (workshops, conferences etc.) and setting up of a knowledge exchange platform (virtual and real);
 - (c) Dissemination of customized training programmes and working out a concept for utilization of webbased training programmes, in cooperation with the GIZ-HCD Unit.
 - (d) Publication of the experiences of 1 pilot application of the SEA approach.
- (vi) Organizing an Indo-German exchange with BfN experts.

At WII, the project is being coordinated by Dr. Asha Rajvanshi. The project has made significant progress on the ground. Learning resources for capacity building initiatives in SEA have been already developed and will be road-tested through training programmes.

Providing professional support to IUCN-Pakistan in organizing the South Asian Environmental Assessment Conference (SAEAC'13) at Islamabad, Pakistan, 4-5 December 2013.

WII provided the technical support in organizing the inputs of the Indian delegation at this year's conference, "Impact Assessment: Raising the Bar on Regional Cooperation". WII also



assisted with the planning of the technical sessions and the conduct of the pre-meeting course. Dr. Asha Rajvanshi and Dr. Malvika Onial participated as the members of the Indian delegation at the conference.

Professional support to IUCN-India office

The Country Head, IUCN-India invited WII to be the knowledge partner for organizing an international workshop, "Best Practice for Mainstreaming Biodiversity Conservation in Mining Sector", on 19 and 20 March 2014 at New Delhi. Both Dr. V.B. Mathur and Dr. Asha Rajvanshi provided the technical support in the development of the workshop programme and provided professional inputs during the various technical sessions of the workshop.

Professional Support to School of Architecture and Planning, The Catholic University of America, Washington DC, USA

Dr. Asha Rajvanshi was invited to collaborate with Prof. Charles Hostovsky on a small research initiative for studying EIA in India and South Asia. The work involved a literature review, supplemented by in-person key informant interviews of EIA experts at New Delhi in October 2013. Interviewees included government environmental planning officials, Indian EIA academics, certified EIA consultants and an NGO. The interviews were tape-recorded, transcribed, analysed and coded with ethnographic software (Atlas ti). Overall, the goal of this research was to make recommendations towards more culturally sensitive and ecologically appropriate EIA planning processes in India. The outcome of the research will be presented at the 54th annual conference of the Association of Collegiate School of Planning in 2014 at Philadelphia, USA.

Professional Support to Other Organizations

Professional support to the Indian Road Congress (2011-2013)

Dr. Asha Rajvanshi was invited to serve on the Committee on Reduction of Carbon Footprint in Road Construction and Environment (G-3) of the Indian Roads Congress, which is a premier technical body for ensuring environmental conservation and sustainable development of highways projects in India. In her capacity as a member of this committee since March 2012, Dr. Rajvanshi provided professional support.

Professional support to Quality Council of India's National Registration Board for Personnel and Training

As part of the ongoing initiative of MoEF of revising the

environmental clearance process, the Quality Council of India (QCI) initiated the development of a registration scheme for EIA consultants through the National Registration Board for Personnel and Training (NRBPT). Subsequently, in March 2012, Dr. Asha Rajvanshi was invited to serve on the accreditation committee for EIA consultant organizations for NRBT registration. During the reporting year, Dr. Rajvanshi provided professional inputs in evaluating the applications received for seeking accreditation of QCI and continued to provide professional support to QCI in taking forward the scheme through contributions at several consultative meetings organized during the reporting year.

Professional support to IAIA

International Association for Impact Assessment (IAIA) is an interdisciplinary, non-profit professional society established in 1980. This professional body, with over 2500 members representing EIA professionals, practitioners, government officials, project planners, administrators, teachers and students from across the globe, is the leading global authority for advancing innovations and communication of best practices in all forms of impact assessment. Dr. Asha Rajvanshi and Dr. V.B. Mathur have been members of this association for over a decade and have actively contributed to the activities of the Biodiversity and Ecology Section. They have been directly involved in the planning of sessions for the annual meeting and in delivering training courses.

Advisory support to Ministry of Environment and Forests, Govt. of India on matters related to environmental decision making

Dr. Asha Rajvanshi has been invited to become a member of the reconstituted Expert Appraisal Committee (Non-Coal Mining) of the MoEF for EIA and evaluation of projects. In this capacity, she has been reviewing EIA reports for non-coal mining projects and attended EAC meetings.

Information Technology, Remote Sensing And Geographic Information System

The Information Technology, Remote Sensing and Geographic Information System (IT, RS & GIS) facility is a hallmark of WII, providing cutting edge technology relevant to wildlife research, education and training. The facility is available 24 hours a day to the faculty members, trainees/researchers/students and collaborators working with WII. A large number of desktop computers configured with updated operating systems and specialized analytical software for data processing and research purposes have been made available in this dedicated lab. The computer facility is equipped with a wide range of hardware



connected to a local area network (LAN). There are Intel Pentium Xeon/Itanium servers for Internet, Intranet and database management and library automation services. There are workstations, a storage area network (SAN) and more than 300 nodes. Wi-Fi connectivity is available in the hostels, guest house, classrooms, auditorium, board room and Porta cabin. WII has 15 Mbps (1:1) Internet leased line connectivity. All the computers of WII are provided connectivity to the Internet and mailing services.

The Geo-informatics Laboratory, *i.e.* Geographic Information System, Remote Sensing and Global Positioning System (GPS) technology at WII caters to the research and training programmes of the Institute and to the demand from field managers. The laboratory is equipped with software such as ArcGIS, ERDAS Imagine, Idrisi, GRASS and several open source packages for landscape level analysis. A dedicated team is available for providing support and training in IT and geo-informatics. A module on remote sensing and GIS is conducted for the M.Sc., PG Diploma and Certificate courses at WII, and hands-on training is also provided to other graduate and post-graduate students and interns.

Video Conferencing Facility

In the reporting year, WII established a video conferencing facility. Polycom HDX 8000 VC systems with high definition cameras and displays based on an IP Internet leased line connection have been installed in the board room and Porta Cabin of WII. These systems are being regularly used for conducting lectures, meetings, classes, interviews and presentations within the country and abroad.

Application of Geo-Informatics in Research Projects

Geo-informatics technology is being used in most of the research projects of WII for wildlife research and conservation. Work on the development of a spatial database on the



boundaries of all the national parks, wildlife sanctuaries, conservation reserves and community reserves in the country is progressing. Similarly, digitization of the division, range and beat boundaries of the 17 tiger range states in the country is in progress. Work on country level data on climate, vegetation, topography and animal distribution is also in progress.

Wildlife Forensic Cell

Wildlife Forensic Cell (WFC) at Wildlife Institute of India (WII) was established to develop protocols for identification of species from various parts, products and derivatives encountered in illegal wildlife trade and share the knowledge acquired with different forensic laboratories in the country and providing support to adjoining countries. The aim was to provide better support to law enforcement agencies in implementation of National and International Acts and treaties like CITES. WII's Wildlife forensic facility is the only facility in the entire South and South-East Asian countries that specifically deals with wildlife forensics by continuous research and development (R&D) based on morphology and DNA based work.

During the reporting period, the activities of the WFC were as follows:

- (i) Case analysis of wildlife offences.
- (ii) Development of protocols.
- (iii) Sensitization of enforcement agencies through appropriate Hands on Training (HoT).

During this period, 294 wildlife offence related cases were referred to WFC by the State Forest departments, Police & CBI, Court(s), Department of Customs and Central Excise, etc. Out of these 159 cases were analyzed and reports were submitted to the concerned law enforcement agencies. WFC also received 47 courts summons for appearance as expert scientific witness under wildlife offence cases in various courts within the country.

Besides these WFC sensitized various enforcement agencies in crime scene examination and proper collection of evidences through regular training and workshops. Field (Mock) exercises and lectures were conducted on "Crime scene management and evidence collection- for officer trainees of the Diploma course, Certificate course, for officer trainees at Indira Gandhi National Forest Academy and other Forest Officials of Uttarakhand Forest Department at Haldwani and Kalagarh. Hands-on training was also imparted on the identification of various parts and products encountered in illegal wildlife trade for the Forest Officers, Customs probationers and popular lectures were undertaken for various visitors and groups at WFC.

On the request from the National Forensic Science Laboratory,



Govt. of Nepal, a hands-on training workshop on 'Wildlife Forensics' was conducted during 21-25 October, 2013.

Wildlife Extension & Audio Visual

This cell caters to the needs of various requirements of academic activities. It maintains 16 mm films, video films, synchronized programmes, CDs/DVDs, a conference system, a projection system, various audio-visual equipment, still cameras and video cameras with accessories and a photo library.

As part of its information dissemination activities, WII prepares 4 quarterly issues of the e-newsletter of WII. The issues were uploaded to the web site of WII during the reporting period.

Discussion forum on Himalayan Day, Dehradun

9 September 2013. A discussion forum was held at WII on Mountain Day on the topic "Challenges for Conservation and Development in Indian Himalayas". A total of 70 participants including WII's faculty members, researchers, officer trainees of the PG Diploma course, M.Sc. students and representatives of 4 non-governmental organizations participated.

Shri V.K. Uniyal, IFS and faculty member of W00 moderated the discussion, welcoming the participants. He gave the background about why the Mountain Day is celebrated. Dr. Dhananjai Mohan, CCF (WL), Uttarakhand Forest Department spoke on why dams were being built. He suggested that we should all look inwards at our need for electricity and other supplies. Dr. Malvika Chauhan spoke about Himmothan's initiatives in working with the resource dependent communities in the Garhwal Himalaya region. Dr. Kishor Nautiyal made the participants aware of the initiatives of SAMVEDI in the disaster affected region. Shri J.P. Maithani presented a slide show on the recent disaster and appraised the gathering about the work being done by AAGAAS Federation in the areas affected by the disaster recently. Dr. Jatinder Kaur described the initiatives of WWF-India towards responsible tourism in the Himalaya.



Brain exercise for students during Wildlife Week, Dehradun

5 October 2013. The XIth Wildlife & Environment Quiz 2013-a collaborative activity of WII and Friends of Doon (FoD) Society was organized at WII to mark the celebrations of Wildlife Week 2013. Thirteen schools participated in the preliminary round. Five teams, viz. Brightlands School, The Doon School, Hilton's School, Asian School and St. Jude's School, qualified for the final round. The final quiz had 6 rounds, viz. Uttarakhand; Guess who; Pictionary; Audio round; Taboo round; and Biogeographic zones & landscapes round. Brightlands School topped the list and won the WII-FoD Rolling Trophy, Book Prize and Sameer Ghosh Memorial Nature and Wildlife Rolling Trophy. Doon School won the second prize, and Hilton's School won the third prize. Dr. Mahendra Shrestha, Programme Director, Smithsonian Conservation Biology Institute, USA graced the occasion as the chief guest and distributed the prizes to the winning team.



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WILDLIFE HEALTH SERVICES

Assistance to Maharashtra Forest Department

3-4 August 2013. Assistance was provided to the Maharashtra Forest Department with collaring 3 wild caught leopards that



were captured from a human dominated landscape. The animals were successfully immobilized prior to collaring and were released back into the wild.

Assistance to Rajasthan Forest Department

24–25 April 2013. Technical inputs on various aspects of wildlife health management were provided to forest officials of Sariska Tiger Reserve (STR). These included inputs on management of neoplastic proliferation in the tiger ST 6 and disease outbreaks (swine fever) in the swine population in and around STR.

Assistance was provided to the Rajasthan Forest Department with the capture and collaring of the tigress ST 10. The tigress (ST 10/Bina2) had dropped a collar that was previously deployed in January 2013. The animal was successfully tracked in the Panidhal area of STR, chemically immobilized and collared on 24 April 2013. The animal had an uneventful recovery after sedation. The animal's movements were tracked on 25 April 2014.

The collar of the tigress ST 3 at STR had been non-functional for almost 2 years, thereby posing a major challenge to monitoring. The animal was successfully captured and the collar replaced on 23 December 2013.

Emergency Services Provided to Uttarakhand Forest Department Management of trapped leopard at Ghamandpur, Dehradun FD

30 April 2013. Upon receiving a request from the DFO, Dehradun Forest Department, Dr. Parag Nigam proceeded to Ghamandpur to provide technical assistance in managing a trapped leopard. The leopard was trapped in a clutch wire snare and had sustained injuries on the limb. The animal was successfully immobilized, and it was provided first aid, after which it was released back in the wild.

Management of injured wild elephant at Rajaji National Park

May 2013. An injured wild tusker was successfully immobilized and treated near Haridwar in May 2013. The animal had sustained severe injuries on the hind leg and was lame. It was provided with the necessary medication and fluid therapy. The animal recovered from the sedation but succumbed to its injuries after 10 days. A post-mortem examination revealed septicaemia.

Management of Wounded Elephant

1 June 2013. Responding to a request from the Director, Rajaji National Park, Dr. Parag Nigam proceeded to Haridwar on 1 June 2013 for providing assistance with the management of an injured tusker in Mayapur Block, Haridwar Forest Division. The

animal was successfully immobilized and treated. The animal was identified as the tusker T4 of Rajaji National Park.

Management of trapped leopard at Rishikesh

26 December 2013. In response to a request from the CWLW, Uttarakhand and DFO, Dehradun, Dr. Parag Nigam proceeded to Rishikesh to provide technical assistance with the management of a trapped leopard. The leopard was trapped in the city hospital. It was successfully trapped in cage and immobilized. It was provided first aid and released back in the wild. The operation was a unique operation that took almost 8 hours from capture to release.

Library & Documentation Centre (1&dc)

The L&DC plays a vital role in disseminating information to target scientists of research and training organizations.

Therefore, the L&DC is considered the backbone of any research institution. So is the case with WII's L&DC. It was established in line with WII's mission of being a multidisciplinary information and learning resource centre for biodiversity conservation and management.

The L&DC has the following objectives:-

- (a) To serve as a repository of all wildlife related literature published in India.
- (b) To acquire, organize and disseminate all relevant literature from around the world on biodiversity conservation and related fields.
- (c) To serve the user readership through normal and special library and information services such as circulation, reference, photocopying and documentation.
- (d) To establish and maintain links with other national information systems in India and other countries to ensure a free flow of information at the national and international levels.
- (e) To serve as a training centre for information personnel and users.
- (f) To provide the above services to:
 - (i) WII
 - (ii) Protected areas all across the country;
 - (iii) Institutions engaged in nature conservation research in the country and abroad;
 - (iv) Universities and colleges;
 - (v) Individual scholars working in related areas, NGOs, etc.;
- (g) To bring out periodic publications on.
 - (i) Current content of periodicals;
 - (ii) Research in progress;
 - (iii) Unpublished research literature, covering



dissertations, theses, etc.;

- (iv) Bibliographies;
- (vi) Abstracts.

The LGDC now holds approximately 28,000 books, 7500 maps/toposheets, 25,500 newspaper clippings and more than 6459 bound volumes of old and rare journals. The library also maintains a good collection of scientific papers numbering 10,900. It subscribes to more than 470 print and online journals.





The L&DC is fully computerized, using the LIBSYS library management software, UNESCO'S WINISIS software, CD server, barcode and related technologies. For optimum resource use by researchers, students, officer trainees and other users, 10 computer terminals have been made available in the library premises, and the faculty desks have been inter-connected with a LAN. Being connected to the library facility, the users have the privilege of accessing all in-house databases of books, reprints, Indian wildlife abstracts, map/toposheet collections and press clippings and specialized bibliographic databases: Musk Deer, Application of Telemetry in Wildlife, Wildlife and Protected Area Management in Madhya Pradesh, Mountain Ungulates, Rainforests Conservation in India, Ungulates of India, Rajaji National Park, Galliformes of India, Freshwater Turtles of India and Telemetry in Wildlife Science. Users also have access to online databases such as Wildlife and Ecology Studies Worldwide (from 1935 to date). The L & DC provides a variety of library and information services to its users.

During 2013–2014, over 23,281 pages of photocopies were provided to users. Approximately 46,000 documents were issued and consulted during 2013–2014. The Value Added Service was provided to 3200 clients, and the Ready Reference Service was provided to approximately 250 clients. Approximately 500 queries from outside users were attended to, and more than 9000 bibliographic references were provided to users.

National Wildlife Database Cell

The objectives of the computer-based National Wildlife Database are to:-

- (i) Provide readily accessible and comprehensive information on the conservation status of biogeographic regions, habitat types, individual animal species and the network of protected areas in the country.
- (ii) Establish linkages with researchers, protected area managers and planners and with other data centres.
- (iii) Facilitate research and training activities related to wildlife by providing bibliographic references on protected areas, habitat types and animal species.

During the reporting period, the main thrust of the activities was on updating the Protected Areas, Species and Wildlife Bibliography databases on the basis of current information collected from various published/unpublished sources during the above-mentioned period. The Protected Area Database of the country has been updated, and presently there are 690 protected areas including 102 national parks, 527 wildlife sanctuaries, 4 community reserves and 57 conservation reserves in the country, with an extent of 1,66,852 km2, which is 5.08% of the total geographical area of the country. The Species Database was corrected and updated by adding information on the distribution of mammalian species in various protected areas. The Bibliographic Database was updated by adding current literature published on Indian wildlife in various journals/periodicals during the reporting period. The Review of the Wildlife Protected Area Network has been updated by incorporating the latest information. The Trainees Database has been updated further, and now there is information on 636 Diploma and 518 Certificate officers trainees trained in various courses, including 210 foreign nationals. The web site of the National Wildlife Database has been updated further by incorporating the latest information. Nearly 200 queries were received, and outputs were provided in the desired formats.

Captive Breeding & Zoo Management Cell

The Captive Breeding & Zoo Management Cell of the Institute has the following mandate:-

- (i) To provide technical support for ex-situ Conservation.
- (ii) To provide inputs on various aspect of Zoo management assigned by Central Zoo Authority.
- (iii) Carry out research activities for supporting ex-situ conservation.
- (iv) Nodal centre for preparation and updation of National Studbooks of identified species.



 To provide technical advice on Wildlife health of captive animals.

During the reporting period, the following activities were conducted by the Cell:-

- (i) Workshop on conservation breeding of endangered species by zoological parks. Development of species recovery and conservation breeding plan was conducted during 8-12 July, 2013. There were 30 participants in the course comprising of zoo directors, species experts and resource faculty.
- (ii) Workshop on conservation breeding of endangered species by zoological park was conducted on 'Development of Species Recovery and Conservation Breeding Plan' during 16-19 September 2013. There were 30 participants in the course comprising of zoo directors, species experts and resource faculty.
- (iii) The Cell also provided its inputs in the Certificate Course Module, M.Sc. course and other training courses of the Institute during the reporting period.
- (iv) The Cell also worked on the following research projects during the reporting period:
 - (a) "Studies on housing and enclosure enrichment of some species in selected Indian zoos";
 - (b) "Development and maintenance of stud books for select endangered species".
- (v) Evaluation of two projects i.e. Bondla Zoo and Kittur Rani Chennamma Mini Zoo was conducted and the reports were submitted to Central Zoo Authority.

ENVIS Centre on Wildlife and Protected Areas

The Ministry of Environment and Forests, Government of India established the 23rd Environment Information System Centre in September 1997 at WII. The theme of the WII ENVIS Centre is "Wildlife and Protected Areas". The mission of ENVIS is to support and facilitate a diverse group of clientele from policy makers to researchers and industries and promote national and international level cooperation and exchange of environmental data and information through a nation-wide network.

The goals of the WII ENVIS Centre are to:-

- (i) Build up a repository and act as a dissemination centre for information on wildlife sciences;
- (ii) Provide information for decision-making at the apex level relating to conservation and development;
- (iii) Establish a database on the protected area network in India;

(iv) Promote national and international co-operation through networking and exchange of wildlife related information.

During the reporting period an issue of the ENVIS bulletin on the theme "Arthropods and Their Conservation in India (Insect and Spiders)" was released during the XXVII Annual Research Seminar of WII on 30 September 2013 by the chief guest, Shri S.S. Bist, Former Principal Chief Conservator of Forests and Head of Forest Force, Government of West Bengal.

Herbarium

During the reporting period herbarium staff provided their inputs in various field activities and surveyed different protected areas. Approximately 500 plant species collected by research scholars, diploma and certificate trainees and faculty members from various parts of the country (Pithoragarh district, Askot landscape, Corbett Tiger Reserve, Rajaji NP, WII Campus, High altitude regions of Uttarakhand, Himachal Pradesh and Trans-Himalaya (Suru valley in Ladakh and Niti Valley under Nanda Devi Biosphere Reserve). Apart from specimens ca. 100 photographs were also identified from various PAs as well as outside PAs.

Research Laboratory

The laboratory is equipped with advanced equipment such as an atomic absorption spectrophotometer, a high performance liquid chromatograph, a UV-visible spectrophotometer, a microwave reaction system, an automatic nitrogen and fibre analyser, a Millipore water purification system, a digital pH and conductivity meter, a controlled flame photometer and a digital analytical balance, which are required for analysis of various physio-chemical parameters of ecological samples. Teaching classes followed by practicals were conducted for various courses of WII. The work included analysis of pellets of herbivores and scats pf carnivores, collection and preservation of biological materials, collection of data for determination of the age and sex of wild animals, osteology of mammals and analysis of ecological (plant, water and soil) samples for various parameters. During the reporting period, a total of 2009 samples were analysed at the Teaching and Research Laboratory. Of these, 528 plant samples were analysed for ADF, NDF, lignin, cellulose, nitrogen/crude protein, phosphate, Ca, Mg, Zn, Cu, Fe, Ni, Mn, Ni, Cr and Pb.

A total of 725 scat samples (tiger, leopard, jackal, wild dog and sloth bear) and 156 pellet/dung samples (chital, sambar and nilgai) were also analysed for studies on food habits. The laboratory staff provided technical inputs in various field training programmes, including demonstration of camera traps, mist netting for birds, radio telemetry and the use of GPS. The laboratory staff also collected meteorological data at the WII campus. During the reporting period, the maximum



temperature recorded was 42° C (26 May 2013), and the minimum temperature was 4° C (18 January 2014). The total rainfall recorded during the year at the WII campus was 1918.2 mm.

Right to Information

The following is the status of Right to Information (RTI) requests and appeals received during the year 2013–2014:

Category	Opening balance as on 1 April 2013	Number of applications received as transfer from other public authorities u/s 6(3)	Received during the year	Number of cases trans- ferred to othere PAs u/s 6(3)	Decisions where requests /appeals were rejected	Decisions where requests /appeal were accepted	Closing balance as on 31 March 2014
Requests	0	4	14	0	0	18	0
First Appeal	0		1			1	0

The separate link is provided on the website of the Institute, which is under active updation.

Campus Development

Internal and external finishing work in Type I, Type II and Type III quarters in Block III and renovation/upgrading work of 8 rooms in New Hostel, including electrical and air conditioning work, has been completed.







- Officer Trainees from Forest Research Institute (Deemed)
 University, Dehradun, 1 April 2013.
- Dr. Sanjay Mishra, Head of Department, Climate Change, Department of Science & Technology, New Delhi, 3 April 2013.
- Trainees from Civil and Soyam Forest Division, Almora, 9 April 2013.
- Class from, SFS College, Burnihat, Assam, 23 April 2013.
- Trainees from Corbett Wildlife Training Centre, Kalagarh (Garhwal), Uttarakhand, 26 April 2013.
- Nepalese forestry delegation, Department of Forests, Nepal, 1 May 2013.
- Two batches of students of B.Sc. Forestry of Dolphin Institute of Bio-Medical & Natural Sciences, Dehradun, 3 and 7May 2013.
- Students from Animal Nutrition Research Department, College of Veterinary Science and Animal Husbandry, Anand Agriculture University, Anand, 16 May 2013.
- Students of B.Sc. Honours from Jaipur National University, Jaipur, 29 May 2013.
- Students from Delhi Public School, Vidyutnagar, Gautam Budha Nagar, *31 May 2013*.
- Director General of Forests, Government of India, Shri K.
 Jude Sekar, 12 June 2013.
- RFO trainees from Forest Academy Dulapally, Hyderabad, Andhra Pradesh, 27 June 2013.
- Cadets from Rashtriya Indian Military College, Dehradun, 31 July 2013.
- Students from Madras Veterinary College, Tamil Nadu Veterinary and Animal Science University, Chennai, 5-8 August 2013.
- SFS Officers from Central Academy for State Forest Service, Dehradun, *August 22*, *2013*.
- Students of B.Sc. Forestry from Kathmandu Forestry College, Kathmandu, Nepal, 19 September 2013.
- Students from Tamil Nadu Agriculture University, Coimbatore, 20 September 2013.
- Students from Tamil Nadu Agriculture University, Mettupalayam, 24 September 2013.
- Students of B.Sc. Forestry from Tribhuvan University, Hetuda, Nepal, 27 September 2013.
- RFO trainees from FTI & Rangers College, Sundernagar, Himachal Pradesh, *8 October 2013.*

- Students of M.Sc. (Geoinformatics) from TERI University, New Delhi, 8 October 2013.
- B.V.Sc. & A.H. students from Dr. G.C. Negi College of Veterinary and Animal Science CSKHPKY, Palampur, 14 October 2013.
- IFS officers of PSU course from Indira Gandhi National Forest Academy, Dehradun, *23 October 2013*.
- Forest Guards from Forestry Training Centre, Jainti, Almora, 24 October 2013.
- RFO Trainees from Principal Forest Rangers College,
 Balaghat, Madhya Pradesh, 7 November 2013.
- Forest Guard trainees from Corbett Wildlife Training Centre, Kalagarh (Garhwal), Uttarakhand, 13 November 2013
- Students of Dolphin (P.G.) Institute of Biomedical & Natural Science, Dehradun, 19 November 2013.
- RFO Trainees from Central Academy for State Forest Service, Burnihat, Assam, 21 November 2013.
- Students from College of Veterinary Science & Animal Husbandry, Jabalpur, 29 November 2013.
- Students of M.Sc. Zoology from Madras Christian College, Chennai, 2 December 2013.
- Students from Grace Academy, Senior Secondary School, Dehradun, 3 December 2013.
- Assistant Commandants from SSB Academy Srinagar (Garhwal), 13 December 2013.
- Group from Indian Institute of Public Administration, New Delhi, 17 December 2013.
- IFS probationers from Indira Gandhi National Forest Academy, Dehradun, 20 December 2013.
- B.Sc. (Life Science) students from S.M. College Chandausi, Moradabad, 23 December 2013.
- B.Sc. (Honours) Forestry students from Dr. Y.S. Parmar University of Horticulture and Forestry, Nauni-Solan, Himachal Pradesh, 27 December 2013.
- KFC trainees from the Principal Soil Conservation Training School, Miransahib, Jammu, 8 January 2014.
- M.Sc. Biotechnology from Dibrugarh University, Dibrugarh, 8 January 2014.
- B.Sc. Forestry students from College of Forestry, Ponnampet, Kodagu, Karnataka, 17 January 2014.
- IFS probationers from Forest Survey of India, Dehradun, 23 January 2014.



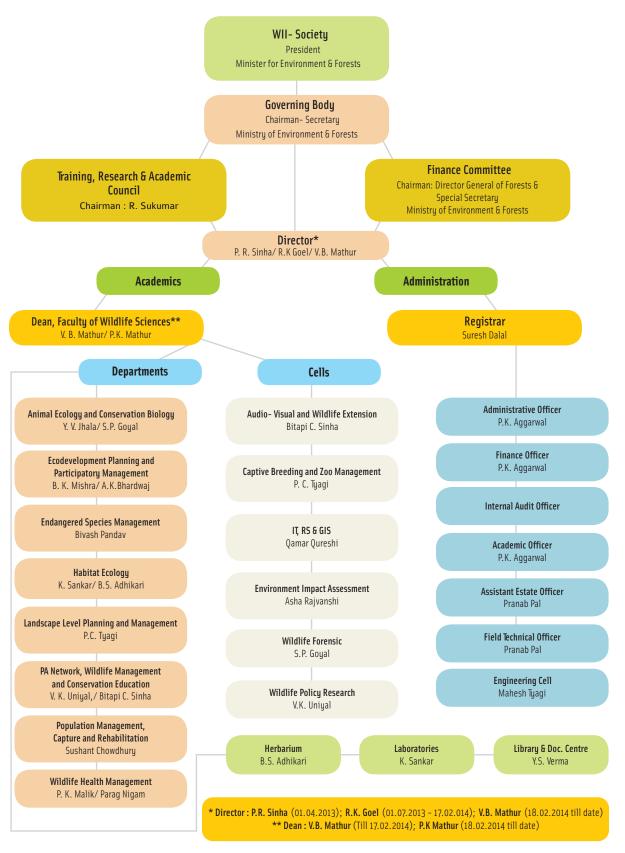
- B.Sc. Forestry students from Faculty of Forestry, Birsa Agriculture University, Ranchi, 29 January 2014.
- P.G. Diploma and M. Tech. trainees from Indian Institute of Remote Sensing, Dehradun, 30 January 2014.
- Cadets from Rashtriya Indian Military College, Dehradun, 31 January 2014.
- Officer trainees from Central Academy for State Forest Service, Dehradun, 11 February 2014.
- Trainees from J&K Forest Training Institute Chatternar Camp, Jammu, 17 February 2014.
- B.Sc. Forestry students from Sam Higginbottom Institute of Agriculture, Technology & Sciences, Allahabad, 24 February 2014.
- Students from ASPEE College of Horticulture and Forestry of Navsari Agriculture University, Navsari, 7 March 2014.
- B.Sc. (Honours) Forestry students from University of Agriculture and Horticultural Sciences, Shimoga, College of Forestry, Ponnampet, Karnataka, 10 March 2014.
- Forest Guard trainees from Forest Training Institute & Rangers College, Sundernagar, Himachal Pradesh, 10 March 2014.
- Students from Sanskriti School, Chanakyapuri, New Delhi, 24 March 2014.
- M.Sc. (Zoology) students from Kashmir University, Jammu & Kashmir, 24 March 2014.







ORGANIZATIONAL STRUCTURE OF WII





WII -	Society		11.	Hon'ble Minister Forests & Environment,	Member
1	Minister of State for Environment & Fo (Independent Charge), Government o Ministry of Environment & Forests, Paryavaran Bhavan, 'B' Block,			Government of Tamil Nadu, 'Secretariat' Chennai (Tamil Nadu)	
	CGO Complex, Lodi Road, New Delhi -	110 003	12.	Hon'ble Minister Forests & Environment,	Member
2.	Three Members of Parliament	To be nominated by Govt. of India		Government of Haryana, 'Secretariat',	
3.	Hon'ble Minister Forests & Environment,	Member		Panchkula, Ambala (Haryana)	
	Government of Assam, 'Secretariat' Dispur, Guwahati (Assam)		13.	Hon'ble Minister Forests & Environment, Government of Himachal Pradesh,	Member
4.	Hon'ble Minister Forests & Environment,	Member		'Secretariat' Shimla (Himachal Pradesh)	
	Government of Meghalaya, 'Secretariat' Shillong (Meghalaya)		14.	Hon'ble Minister Forests & Environment, Government of Madhya Pradesh,	Member
5.	Hon'ble Minister Forests & Environment,	Member		'Secretariat' Bhopal (Madhya Pradesh)	
	Government of Sikkim, 'Secretariat' Gangtok (Sikkim)		15.	Hon'ble Minister Forests & Environment, Government of Uttarakhand,	Member
6.	Hon'ble Minister Forests & Environment,	Member		'Secretariat' Dehradun-248 001 (Uttarakhand)	
	Government of West Bengal, 'Secretariat' Kolkata (West Bengal)		16.	Shri Brijendra Singh 28, Sunder Nagar, New Delhi – 110 003	Member
7.	Hon'ble Minister Forests & Environment,	Member	17.	Dr. Ullas Karanth Director, Centre for Wildlife Studies,	Member
	Government of Andaman & Nicobar, 'Secretariat' Andaman (A&N)			403, Seebo Apartments, 26-2, Aga Abbas Ali Bangalore-560042 (Karnataka)	
8.	Hon'ble Minister Forests & Environment, Government o	Member f Goa,	18.	Dr. Biswajit Mohanty Shantikunj, Link Road, Cuttack (Orissa)	Member
	'Secretariat' Hadoo (Goa)		19.	Dr. Erach Bharucha Director,	Member
9.	Hon'ble Minister Forests & Environment, Government of Maharashtra, 'Secretariat' Nagpur (Maharashtra)	Member		Bharti Vidyapeeth Institute of Environment, Education and Research, (Bhartiya Vidyapeeth Deemed University) Katraj-Dhankawadi,	
10.	Hon'ble Minister Forests & Environment, Government of Kerala, 'Secretariat' Thiruvananthapuram (Kerala)	Member	20.	Pune-411 043 (Maharashtra) Dr. Reena Mathur, D-279, Todarmal Marg, Banipark, Jaipur (Rajasthan)	Member



21.	Dr. H.S. Pabla Former PCCF (Madhya Pradesh), E-5, Surendra Garden, Hoshangabad Road, Bhopal-462 026	Member	32.	The Secretary, Government of India, Ministry of Finance, North Block, New Delhi - 110 001	Member
22.	Shri A.S. Negi, Former Chief Wildlife Warden (Uttarakhand) 300, Model Colony, Araghar, (Near R.N. Singh Eye Clinic), Dehradun -248 (Member	33.	The Secretary Government of India, Department of Science and Technology, Technology Bhavan, New Mehrauli Road, New Delhi - 110 01	Member
23.	Dr. Ms. Priya Davidar Head, Salim Ali school of Ecology and Environmental Sciences, R Venkataraman Nagar, Kalapet, Pondicherry	Member	34.	The Secretary, Government of India, Department of Education, Ministry of Human Resource Development, Shastri Bhavan, New Delhi - 110 001	Member
24.	Dr. Mewa Singh Ramanna Fellow and Professor of Psychology, University of Mysore, Mysore-570 006	Member	35.	The Deputy President Planning Commission, Yojana Bhavan, Sansad Marg, New Delhi	Member
25.	Dr. A.J.T. Johnsingh 101, Magnolia, Esteem Gardenia, Sahkara Nagar, Bangaluru- 560 092	Member	36.	The Chairman, University Grant Commission (UGC),	Member
26.	Director Bombay Natural History Society (BNHS),	Member		Bahadur Shah Zafar Marg, New Delhi	
	Hornbill House, Dr. Salim Ali Chowk, Shaheed Bhagat Singh Road, Mumbai-400 023		37.	Chief Secretary, Govt. of Uttarakhand "Sachivalaya" Dehradun	Member
27.	Secretary General & CEO World Wide Fund for Nature-India (WWF), "Secretariat", 172-Lodhi Estate, New Delhi-110 003	Member	38.	Director General of Forests & Special Secretary to the Government to Special Secretary, Ministry of Environment & F Paryavaran Bhavan, 'B' Block,	Member orests,
28.	Wildlife Preservation Society of India, 7, Astley House,	Member		CGO Complex, Lodi Road, New Delhi - 110 003	
29.	Dehradun-248 001 Director, Centre for Environment Education, Nehru Foundation for Development, Thaltej Tekra,	Member	39.	Addl. Director General of Forests (WL) & Director Wildlife Preservation, Ministry of Environment & Forests, Paryavaran Bhavan, 'B' Block, New Delhi - 110 003	Member
	Ahmadabad (Gujarat)		40.	Additional Secretary & Finance Advisor, Ministry of Environment & Forests,	Member
30.	A Representative of Friends of Doon, Jakhan, Dilaram bazaar, Dehradun	Member		Paryavaran Bhavan, 'B' Block, CGO Complex, Lodi Road, New Delhi – 110 003	
31.	Secretary Secretary to the Govt. of India, Ministry of Environment & Forests, Paryavaran Bhavan, 'B' Block,	Member	41.	Director General, Indian Council of Forestry Research & Educatio P.O. New Forest, Dehra Dun - 248 006	Member n,
	CGO Complex, Lodi Road, New Delhi – 110 003		42.	Director Zoological Survey of India, M-Block, New Alipore, Calcutta - 700 053	Member



43. Director Member

Botanical Survey of India,

CGO Complex, 3 MSO Building,

Block F, 5th& 6th Floor, DF Block,

Sector-I, Salt Lake City, Kolkata - 700 064 (W.B.)

44. Dr. P.K. Mathur Member
Dean, FWS
Wildlife Institute of India, Dehra Dun - 248 001

45. Shri V.K. Uniyal Scientist - F Wildlife Institute of India Dehra Dun - 248 001

46. Dr. V.B. Mathur, Director Member-Secretary
Wildlife Institute of India
Dehra Dun - 248 001

Permanent Invitee

47. Inspector General of Forests (WL)

Ministry of Environment & Forests, Paryavaran Bhavan, 'B' Block, CGO Complex, Lodi Road, New Delhi – 110 003

48. Member Secretary

National Tiger Conservation Authority Annexe-5, Bikaner House, Shahjahan Road, New Delhi- 110 011

49. Director (Project Elephant)

Ministry of Environment & Forests, Paryavaran Bhavan, 'B' Block, CGO Complex, Lodi Road, New Delhi – 110 003

Governing Body

1. Secretary Chairman

Ministry of Environment & Forests, Govt. of India, Paryavaran Bhavan, B-Block, CGO Complex, Lodi Road, New Delhi - 110 003

 Director General of Forests & Vice-Chairman Special Secretary,

Ministry of Environment & Forests, Govt. of India, Paryavaran Bhavan, B-Block, CGO Complex, Lodi Road, New Delhi - 110 003

3 Dr. A.J.T. Johnsingh Member 101, Magnolia, Esteem Gardenia Sahkara Nagar, Bangaluru- 560 092 4. Shri Brijendra Singh Member 28, Sunder Nagar, New Delhi - 110 003

5. Dr. Ullas Karanth Member
Director, Centre for Wildlife Studies,
403, Seebo Apartments,
26-2, Aga Abbas Ali Road,
Bangalore-560042 (Karnataka)

6. Shri Biswajit Mohanty Member
Shantikunj, Link Road,
Cuttack (Orissa)

7. Dr. Erach Bharucha Member
Director, Bharti Vidyapeeth Institute of Environment,
Education and Research,
(Bhartiya Vidyapeeth Deemed University)
Katraj-Dhankawadi,
Pune-411 043 (Maharashtra)

8. Dr. Reena Mathur, Member
D-279, Todarmal Marg,
Banipark, Jaipur (Rajasthan)

9. Additional Secretary & Financial Advisor, Member
Ministry of Environment & Forests,
Paryavaran Bhavan, 'B' Block,
CGO Complex, Lodi Road,
New Delhi - 110 003

10. Chief Secretary Member
Government of Uttarakhand,
"Sachivalaya"
Dehradun - 248 001

11. Chief Wildlife Warden Member
Govt. of Uttarakhand,
Chandrabani, Dehra Dun

12 Chief Wildlife Warden, Member
Government of Mizoram,
Environment & Forest Department,
Tuikhuahtlang, Aizawl (Mizoram)

Chief Wildlife Warden,
Bikash Bhavan,
3rd Floor, North Block, Salt Lake City,
Kolkata - 700 091 (West Bengal)

14 Chief Wildlife Warden, Member
Government of Jammu & Kashmir
Raj Bagh Forest Complex,
Silk Factory Road
Srinagar-190001 (J&K)



	15	Chief	Wildlife	Warden,
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Wildlife Institute of India,
Dehradun

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Tracking Movement Pattern of Bar-headed Goose in Jammu and Kashmir

for Management and



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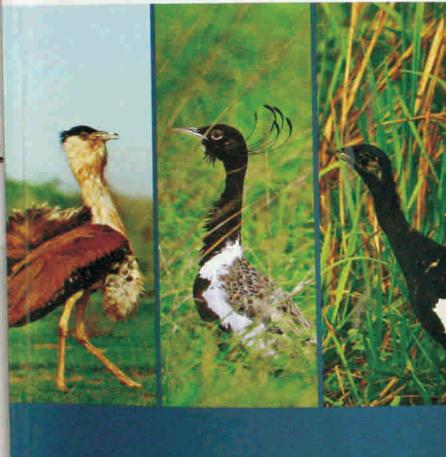






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- **Papers Presented**
- Popular Articles





n Assessment of Entomofauna d Conservation of Biodiversity in Gangotri Landscape

Supervisor: Dr. V. P. Uniyal Researchers: Manish Bhardwa) & Abesh Kr Sanyal Ecology of Asiatic black bear (*Ursus thibetanus*) in Dachigam National Park, Kashmir, India



Computing biomass consumption from prey occurrences in scats of tropical felids



Principal Investigator: Y.V. Jhala, Ph.D Researcher: Stotra Chakrabarti Collaborators: Shri V.J. Rana and Dr. R.F. Kadivar



भारतीय वन्यजीव संस्थान Wildlife Institute of India



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PAPERS PRESENTED

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Badola, R., 2013. Role of women in promoting livelihood security and community participation in forest conservation in the fringes of Kedarnath Wildlife Sanctuary, Uttarakhand. Paper presented at the Workshop on Science and Technology and Sustainable Bio-economy for Women's Welfare, Dehradun. 17-18 May 2013.

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Begum, N., Srivastav, A., Lakshminarasimha, R., Tyagi, P.C. and Nigam, P., 2013. Management of captive populations: Relevance of pedigree records. Paper presented at the National Symposium on Newer Approaches in Welfare and Health Management of Captive and Free Ranging Wild Animals, organized by the College of Veterinary Science, OUAT, Bhubaneswar and AIZWV. 19–21 April 2013. Awarded the best paper (oral) award at the conference.

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Kumar, R.S., 2014. **Tracking the incredible journeys of a small raptor, Amur falcon** *Falco amurensis*. Paper presented at the Regional Workshop on Birds, Birdwatching and Communitybased Tourism in Himalayas, organized by the Uttarakhand State Forest Department, Dehradun, 5-9 February 2014.

Kumar, R.S., Fehérvári, P., Kamdi, H., Palatitz, P., Patton, Z., Rao, L., Solt, S. and Williams, N.P., 2014. **Satellite tracking the autumnal migration of the Amur falcon** *Falco amurensis* from **Nagaland, India to Africa.** Paper presented at the Eighth Asian Raptor Research and Conservation Network Symposium, Pune, 6-9 February 2014.

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Mathur, P.K., 2013. **KSLCDI and Van Panchyats.** Paper presented at the workshop on 'Participatory Natural Resource Management for *Van Panchayat* Forests' organized by WII and partner organizations at *Zilla Panchayat*, Pithoragarh, Uttarakhand, 13 November, 2013.

Mathur, P.K., 2013. Landscape approach to conservation in India – Lessons learned, challenges and the ways forward. Paper presented at the international workshop on 'Land use optimization for coordinating regional development with conservation of endangered species' jointly organized by Pondicherry University, USFWS, and Indo-US Science and Technology Forum, 16–18 December, 2013. Abstract Published in the Workshop Proceedings.

Mathur, P.K., 2014. **Wildlife research in Khangchendzonga landscape**. Paper presented at the inception meeting on Khangchendzonga Landscape Conservation and Development Initiative at Gangtok, Sikkim organized by GBPIHED, 28–29 January, 2014.

Mathur, V.B., 2013. **Compliance monitoring: The Indian experience.** Presented at the 33rd IAIA Annual Conference of the International Association for Impact Assessment (IAIA) in Calgary, Canada, 13–16 May 2013.

Mathur, V.B., 2013. Management effectiveness evaluation (MEE) of tiger reserves in India (2013-14): An overview. Presented at the Independent Management Effectiveness Evaluation (MEE) of Tiger Reserves (2014-2015) meeting on 27 May 2013.

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Mathur, V.B., 2013. Implementation in Keoladeo and Nanda Devi World Heritage Sites: Key activities, outcomes and learnings. Presentation at the regional conference "Conservation and Management of UNESCO World Natural Heritage Sites: Sharing Experiences and Best Practices from South Asia" at New Delhi during 17–18 September 2013.

Mathur, V.B., 2013. **Conservation in a Changing World: Issues, Challenges & Way Forward.** Presented at the national conference on "Biodiversity Conservation: Embracing Our Future,
Preserving Our Past" at New Delhi on 27 September 2013.

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Mathur, V.B. and Rajvanshi, A., 2013. Hydropower projects: Tumultuous journey or a peaceful march from approval? Paper presented at the 33rd annual conference of the International Association for Impact Assessment on Impact Assessment: The Next Generation (at the technical session "IAIA Section: Biodiversity & Ecology".), Calgary, Canada, 14 May 2013.

Nigam, P., 2013. Approaches for wild animal immobilization. Lead paper presented at the national symposium "Newer Approaches in Welfare and Health Management of Captive and Free Ranging Wild Animals", organized by the College of Veterinary Science, OUAT, Bhubaneswar and AIZWV, 19–21 April 2013.

Rajvanshi, A., 2013. **SEA: Is South Asia ready for it? The Indian experience.** Presented at Session II-C at the South Asian Environmental Assessment Conference (SAEAC) 2013, Islamabad, Pakistan on 4 December 2013.

Ramesh, K., 2013. State of landscape ecology and management in India: Species-centric and land centric approaches. Plenary presentation at the international workshop "Land Use Optimisation for Coordinating Regional Development with Conservation of Endangered Species", Pondicherry Central University, Pondicherry, 11-13 December 2013.

Ramesh, K., 2013. Landscape approach to biodiversity conservation: An analysis of biosphere reserve and emerging models. Plenary presentation at the National Conference on Nilgiri Biosphere Reserve & Silver Jubilee Celebration (NBRSJC-2013), Government Arts College, Udhagamanadalam (Ooty), Tamil Nadu, 28-30 August 2013.

Ramesh, K., 2013. **Reintroduction and rehabilitation of species: Guidelines and IUCN protocols.** Training workshop,



"Conservation Breeding of Endangered Species by Zoological Park: Development of Species Recovery and Conservation Breeding Plan", Central Zoo Authority, Wildlife Institute of India and LaCONES, Hyderabad, 8–12 July 2013.

Ramesh, K., 2014. Landscape approach: An overview of history and recent development. Presented at the national workshop "Landscape Approach to Conservation & Natural Resource Management: Identifying Capacity Gaps in India" (sponsored by UNDP, New Delhi), Indian Institute of Forest Management, Bhopal, 15-16 January 2014.

Ramesh, K., 2014. **Wildlife research and conservation: Application of modern tools.** Presented at the UGC sponsored national seminar "Biosciences and Conservation", AVC College, Bharathidasan University, Tamil Nadu, 10-11 March 2014.

Ramesh, K. and Sankar, K., 2013. **Reintroduction and rehabilitation of species: Guidelines and IUCN protocols.**Presented at the workshop "Conservation Breeding of Endangered Species by Zoological Parks: Development of Species Recovery and Conservation Breeding Plan", Central Zoo Authority, Wildlife Institute of India and Nandankanan Zoological Park, Bhubaneswar, 16-19 September 2013.

Rajvanshi, A., 2013. **How "inclusive" is biodiversity in EIA in South Asia?** Presented at Session III A at the South Asian Environmental Assessment Conference (SAEAC) 2013, Islamabad, Pakistan, 4 December 2013.

Rajvanshi, A., 2013. Framework for integrating biodiversity conservation & sustainability in mining. Paper presented at Session V of the international workshop "Best Practices for Mainstreaming Biodiversity Conservation in Mining Sector", organized by IUCN-India, New Delhi, 20 March 2014.

Rajvanshi, A., 2014. **EIA framework for integrating biodiversity conservation in mining.** Paper presented at the international workshop "Best Practices for Mainstreaming Biodiversity Conservation in Mining Sector", organized by IUCN-India, New Delhi, 20 March 2014.

Shrivastav, A.B., Singh, K.P., Nigam, P., Francis, L. and Shrivastav, G., 2013. **Occurrence of** *Hymenolepis* **in western tragopan.** Oral presentation at the national symposium "Newer Approaches in Welfare and Health Management of Captive and Free Ranging Wild Animals", organized by the College of Veterinary Science, OUAT, Bhubaneswar and AIZWV, 19–21 April 2013

Srivastav, A., Begum, N., Tyagi, P.C. and Nigam, P., 2013. **Genetic consequences of founder size in captive populations.** Poster presented at the national symposium "Newer Approaches in Welfare and Health Management of Captive and Free Ranging Wild Animals", organized by the College of Veterinary Science, OUAT, Bhubaneswar and AIZWV, 19-21 April 2013.

Tuboi, C., Vaiphei, N. and Hussain, S.A., 2013. Foraging ecology of Eld's *Rucervus eldii* and hog deer *Axis porcinus* on the floating meadows of Barak-Chindwin river basin. Paper presented at the 11th International Mammalogical Congress, Belfast, Ireland, 11-16 August 2013.

POPULAR ARTICLES

Badola, R., 2013. **Jungle jahan shuru hota hai.** Daily newspaper *Amar Ujala*, 17 November 2013.

Chaudhary, A., Bhardwaj, G.S. and Sivakumar, K., 2013. **The flight of the florican**. *Saevus* 2(6): 12-19.

Majumder, A., Sankar, K. and Naik, K., 2013. **Collarwali: An insight into the secret family life of a remarkable Pench tigress.** *Sanctuary Asia* XXXIII(4): 76-81.

Sathyakumar, S. 2013. The red fox: *Vulpus* versatile. $S\alpha evus$ 2(2): 32-39.

Selvan, K.M., Lyngdoh, S., Gopi, G.V. and Habib, B., 2013. A photographic record of the white-winged wood-duck *Ascornis scutulata* from Pakke Tiger Reserve, Arunachal Pradesh, India. *Indian Birds* 8(4): 96-97.





TEACHING INPUTS PROVIDED TO OTHER INSTITUTIONS

FROM WII

Dr. Ruchi Badola (4 April 2013). **Joint and participatory forest management.** India Council for Forestry Research & Education, Dehradun.

Dr. Asha Rajvanshi (9 April 2013). **Environment impact assessment with procedure and discussion on case studies.** Lal Bahadur Shastri National Academy of Administration, Mussoorie.

Dr. G. Talukdar (12 April 2013). **Ecosystem analysis.** Indian Institute of Remote Sensing, Dehradun.

Dr. Ruchi Badola (15 April 2013). **Organizing research and project planning.** Forest Research Institute (Deemed) University, Dehradun.

Dr. G.V. Gopi (15 April 2013). **Confronting impacts on terrestrial flora & fauna: Climate resilience and adaptation in Godavari River Estuarine Ecosystem.** Consultation-cum-stakeholders workshop at Aranya Bhavan, Hyderabad.

Dr. V.B. Mathur (12 May 2013). **Evaluation of management effectiveness of PAs.** Indira Gandhi National Forest Academy, Dehradun.

Dr. K. Ramesh (May-June 2013). **Technical/advisory inputs.** International field course on forestry and conservation science conducted in India by University of British Columbia, Canada.

Dr. Asha Rajvanshi (5 June 2013). Caring for the environment and living responsibly: Renewing our promises on World Environment Day. Pollution Control Research Institute, Haridwar.

Dr. Ruchi Badola (5 June 2013). **Environment and we.** Indian Institute of Remote Sensing, Dehradun.

Shri R. Suresh Kumar (25 June 2013). **Use of remote sensing and GIS in understanding olive ridley turtle migration.** Indian Institute of Remote Sensing, Dehradun.

Dr. Ruchi Badola (16 July 2013). **Ecosystem, biodiversity and climate: Regulating services from forests.** Indira Gandhi National Forest Academy, Dehradun.

Dr. V.B. Mathur (10-11 August 2013). **Fine tuning future strategies for tiger conservation.** Two-day workshop on Panna tiger reintroduction/review and future strategies at Panna Tiger Reserve.

Dr. V.B. Mathur (13 August 2013). **Biogeographic classification of India and planning of PAs (Part I)**. Indira Gandhi National Forest Academy, Dehradun.

Dr. V.B. Mathur (14 August 2013). Biogeographic classification

of India and planning of PAs (Part II). Indira Gandhi National Forest Academy, Dehradun.

Dr. P.K. Mathur (19 August, 2013). Management Planning. Central Academy of State Forest Officers, Dehra Dun.

Dr. B.K. Mishra (21 August 2013). **Ecodevelopment for biodiversity conservation: Challenges and path ahead.** Indira Gandhi National Forest Academy, Dehradun.

Dr. B.K. Mishra (21 August 2013). **Community participation for implementation of ecodevelopment projects.** Indira Gandhi National Forest Academy, Dehradun.

Dr. Asha Rajvanshi (22 August 2013). **Biodiversity.** International Centre for Information Systems and Audit, Noida.

Dr. B.K. Mishra (23 August 2013). **Project planning.** Indira Gandhi National Forest Academy, Dehradun.

Dr. B.K. Mishra (23 August 2013). **Project monitoring and evaluation**. Indira Gandhi National Forest Academy, Dehradun.

Dr. Parag Nigam (4-9 September 2013). Various aspects of wildlife health management and wild animal capture and restraint. Indira Gandhi National Forest Academy, Dehradun.

Dr. Asha Rajvanshi (5 September 2013). **SEA: Experience, potential and preparedness in India.** Consultation meeting with representatives of other GIZ and KfW programmes, New Delhi.

Dr. K. Ramesh (10 September 2013). **Technical inputs/advisory.** Foundation Course on Ecology 2013, for the technical staff of Wildlife Trust of India at Chilla, Uttarakhand.

Dr. Ruchi Badola (11 September 2013). **Ecosystem services**, species decline and human well being. HESCO.

Dr. V.P. Uniyal (14 September 2013). **Himalayan pollinators.** Navdanya farm at Ramgarh, Dehradun.

Dr. V.B. Mathur (4 October 2013). **Biodiversity management for sustainable livelihoods.** Indira Gandhi National Forest Academy, Dehradun.

Dr. K. Ramesh (4 October 2013). **Population ecology and conservation biology.** Indira Gandhi National Forest Academy, Dehradun.

Dr. V.P. Uniyal (5 October 2013). **Wildlife of Western Himalaya.**Dolphin (PG) Institute of Bio-Medical and Natural Sciences,
Dehradun.

Dr. Parag Nigam (9-10 October 2013). **Various aspects of wildlife health management and wild animal capture and restraint.** Indira Gandhi National Forest Academy, Dehradun.

Dr. B.K. Mishra (22 October 2013). **Building partnerships for biodiversity conservation.** Indira Gandhi National Forest Academy, Dehradun.

Dr. Parag Nigam (23–24 October 2013). **Emerging wildlife health issues and managing animals in distress.** Professional skill



upgrading course, Indira Gandhi National Forest Academy Dehradun.

Dr. K. Ramesh (1 November 2013). **Wildlife management module.** Indira Gandhi National Forest Academy, Dehradun.

Dr. V.B. Mathur (12 November 2013). **Rajaji National Park: Profile and conservation challenges.** UNU-IAS Master's Course in Environmental Governance at United Nations University-Institute of Advanced Studies (UNU-IAS), Japan.

Dr. Ruchi Badola (12 November 2013). **Gender issues in forestry.** Indira Gandhi National Forest Academy, Dehradun.

Dr. Ruchi Badola (29 November 2013). **Payment of ecosystem services.** Indira Gandhi National Forest Academy, Dehradun.

Dr. K. Ramesh (1-5 December 2013). **World Wide Fund: Tigers Alive initiative.** WWF TAI-Tiger Landscape Biologists meeting at Sunderbans.

Dr. V.B. Mathur (3 December 2013). **Biodiversity conservation: Issues and challenges.** Indira Gandhi National Forest Academy, Dehradun.

Dr. Ruchi Badola (4 December 2013). **Challenges of climate change.** Indira Gandhi National Forest Academy, Dehradun.

Dr. Asha Rajvanshi (9 December 2013). **Environmental impact assessment.** Indian Institute of Remote Sensing, Dehradun.

Dr. Asha Rajvanshi (12 December 2013). **Environmental impact assessment with procedure and discussion on case studies.** Lal Bahadur Shastri National Academy of Administration, Mussoorie.

Dr. Ruchi Badola (17 December 2013). **Johari window.** Indira Gandhi National Forest Academy, Dehradun.

Dr. V.B. Mathur (4 February 2014). **Protected areas planning and management in India.** Indian Institute of Remote Sensing, Dehradun.

Dr. K. Ramesh (February 2014). **Global Tiger Forum.** Indo-Russian tiger watch programme organized for Russian officials at Panna Tiger Reserve.

Dr. Ruchi Badola (18 March 2014). **Ecosystem goods and services assessment and ecological economics.** Indian Institute of Remote Sensing, Dehradun.

RESOURCE SPEAKERS TO WII

- Dr. Bettina Harr, Max Planck Institute, Ploen, Germany delivered a lecture on 'The genomics of species formation in the house mouse' on 18 April, 2013.
- Dr. Himender Bharti, Punjabi University, Patiala delivered a lecture on 'Indian ants: current knowledge and future plans' on 18 April, 2013.
- Dr. Trevor D Price, Professor, University of Chicago and

- collaborator on the WII-University of Chicago research project on Himalayan birds delivered a talk on "Why there are more songbirds in the mid-elevations in Eastern Himalayas: A phylogenetic analysis" on 2 May, 2013.
- Dr. André Dhondt, Morgens Professor of Ornithology, Laboratory of Ornithology, Cornell University delivered a lecture on "Interspecific competition in birds and its effect of avian population biology" on 21 May, 2013.
- Dr. Kathy Mackinnon, Deputy Chair (IUCN-WCPA) and Consultant (Biodiversity Conservation and Rural Livelihood Improvement Project) delivered a guest lecture on 'Challenges to Protected Area Management: A Global Overview' on 25 September, 2013.
- Ms. Wendy Foden, former Programme Officer Global Species and Climate Change Programme, IUCN, Cambridge delivered a talk on "Identifying the World's Most Climate Change Vulnerable Species: A Systematic Trait-Based Assessment of Birds, Amphibians and Corals" on 15 October 2013.

AWARDS

UNESCO's Young Scientist Award to Dr. Bilal Habib

Dr. Bilal Habib, Scientist, Wildlife Institute of India,
Dehradun was named as one of the six winners of UNESCO's
Young Scientist Award on 30 May 2013. The announcement
was made by the International Co-coordinating Council of
the Man and the Biosphere (MAB) Programme, which met
at the United Nations Educational, Scientific and Cultural
Organisation (UNESCO) headquarters in Paris from 27 to 30
May 2013. Dr. Habib won the award for designing and
developing an "Ecological Monitoring Programme
Involving Local Communities in the Nanda Devi Biosphere
Reserve, Uttarakhand".

The MAB Young Scientists Award targets young researchers carrying out inter-disciplinary research in line with UNESCO's MAB Programme. The 2013 laureates of the Young Scientist Awards in the MAB programme were selected from 117 countries all over the world. The award consists of a grant of \$5000 for undertaking research in an area chosen by the awardee. During the last five years, India has won this award twice, consecutively in 2012 and 2013.







Separate Audit Report of the Comptroller and Auditor General of India on the Accounts of Wildlife Institute of India, Dehradun for the year ending 31st March 2014

- 1 We have audited the attached Balance Sheet of Wildlife Institute of India, as on 31 March 2014, the Income & Expenditure Account and the Receipts & Payments Account for the year ended on that date under Section 19(2) of the Comptroller & Auditor General's (Duties, Powers & Conditions of Service) Act, 1971 read with Section 38E(5) of the Wildlife (Protection) Act, 1972. These financial statements are the responsibility of the WII's management. Our responsibility is to express an opinion on these financial statements based on our audit.
- This Separate Audit Report contains the comments of the Comptroller and Auditor General of India (CAG) on the accounting treatment only with regard to classification, conformity with the best accounting practices, accounting standards and disclosure norms, etc. Audit observations on financial transactions with regard to compliance with the Law, Rules & Regulations (Propriety and Regularity) and efficiency-cum-performance aspects, etc., if any, are reported through Inspection Reports/CAG's Audit Reports separately.
- We have conducted our audit in accordance with auditing standards generally accepted in India. These standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material mis-statements. An audit includes examining, on a test basis, evidences supporting the amounts and disclosure in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of financial statements. We believe that our audit provides a reasonable basis for our opinion.
- 4 Based on our audit, we report that:
 - (i) We have obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purpose of our audit.
 - (ii) The Balance Sheet, Income & Expenditure Account and Receipts & Payments Account dealt with by this report have been drawn up in the format approved by the Ministry of Finance.
 - (iii) In our opinion, proper books of accounts and other

relevant records have been maintained by the WII as required under Section 38E of the Wildlife (Protection) Act, 1972 in so far as it appears from our examination of such books.

(iv) We further report that:

A. Balance Sheet:

Assets

1.1. Fixed assets (Schedule-8) Rs. 1401.44 lakh.

- (a) Fixed Assets include 'Avenue Plantations' and 'Trees' valued at Rs. 34.38 lakh and Rs. 24.33 lakh respectively, Since both tree 'Avenue Plantations' and 'Trees' were located in public place i.e. outside WII campus and not under the administrative control/ ownership of WII, the inclusion of above fixed assets amounting to Rs. 58.71 lakh resulted in overstatement of Fixed Assets and Capital Fund in the Balance Sheet.
- (b) An amount of Rs. 19.86 lakh included in fixed assets under the head 'campus development' was revenue expenditure on repair and maintenance for the year 2012-13 resulting, in the overstatement of fixed assets by Rs. 18.43 lakh after adjustment of depreciation of Rs. 1.43 lakh and understatement of expenditure by equal amount. This also resulted in overstatement of capital fund to the same extent.

While carrying out correction during 2013–14, an amount of Rs. 21.29 lakh was reduced from 'Campus Development' head instead of Rs. 18.43 lakh, resulting in understatement of fixed assets to the tune of Rs. 2.86 lakh. Similarly, Rs. 21.29 lakh has been included in Schedule–21 as 'expenditures wrongly less shown in 2012–13' instead of Rs. 19.86 lakh resulting in overstatement of Schedule–21 by Rs. 1.43 lakh. Depreciation of Rs. 1.43 lakh charged on Rs. 19.86 lakh during 2012–13 and Rs. 1.84 lakh charged on Rs. 18.43 lakh during 2013–14 was required to be written back. This resulted in overstatement of expenditure by Rs. 3.27 lakh and understatement of Corpus/Capital Fund by the same amount.

- (c) 'Journals and Periodicals' amounting to Rs. 0.34 lakh purchased during June 2013 for a Research Project were included in Schedule-8 (Fixed Assets). This resulted in overstatement of Fixed Assets amounting to Rs. 0.34 lakh.
- (d) Purchases amounting to Rs. 0.43 lakh were taken



under fixed assets, though the items purchased were not fixed assets, resulting overstatement of assets and understatement of expenditure.

1.2. Current Assets, Loans, Advances and other Assets (Schedule-11) Rs. 975.21 lakh.

1.2.1. Accrued interest on FDRs (Pension Fund) was shown as Rs. 105.99 lakh instead of Rs. 104.79 lakh resulting in overstatement of current assets by Rs. 1.20 lakh and overstatement of Capital Fund to the same extent.

1.3. Schedule - 6 Deferred Credit Liabilities

An amount of Rs. 18.31 lakh has been shown as interest earned on saving bank account during the year 2013–14 as income is refundable to MoEF and should have been shown in Schedule–6 Deferred Credit Liabilities–Others 'Interest on Grand-in-aid refundable to MoEF'. This resulted in overstatement of Income in Income & Expenditure Account and understatement of liabilities by the same amount.

1.4. Schedule-10 Investment-Others, Rs. 2641.50 lakh.

Investment in FDR (GPF) was shown as Rs. 418.47 lakh instead of Rs. 408.43 lakh resulting in overstatement of investment in FDR (GPF) by Rs. 10.04 lakh and overstatement of assets in Balance Sheet by the same

B. Income and Expenditure Account: -NIL-

C. Grants-in-Aid:

During the year 2013-14, WII received grants in aid of Rs. 2131.49 lakh (Rs. 2028.00 lakh under Plan and Rs. 103.49 lakh under Non-Plan heads) and out if it an amount of Rs. 129.00 lakh under Plan was received during the month of March 2014 and whole of the grants were expended.

D. Management Letter

Deficiencies which have not been included in the Audit Report have been brought to the notice of the Director, Wildlife Institute of India, Dehradun through a management letter issued separately for remedial/corrective action.

- (v) Subject to our observation in the preceding paragraphs, we report that the Balance Sheet, Income & Expenditure Account and Receipts & Payments Account dealt with by this report are in agreement with the books of accounts.
- (vi) In our opinion and to the best of our information and according to the explanations given to us, the said financial statements read together with the Accounting Policies and Notes on Account, and subject to the significant matters stated above and other matters mentioned in Annexure to this report give a true and fair view in conformity with accounting principles generally accepted in India.
 - In so far as it relates to the Balance Sheet, of the state of affairs of the Wildlife Institute of India, Dehradun as at 31 March 2014.
 - In so far as it relates to Income & Expenditure
 Account of the surplus for the year ended on that date.

For and on behalf of the C&AG of India

Principal Director of Audit (SD)

Place: New Delhi Date: 28/10/2014

Annexure

1. Adequacy of Internal Audit System

Internal Audit of WII has been conducted for the first time since inception during 2010–11 by PAO, MoEF. The Internal Audit was conducted up to 2011–12. The Institute has a post of internal audit officer, which is lying vacant. The system was not adequate.

2. System of Physical Verification of Assets

Physical verification of Assets has been conducted for the period 2011–12 and was in progress for the years 2012–13 and 2013–14. The system was not adequate.

3. Adequacy of Internal Control System

The Internal Control System is adequate for areas seen in audit.

4. Regularity in payment of statutory dues

WII was generally regular in payment of undisputed statutory dues.

5. Maintenance of Asset Register

The Asset Register is not complete and to that extent that actual number of particular type of assets available at the end of 31.03.2014, no. of assets purchased during a particular year and the depreciated value of assets according to the year of purchase of assets could not be ascertained.

Sr. Audit Officer



RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2013-14

RECEIPTS					PAYMENT				
Particulars	Plan	Non Plan	Total	Previous Year	Particulars	Plan	Non Plan	Total	Previous Year
(A) GRANT-IN-AID					Expenses				
Opening Balance			0		Salaries & Allowances	10,30,29,806	1,03,49,000	11,33,78,806	10,51,18,567
Cash in Bank	1,56,88,280	0	1,56,88,280	1,28,91,554	Medical	73,01,346	0	73,01,346	67,65,916
Cash In Hand	1,65,899	0	1,65,899	41,542	TLC	20,66,179	0	20,66,179	9,41,645
					0TA	4,16,251	0	4,16,251	4,19,715
Grant in Aid (Revenue)	20,03,00,000	1,03,49,000	21,06,49,000	19,42,20,000	Honorarium	53,900	0	53,900	74,400
Grant in Aid (Capital)	25,00,000	0	25,00,000	1,00,000	Wages	0	0	0	1,31,76,311
Grant (other Projects)	0	0	0	0	Fellowship & Wages (R/Proj)	31, 56,926	0	31,56,926	42,36,203
MSc Course Fee	12,89,700	0	12,89,700	8,03,839	Stipend of MSc Students	4,38,925	0	4,38,925	0
Bus Charges	2,68,250	0	2,68,250	71,199	Leave encashment & Gratuity	38,47,769	0	38,47,769	0
Rent	6,21,730	0	6,21,730	6,52,170	Bonus	4,10,618	0	4,10,618	4,36,523
WII Products	41,916	0	41,916	24,815	Leave Salary Pension Con	93,95,073	0	93,95,073	42,48,143
Misc Receipts	6,74,830	0	6,74,830	4,65,124	Base Camp Expenses (Res Project)	1,45,261	0	1,45,261	1,18,693
Elect & Water	3,67,173	0	3,67,173	3,54,483	Annual Res Seminar-ARS	8,56,965	0	8,56,965	6,73,987
Telephone	3,836	0	3,836	6,838	Estate Security	1,22,33,271	0	1,22,33,271	96,19,826
Interest on Saving A/c	18,30,936	0	18,30,936	16,34,791	POL, Hiring of Veh (R/Proj)	16,91,513	0	16,91,513	12,73,700
Loan & Advance	1,56,223	0	1,56,223	1,51,494	Contingencies (Res Proj)	13,84,005	0	13,84,005	25,04,056
Hostel Caution Money	52,743	0	52,743	49,000	Lab Expenses-Forc Lab	12,72,484	0	12,72,484	12,66,281
EMD Security Deposit	4,10,500	0	4,10,500	0	Travel Expenses (Res. Proj)	4,71,376	0	4,71,376	9,90,828
Income Tax Refund	5,000	0	5,000	7,93,010	Research Fellowship	0	0	0	65,754
Travel Advance-GIA	11,609	0	11,609	14,485	Harberium	58,223	0	58,223	0
Forest Advance-GIA	0	0	0	2,38,155	M.Sc Expenditure	28,59,256	0	28,59,256	17,05,158
Travel Advance (R/Proj)	0	0	0	1,18,640	Elect and Water Charges	75,50,067	0	75,50,067	76,85,500
FA (Research Project)	1,19,566	0	1,19,566	3,41,251	Guest House Maint	99,872	0	99,872	1,09,373
LTC Adv	4,19,150	0	4,19,150	0	Hospitality/Entertainment	2,20,647	0	2,20,647	1,05,348
Medical Adv	000'06	0	90,000	0	POL of WII Vehicle	17,05,609	0	17,05,609	21,44,546



ACADEMIC & TRAINING

RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2013-14

RESEARCH

RECEIPTS					PAYMENT				
Particulars	Plan	Non Plan	Total	Previous Year	Particulars	Plan	Non Plan	Total	Previous Year
M.Sc-FA & TA Advance	5,32,005	0	5,32,005	0	Postage & Telegram	2,84,850	0	2,84,850	1,87,485
Internal Loan	2,000	0	2,000	0	Repair & Maint of Vehicle	9,54,437	0	9,54,437	10,16,738
Camp Equipment	12,000	0	12,000	0	Sport	1,53,900		1,53,900	3,94,154
Journals & Periodicals	82,152	0	82,152	1,89,899	Stationery & Consumables	4,43,457	0	4,43,457	4,32,497
TDS	0		0	1	Telephone & Trunk Calls	9,39,795	0	9,39,795	6,97,490
CGEGIS	0		0	100	Training & Skill upgradation	26,000	0	26,000	23,000
Expenses for Capitales	3,86,349		3,86,349	0	Legal Expenses	2,33,335	0	2,33,335	94,775
Sundry Debtors	3, 563		3,563	0	Operational expenses	9,60,641	0	9,60,641	10,31,560
Opening Stock-Library	90,377		90,377	0	Printing & Binding	3,05,086	0	3,05,086	9,35,168
Vehicle	47,774		47,774	0	Publication	0	0	0	1,90,159
					Maint of WII Campus	7,90,029	0	7,90,029	7,56,422
					Repair of equipment/furniture	46,880	0	46,880	1,50,702
					Computer AMC	21,26,409	0	21,26,409	14,38,777
					Lab Expenses – Health Lab.	0	0	0	13,000
					Lab. Expenses-Research Lab	2,84,461	0	2,84,461	9,44,074
					Lab. Expenses-Gen.	1,54,544	0	1,54,544	2,01,357
					Maint. of Civil Work	8,56,833	0	8,56,833	17,01,792
					Transferred to Trg A/c for expenditure	65,00,000	0	65,00,000	90,00,000
					Travel Expenses	27,49,468	0	27,49,468	31,29,660
					Sharing of Cost of KV	0	0	0	20,00,000
					World Environment day	0	0	0	43,939
					EMD Release	0	0	0	1,30,000
					Corpus Funds	41,85,576	0	41,85,576	0
					Medical Adv	79,893	0	79,893	63,885
					Forest advance R/Proj	7,482	0	7,482	0
					Tour Advance -R/Proj	3,000	0	3,000	0



RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2013-14

RECEIPTS				Previsou Year	PAYMENT				Previous Year
Particulars	Plan	Non Plan	Total		Particulars	Plan	Non Plan	Total	
					LTC Advance	1,08,064	0	1,08,064	4,09,958
					M.Sc. TA Advance	45,000	0	45,000	75,761
					M.Sc. FA Advance	3,00,000	0	3,00,000	4,26,244
					Computer & Accessories	1,32,128	0	1,32,128	29,81,612
					By Furniture & Fixture	4,01,357	0	4,01,357	86,844
					By Journals & Periodicals	41,45,644	0	41,45,644	25, 87, 040
					By Lab Eqpt (For Lab)	79,139	0	79,139	1,76,728
					By Office Eqpt (Res. Proj)	3,94,055	0	3,94,055	3,03,017
					By Camp Eqpt (Res. Proj.)	11,64,665	0	11,64,665	11,56,566
					By Vehicle	47,774	0	47,774	47,774
					Office equipment	0	0	0	1,70,804
					Lab Equipment (Res. Lab.)	0	0	0	3,44,549
					TDS 6,134	0	6,134	0	
					TDS Refund GPF, Pension & Corpus	7,93,010	0	7,93,010	0
					CGEGIS1,320	0	1,320	0	
					Purch.of Vehicle-Advance	21,54,319	0	21,54,319	0
					Sundry Creditores	16,82,377	0	16,82,377	0
					Previous Year bal. Transf.	32,61,000	0	32,61,000	0
					GPF	000'09	0	000'09	0
					Advance for CPWD	1,32,05,918	0	1,32,05,918	2,84,206
					Uttarkhand Bamboo Hut	4,66,940	0	4,66,940	0
					Raj Kishore Mohanti	1,19,301	0	1,19,301	0
					Sale for Complementry-Library	90,377	0	90,377	0
					Closing Balance			0	
					In Bank	1,46,58,201	0	1,46,58,201	1,56,88,280
					In Hand	1,08,420	0	1,08,420	1,65,899
A' Total	22,61,76,561	1,03,49,000	23,65,25,561	21,31,62,390	A' Total	22,61,76,561	1,03,49,000	23,65,25,561	21,31,62,390



RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2013-14

GPF								
Particulars		Non Plan	Total	Previous Year	Particular		Non Plan T	Total Previous Year
To Opening Bal (Bank)	361319.00		361319.00	5763253.00	By Final Payment	37,13,484.00	37,13,484.00	.00 46,98,916.00
To GP Fund Contribution	17185743.00		17185743.00	16187586.00	16187586.00 By Advance/withdrawl	96,47,496.00	96,47,496.00	.00 1,00,00,000.00
Encashment of FDR's	1003702.00		1003702.00		Auto Sweep FDR	49,65,000.00	49,65,000.00	00.00
TDS received from ITO	101607.00		101607.00		Loan to Deputationists	4,00,000.00	4,00,000.00	00.00
Intrest on FDR-TDS	385851.00		385851.00		Interest on FDR's	3,85,851.00	3,85,851.00	00.
To Int. on saving a/c	2998.00		2998.00	409081.00	By Advance/withdrawl	0.00)	0.00 72,99,685.00
To Int. on FDRs	94524.00		94524.00	107711.00	TDS on Interest on FDRs	0.00)	0.00 1,07,711.00
					By Closing Balance (Cash	10, 573.00	10,573.00	00.00
					By Closing Balance (Bank)	13,340.00	13,340.00	.00 3,61,319.00
F' Total	1,91,35,744.00	0.00	1,91,35,744.00 2,24,67,631.00	2,24,67,631.00	F' Total	1,91,35,744.00	0.00 1,91,35,744.00	.00 2,24,67,631.00

PENSIONS								
Particulars		Non Plan	Total	Previous Year	Particular		Non Plan Total	Previous Year
To Opening Balance								
Cash in Bank	419057.00		419057.00	1124097.00	1124097.00 By Investment in FDR	0.00	0.00	4,05,00,000.00
To encashment of FDR	2588479.00		2588479.00	43445052.00	43445052.00 By Commuted Value of Pension	11,70,899.00	11,70,899.00	33,26,273.00
To Interest (Pension A/c)	36830.00		36830.00	55858.00	55858.00 By Pension/ Family Pension	55,44,124.00	55,44,124.00	39,04,213.00
To WII Contribution	3907315.00		3907315.00	3439992.00				
To Interest on FDRs	1047742.00		1047742.00	0.00	0.00 By Interest on FDRs	10,47,742.00	10,47,742.00	8,65,509.00
To Pension Contribution	0.00		0.00	84544.00				
To Interest on FDR (TDS)	592634.00		592634.00	865509.00	865509.00 Cash in Bank	8,29,292.00	8,29,292.00	4,19,057.00



RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2013-14

CORPUS FUND									
Particulars		Non Plan	Total	Previous Year	Particular		Non Plan	Total	Previous Year
To Opening Balance	16432739.00	0.00	16432739.00	792405.00					
Misc Receipts	7067183.00	0.00	70,67,183.00	15610579.42	15610579.42 By Investment	2,00,00,000.00	0.00	0.00 2,00,00,000.00	0.00
Interests on Saving A/c	344418.00	0.00	3,44,418.00	29755.00	29755.00 Interest paid to GIA	3001689.00	0.00	30,01,689.00	82532.00
To Encashment of FDR	0.00	0.00	0.00	0.00	0.00 TDS on Interest on FDRs	3,64,789.00		3,64,789.00	
To Interet on FDRs	364789.00	0.00	3,64,789.00	82532.00				0.00	
TDS received from ITO	98860.00	0.00	98,860.00	0.00	0.00 On FDRs on pre extension of period	0.00	0	0.00	0.00
					Closing Balance	9,41,511.00		9,41,511.00	1,64,32,739.42
F' Total	2,43,07,989.00	0.00	2,43,07,989.00 1,65,15,271.42	1,65,15,271.42	F' Total	2,43,07,989.00	0.00	0.00 2,43,07,989.00 1,65,15,271.42	1,65,15,271.42



RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2013-14

TRAINING ACCOUNT

RECEIPTS				Previous Year	PAYMENT			Previous Year
Particulars	Plan	Non Plan	Total		Particulars	Plan	Non Plan Total	al
To Opening in Bank	24,59,583.21		24,59,583.54	1,98,838.33	By Equipment	932249.00	9,32,249.00	244632.00
Grant Received	65,00,000.00		65,00,000.00	1,09,72,829.00	By Office Equipment	243383.00	2,43,383.00	152608.00
Interest Received	2,39,451.00		2,39,451.00	61,837.00	By Furniture & Fixture		0.	0.00 0.00
Other Receipts	1,37,36,907.00		1,37,36,907.00	38,61,822.90	By Hostel Items	368270.00	3,68,270.00	43123.00
					By Cont/Misc	730355.46	7,30,355.46	436109.62
					By Camping Gear	145877.00	1,45,877.00	149974.00
					By Travelling Expenses	4392347.76	43,92,347.76	6 5682546.00
					TA/DA & Honorarium (Guest Faculty)	277972.00	2,77,972.00	237947.00
					By Training Allowance	395111.00	3,95,111.00	288265.00
					POL & Maint of Vehicle	655568.00	6,55,568.00	207191.00
					Boarding & Lodging	4486155.00	44,86,155.00	00 4861122.00
					Books	284308.00	2,84,308.00	188420.00
					Advance for CPWD-Civil	850500.00	8,50,500.00	00.00
					Salary & Wages	283837.00	2,83,837.00	43806.00
					Advance to Firm		0.	0.00 0.00
					Maint of Vehicle	631154.00	6,31,154.00	00.00
					Sports Item	19058.00	19,058.00	00.00
					otheradvances	0.00	0.	0.00 100000.00
					Repair of Building	126424.00	1,26,424.00	00.00
					By Closing in Bank	8113371.99	81,13,371.99	2459583.61
C' Total	2,29,35,941.21	0.00	2,29,35,941.21	1,50,95,327.23	C' Total	2,29,35,941.21	0.00 2,29,35,941.21	1,50,95,327.23
CONSULTANCY PROJECTS								
To Opening Balance:	0.00	0	0					
at Bank	1,28,94,805.68		1,28,94,805.68	3,31,64,435.85	By Camp Equipment	88,296.00	88,296.00	00.00
Grant Received	2,66,21,469.00		2,66,21,469.00	2,21,56,242.00	By Office Equipment	23,899.00	23,899.00	3,30,782.00



ANNU	
2013	
2010	

Interest Saving A/c	6,49,129.00	6,49,129.00	8,13,872.00	By Contingenciges/Misc	34,39,606.29	34,39,606.29	53,44,478.83
Other Receipt	13,91,770.00	13,91,770.00	22,045.00	By Fellowship & Wages	22,64,112.00	22,64,112.00	12,37,004.00
Loan from A/c No. 50650	11,73,539.00	11,73,539.00	00.00	By Travel Expenses	42,06,344.71	42,06,344.71	73,59,154.38
				By POL & Maint. of veh.	3,25,992.00	3,25,992.00	2,11,728.00
				Stationery items	1,99,739.00	1,99,739.00	2,68,873.00
				By Forests Advance (FA)	57,000.00	27,000.00	2,57,500.00
				Other Advance	2,54,179.00	2,54,179.00	3,36,179.00
				By Boarding & Lodging	56,57,952.00	56,57,952.00	1,08,47,881.54
				By TA / DA & Honorarium	21,000.00	21,000.00	3,60,534.00
				Books	1,22,587.00	1,22,587.00	2,71,337.00
				Misc Expenses A/c No 8	5,18,996.00	5,18,996.00	30,215.00
				Transf. To Corpus Fund	1,91,334.00	1,91,334.00	1,52,54,909.42
				Security deposit	5,000.00	5,000.00	0.00
				Consultancy fees	4,76,023.00	4,76,023.00	0.00
				loan-BCRLIP	30,00,000.00	30,000,000.00	0.00
				Advance payment to CPWD	17,96,400.00	17,96,400.00	0.00
				Pre-recd bill for 2012-13	1,08,253.00	1,08,253.00	0.00
				Service tax	3,55,556.00	3,55,556.00	0.00
				Report writing	3,82,716.00	3,82,716.00	0.00
				Base camp expenses	38,048.00	38,048.00	0.00
				Field Equipment	59,545.00	59,545.00	0.00
				Building renovation	49,600.00	49,600.00	0.00
				Fund transferred	60,98,588.00	60,98,588.00	0.00
				Publication & Printing		00.00	1,86,213.00
				Misc Receipt-Payment		0.00	2,60,000.00
				Loan A/c 51411 &		0.00	2,05,000.00
				By Bank Balance	1,29,89,946.68	1,29,89,946.68	1,28,94,805.68
E' Total	4,27,30,712.68 0.00	4,27,30,712.68	5,61,56,594.85	E' Total	4,27,30,712.68	0.00 4,27,30,712.68	5,61,56,594.85



ACCOUNTS





FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) BALANCE SHEET AS ON 31 MARCH 2014

			(Amt. Rs.)
CORPUS /CAPITAL FUND AND LIABILITIES	Schedule	Current Year	Previous Year
CORPUS /CAPITAL FUND	1	272754892.25	259933265.36
RESERVE AND SURPLUS	2	0.00	0.00
EARMARKED FUND	3	12989947.00	12894806.00
SECURED LOAN AND BORROWINGS	4	0.00	0.00
UNSECURED LOAN AND BORROWINGS	5	330428.00	325428.00
DEFERRED CREDIT LIABILITIES	6	0.00	0.00
CURRENT LIABILITIES AND PROVISION	7	215739835.00	195794099.00
TOTAL (A)		501815102.25	468947598.36
ASSETS			
FIXED ASSETS	8	140144199.51	153361642.36
INVESTMENTS- FROM EARMARKED / ENDOWMENT FUNDS	9	0.00	0.00
INVESTMENTS- OTHERS	10	264149519.00	229207506.00
CURENT ASSETS, LOANS, ADVANCES ETC.	11	97521383.74	86378450.00
MISCELLANEOUS EXPENDITURE (to the extent not written off or adjusted)			
TOTAL (B)		501815102.25	468947598.36





(Dr. V.B. Mathur) Director



FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) SHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2014

			(Amt. Rs.)
SCHEDULE 1: CORPUS/ CAPITAL FUND		Current Year	Previous Year
Balance as at the begninig of the year		192408889.36	198807068.60
Add: Contribution towards Corpus/ Capital fund		5315591.33	10238172.45
Less : Pre receipted Bill of consultancy Project			
Add/(Deduct) : Balance of net income (expenditure) transferred from	513125.07	-16636351.69	
TOTAL	A	198237605.76	192408889.36
Corpus Fund			
Opening Balance		67524376.00	49998144.00
Received during the year		7067183.00	15610579.00
Add Accrued Interest		2666342.00	1803366.00
Add Interest Earned		261074.49	112287.00
Less: Payment made to Grant in Aid		-3001689.00	0.00
Total	В	74517286.49	67524376.00
Total A+B		272754892.25	259933265.36



FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) SHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2014

				Current Year	Previous Year
) 0	Opei	ining Balance of the Funds		12894806.00	33164436.00
) A	Addi	tion to the Funds			
i		Grants Received		26621469.00	22156242.00
ii	i	Interest Received		649129.00	813872.00
ii	ii	Other Receipts		1391770.00	22045.00
i	٧	Pre receipted Bill receive	ed 1065286.00	0.00	
٧	/	Refund of Loan from A/c	No. 50650	0.00	
		Total		29727654.00	22992159.00
T	ГОТА	ıL (A+B)		42622460.00	56156595.00
U	Utilis	sation/Expendition toward	s objectives of funds		
) i		Capital Expenditures			
		Fixed Assets	Camp Equipment	147841.00	0.00
			Office Equipment	23899.00	330782.00
			Books	122587.00	271337.00
ii	i	Revenue Expenditure	Camp Expenses	38048.00	0.00
			Contigencies/Misc.	4179341.29	6190314.00
			Fellowship & Wages	2264112.00	1237004.00
			Travel Expenses	4206344.71	7359154.00
			POL & Maint. Of Vehicle	325992.00	211728.00
			Advance for Expenses (FA)	57000.00	257500.00
			Boarding & Lodging	5657952.00	10847882.00
			Transferred to Corpus Fund	0.00	15254909.00
			Misc receipt - Payment	0.00	760000.00
			Loan D/WII A/c No. 51411	300000.00	205000.00
			Other advances - Firm	254179.00	336179.00
			Building Renovation	49600.00	0.00
			Fund Transferred	6098588.00	0.00
			Consultancy Fees	476023.00	0.00
			Service Tax	355556.00	0.00
			Report Writing	382716.00	0.00
			Advance payment for CPWD-Civil	1796400.00	0.00
			Corpus fund	191334.00	0.00
			Securityb deposit	5000.00	0.00
ii	ii		Pre receipted Bill yet to be received	0.00	0.00

12989947.00

12894806.00

NET BALANCE AS AT THE YEAR-END (A+B-C)



FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) SHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2014

SCHEDULE 5: UNSECURED LOANS AND BORROWINGS

		Current Year	Previous Year
(1)	Central Govt.	0.00	0.00
(2)	State Govt. (Specify)	0.00	0.00
(3)	Financial Instittions	0.00	0.00
(4)	Banks		
	(i) Term Loans	0.00	0.00
	(ii) Others (specify)	0.00	0.00
(5)	Other Institutions and Agencies	0.00	0.00
(6)	Debentures and Bonds	0.00	0.00
(7)	Fixed Deposits	0.00	0.00
(8)	Others (Specify)		
	Security Deposit	314318.00	314318.00
	Internal Loan	16110.00	11110.00
	TOTAL	330428.00	325428.00



FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) SHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2014

						Current Year	Previous Year
(A)	CUR	RENT LIABILITIES					
	(1)	Acceptances					
	(2)	Sundry Creditors					
		(1) For Goods					
		(2) For Others		Prev. Year	Current Year		
		Other Payments outsta	inding (Grant in Aid) (12-13)	277000		277000.00	1113794.00
			anding (Res Project) (12-13)			0.00	1133933.00
			inding (Grant in Aid) (13-14)		2687135	2687135.00	0.00
	(2)		anding (Res Project) (13-14)			1552560.00	0.00
	(3)	Advances Received					
		Hostel Caution Money				303403.00	250660.00
(4)		rest accrued but not due on					
_	(1)	Secured Loans/Borrowings					
	(2)	Unsecured Loans/Borrowing	S				
(5)	Stat	uary Liabilities					
	(1)	Overdue					
	(2)	Others (Specify)					
			9115216+815000+14292+20932			139137406.00	129614899.00
GP Fund (20000000+41847170+4965000+10573+13340+572892+3473340) (6) Others (Specify) EMD Received TOTAL (A)			70882315.00	62348749.00			
(6)							
						761808.00	351308.00
	TOTA	L (A)				215601627.00	194813343.00
(B)	PROVIS	SIONS					
(1)	or Tax TDS	ation			6134.00	2156.00	
(2)	Gratuit	·y					
(3)	Supera	nnuation/ Pension					
(4)	Accum	ulated Leave Encashment					
(5)	Frade \	Warranties/ Claims					
(6)	Others	(Specify)					
	TDS	refund paid to GPF, Pension & (Corpus			0.00	793010.00
	CGE		•			1320.00	535.00
	GPF	nant ta Incoma Tay				60000.00	0.00
		nent to Income Tax nent made to Sh Rajkishore Mo	nhanto (Pac Drojacdt)			5000.00 0.00	0.00 119301.00
		owship (Arrear)	manto (Nes. 110]ccut)			65754.00	65754.00
TOTA	L (B)	<u> </u>				138208.00	980756.00
	L(A+	-1				215739835.00	195794099.00



FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 2013-14

		_	Gross Block				DEPRECIATION	ATION		NET BLOCK	CK
Pariculars	Cost as at the begining of the year	Addition dur Upto 30-Sep	Addition during the year to 30-Sep After 30-Sep	Deduction during the year	Cost as at the end of the year	As at the beginning of the year	For the year	Deduction during the year	At the end of the year	As at the current year -end	As at the Previous year-end
LAND											
BLOCK: 0%											
Avenue Plantations	3438280.00	0.00	0.00	00.00	3438280.00	0.00	0.00	0.00	00.00	3438280.00	3438280.00
Land	6607214.58	0.00	0.00	00.00	6607214.58	0.00	0.00	0.00	00.00	6607214.58	6607214.58
Trees	2432709.00	0.00	0.00	00.00	2432709.00	0.00	0.00	0.00	0.00	2432709.00	2432709.00
TOTAL	12478203.58	0.00	0.00	0.00	12478203.58	0.00	0.00	0.00	0.00	12478203.58	12478203.58
BUILDINGS											
BLOCK: 10%											
Arch. & Sprvson Fee	2812677.04	0.00	0.00	00.00	2812677.04	312519.67	281267.70	0.00	281267.70	2531409.34	2812677.04
Auditorium	4211899.34	00.00	0.00	00.00	4211899.34	467988.82	421189.93	0.00	421189.93	3790709.41	4211899.34
Boundary Fencing	256676.82	0.00	0.00	00.00	256676.82	28519.65	25667.68	0.00	25667.68	231009.14	256676.82
Boundary Wall	453833.08	0.00	0.00	00.00	453833.08	50425.90	45383.31	0.00	45383.31	408449.77	453833.08
Building Complex	60735072.13	0.00	0.00	00.00	60735072.13	6748341.35	6073507.21	0.00	6073507.21	54661564.92	60735072.13
Campus Develop Corr. During 22424223.74 the year for C/develop	ring 22424223.74	0.00	0.00	2129253.95	20294969.79	2430087.25	2242422.37	0.00	2242422.37	18052547.42	22424223.74
Tennis Court	185096.73	0.00	0.00	00.00	185096.73	0.00	18509.67	0.00	18509.67	166587.06	185096.73
Sports Complex	105557.36	0.00	0.00	00.00	105557.36	11728.60	10555.74	0.00	10555.74	95001.62	105557.36
BLOCK: 20%											
Road & Culvert	196444.85	0.00	0.00	00.00	196444.85	49111.21	39288.97	0.00	39288.97	157155.88	196444.85
Staff Quarters	2855192.04	0.00	0.00	00.00	2855192.04	665451.95	571038.41	0.00	571038.41	2284153.63	2855192.04
TOTAL	94236673.13	0.00	0.00	2129253.95	92107419.18	10764174.40	9728831.00	0.00	9728831.00	82378588.18	94236673.13



			Gross Block				DEPRECIATION	ATION		NET BLOCK	CK
Pariculars	Cost as at the begining of the year	Addition during the Upto 30-Sep After	ing the year After 30-Sep	Deduction during the year	Cost as at the end of the year	As at the beginning of the year	For the year	Deduction during the year	At the end of the year	As at the current year -end	As at the Previous year-end
PLANT MACHINERY & EQPT											
BLOCK: 20%											
Vehicle	1379680.42		0.00	47774.45	1331905.97	332976.49	275936.08	0.00	275936.08	1055969.88	1379680.42
Development of Foerensic Laboratory	4687223.49	23268.00	55871.00	0.00	4766362.49	1162617.50	947685.40	0.00	947685.40	3818677.09	4687223.49
Training Equipment	499350.41	0.00	0.00	0.00	499350.41	124837.60	99870.08	0.00	99870.08	399480.33	499350.41
BLOCK: 25%											
AC Plant	369212.70	0.00	0.00	00.00	369212.70	123070.90	92303.18	0.00	92303.18	276909.53	369212.70
Camp Equipment (project)	100374.49	00.00	0.00	0.00	100374.49	33458.16	25093.62	0.00	25093.62	75280.87	100374.49
DG Set	730644.62	0.00	0.00	00.00	730644.62	243548.21	182661.15	0.00	182661.15	547983.46	730644.62
EPABX	70864.31	0.00	0.00	0.00	70864.31	23621.44	17716.08	0.00	17716.08	53148.23	70864.31
Lab Equipment	2533500.32	0.00	0.00	00.00	2533500.32	806253.11	633375.08	0.00	633375.08	1900125.24	2533500.32
Office Equipment	990992.68	0.00	0.00	0.00	990992.68	330330.89	247748.17	0.00	247748.17	743244.51	990992.68
Training Equipment (Training A/c)	2279043.36	0.00	932249.00	0.00	3211292.36		686291.97	0.00	686291.97	2525000.40	2279043.36
Office Equipment (Project)	4901.53	0.00	0.00	0.00	4901.53	1633.84	1225.38	0.00	1225.38	3676.15	4901.53
Office Equipment (Research Project)	1565257.02	261088.00	132967.00	0.00	1959312.02	504651.51	473207.13	0.00	473207.13	1486104.89	1565257.02
Camp Equipment (Research Project)	4299374.62	796111.00	368554.00	0.00	5464039.62	1327842.21	1319940.54	0.00	1319940.54	4144099.07	4299374.62
TOTAL	19510419.95	1080467.00	1489641.00	47774.45	22032753.50	5014841.86	5003053.86	0.00	5003053.86	17029699.63	19510419.95
FURNITURE, FIXTURES											
BLOCK: 15%											
Furinitures & Fixtures	4748005.69	52561.00	348796.00	0.00	5149362.69	834353.06	746244.70	0.00	746244.70	4403117.99	4748005.69
Furniture & Fixture (Training)	340808.77	0.00	0.00	0.00	340808.77		51121.32	0.00	51121.32	289687.45	340808.77
TOTAL	5088814.46	52561.00	348796.00	0.00	5490171.46	834353.06	797366.02	0.00	797366.02	4692805.44	5088814.46



			Gross Block				DEPRECIATION	IION		NET BLOCK	OCK
Pariculars	Cost as at the begining of the year	Addition du Upto 30-Sep	Addition during the year to 30-Sep After 30-Sep	Deduction during the year	Cost as at the end of the year	As at the beginning of the year	For the year	Deduction during the year	At the end of the year	As at the current year -end	As at the Previous year-end
OFFICE EQUIPMENT											
BLOCK: 20%											
Office Equipment (Training A/c)	246833.97	0.00	243383.00	0.00	490216.97		73705.09	00.00	73705.09	416511.88	246833.97
T0TAL	246833.97	0.00	243383.00	0.00	490216.97	0.00	73705.09	0.00	73705.09	416511.88	246833.97
COMPUTER/PERIPHERALS											
BLOCK: 20%											
Comp. and Periphrals	3705240.20	4285.00	84830.00	0.00	3794355.20	711188.18	750388.04	0.00	750388.04	3043967.16	3705240.20
BLOCK: 60%											
Comp. & Accessories	158557.70	19618.00	23395.00	0.00	201570.70	237836.56	113923.92	0.00	113923.92	87646.78	158557.70
E Governance	61190.09	0.00	00.00	0.00	61190.09	91785.14	36714.05	0.00	36714.05	24476.04	61190.09
TOTAL	3924987.99	23903.00	108225.00	0.00	4057115.99	1040809.87	901026.01	0.00	901026.01	3156089.98	3924987.99
BOOKS											
BLOCK:10%											
Journals & Periodicals	16315185.03	683979.46	3461664.27	0.00	20460828.76	1721222.06	1872999.67	0.00	1872999.67	18587829.09	16315185.03
Library Books	1560524.16	0.00	00.00	0.00	1560524.16	173391.57	156052.42	0.00	156052.42	1404471.74	1560524.16
TOTAL	17875709.19	683979.46	3461664.27	0.00	22021352.92	1894613.63	2029052.09	0.00	2029052.09	19992300.83	17875709.19
GRAND TOTAL	153361642.27	1840910.46	5651709.27	2177028.40	158677233.60	19548792.80	18533034.08	0.00	18533034.08	140144199.51	153361642.27



FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) SHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2014

		(Amt. Rs.)
DULE :10 INVESTMENT - OTHERS	Current Year	Previous Year
(1) In the Govt. Securities		
(2) Other approved Securities		
(3) Shares		
(4) Debentures and Bonds		
Investment in RBI Bond (GPF)	2000000.00	20000000.00
Investment in RBI Bond (Pension)	16500000.00	16500000.00
Investment in RBI Bond (Corpus Fund)	29800000.00	29800000.00
(5) Subsidaries and Joint Ventures		
(6) Others (Specify)		
Investment in FDR (GPF)	41847170.00	39431927.00
Autosweep FDR-GPF	4965000.00	
Investment in FDR (Pension Fund)	109115216.00	104171812.00
FDR Corpus Fund	41107133.00	19303767.00
Autosweep FDR-Pension Fund	815000.00	
TOTAL	264149519.00	229207506.00



FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) SHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2014

		(Amt. Rs.)
SCHEDULE :11 CURRENT ASSETS, LOANS, ADVANCES ETC.	Current Year	Previous Year
(A) CURRENT ASSETS		
(1) Inventories		
Closing Stock of Steel & Cement	0.00	0.00
Advance paid for Journals (Grant in Aid)	0.00	0.00
Closing Balance of WII Publication	689857.00	780234.00
(2) Sundry Debtors		
(1) Debts Outstanding for a period exceeding six months	95650.00	99213.00
(2) Others (Specify)		
(3) Cash balances in hand (including cheques/drafts and imprest)		
Grant-in-Aid A/c	108420.00	165899.00
Training A/c	0.00	0.00
Pension Fund A/c	0.00	0.00
GPF A/c	10573.00	0.00
Corpus Fund	0.00	0.00
(4) Bank Balances		
(1) With Scheduled Banks		
Grant-in-Aid A/c	14658201.32	15688280.00
Training A/c	8113372.00	2459584.00
Pension Fund A/c	14292.00	419057.00
GPF A/c	13340.00	361319.00
Corpus fund No 4032	941511.42	16432739.00
Endowment Funds	12989947.00	12894806.00
TOTAL (A)	37635163.74	49301131.00



FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) SHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2014

Land Acquisition Charges (Deposited in Hon'ble High Court) 18000000.00 18000000.00 (2) Other entities engaged in activities /objectives similar to (3) Others (Specify) GIA Training 0 Adv for civil work to CPWD 13490124 850500 14340624.00 284206.0 Loan for World Environment Day (MoEF) 280984.00 280984.0	LOAN	S, ADVANCES AND OTHER ASSETS	Current Year	Previous Yea
Loan 6 Advances to Staff Med	(1)	Loans		
Advance for expenses (Staff) (45000+300000-79893+108064) 332957.00 1052764.0 Advance for Expenses to Staff (GPF) 0.0.0 1195666.0 119566.0 119566.0 119566.0 119566.0 119566.0 119566.0 1195666.0 119566.0 1195666.0 11		(1) Staff		
Advance for Expenses to Staff (GPF) Advance for expenses (Research Projects) (3000+7482) Land Acquisition Charges (Deposited in Hon'ble High Court) (2) Other entities engaged in activities /objectives similar to (3) Others (Specify) GIA Training 0 Adv for civil work to CPWD 13490124 850500 14340624.00 284206.0 Loan for World Environment Day (MoEF) 280984.00 280984.0 Loan for Wich workshop 30253.00 30253.00 Advance Payment-GIA 2621259.00 0.0 (2) Advances and other amounts recoverable in cash or in kind or (1) On Capital Accounts (2) Prepayments (3) Others (Specify) Security Deposit for Electricity Connection 412283.00 412283.00 Advance payment to firm (Training-Firm) 0.00 100000.0 TDS to be refunded by the ITO (Porpus fund) 209312.00 1638104.0 TDS to be refunded by the ITO (Corpus fund) 453105.00 187176.0 (3) Income Accrued (1) On Investments from Earmarked / Endowment Funds (2) On Investments - Others Interest Accrued in FDR (GPF) 3473340.00 2415243.0 Interest Accrued in FDR (Corpus Fund) 10599686.00 7556154.0 Interest Accrued in FDR (Corpus Fund) 2213237.00 180366.00 Training Cost Accrued But not Received 838375.00 838375.0 On Loans and Advances (4) Others (Specify) Training Cost Accrued But not Received 838375.00 838375.0 On Cost Accrued But not Received 838375.00 838375.0 On Cost Accrued In FDR (Corpus Fund) 108253.00 0.00 (4) Expenses payable towards capital/fixed Assets (1) Grant in Aid (2013-12) 0.00 0.00 (2) Grant in Aid (2013-14) (2687135-1106474) 1580661.00 0.00 (3) Research Project (2013-14) (1552560-182120) 1370440.00 386349.0		Loan & Advances to Staff Med TA(MSc) FA(M Med) LTC	354177.00	510400.0
Advance for expenses (Research Projects) (3000+7482) 10482.00 18000000.00 (2) Other entities engaged in activities /objectives similar to (3) Others (Specify) GIA Training 0 Adv for civil work to CPWD 13490124 850500 14340624.00 284206.00 Loan for World Environment Day (MoEF) 280984.00 280984.00 Advance Payment-GIA 2621259.00 0.00 (2) Advance Payment-GIA 2621259.00 0.00 (2) Advance and other amounts recoverable in cash or in kind or (1) On Capital Accounts (2) Prepayments (3) Others (Specify) Security Deposit for Electricity Connection 412283.00 412283.00 Advance payment to firm (Training-Firm) 0.00 100000.00 TDS to be refunded by the ITO (Pers) 572892.00 288557.0 TDS to be refunded by the ITO (Corpus fund) 453105.00 187176.0 (3) Income Accrued (1) On Investments from Earmarked / Endowment Funds (2) On Investments from Earmarked / Endowment Funds (3) On Loans and Advances (4) Others (Specify) 100 100000.00 Training Cost Accrued in FDR (Pension Fund) 10599666.00 755615.00 Interest Accrued in FDR (Pension Fund) 2213237.00 1803366.00 Training Cost Accrued But not Received 838375.00 838375.00 Training Cost Accrued But not Received 838375.00 838375.00 Training Cost Accrued But not Received 838375.00 0.00 (4) Expenses payable towards capital/fixed Assets (1) Grant in Aid (2011-12) 0.00 0.00 (2) Grant in Aid (2011-12) 0.00 0.00 (3) Research Project (2013-14) (1552560-182120) 1370440.00 386349.00 TOTAL (8) 5986220.00		Advance for expenses (Staff) (45000+300000+79893+108064)	532957.00	1052764.0
Land Acquisition Charges (Deposited in Hon'ble High Court) 18000000.00		Advance for Expenses to Staff (GPF)		0.0
(2) Other entities engaged in activities /objectives similar to (3) Others (Specify) GIA Training 0 Adv for civil work to CPWD 13490124 850500 14340624.00 284206.0 Loan for WOrd Environment Day (MoEF) 280984.00 30253.00 30253.0 Advance Payment-GIA 2621259.00 0.0 (2) Advances and other amounts recoverable in cash or in kind or (1) On Capital Accounts (2) Prepayments (3) Others (Specify) Security Deposit for Electricity Connection 412283.00 412283.00 Advance payment to firm (Training-Firm) 0.00 100000.0 TDS to be refunded by the ITO (Enrison Fund) 2033121.00 1638104, 0 TDS to be refunded by the ITO (Forpus fund) 453105.00 187176.0 (3) Income Accrued (1) On Investments from Earmarked / Endowment Funds (2) On Investments others Interest Accrued in FDR (Corpus Fund) 10599686.00 7556154.0 Interest Accrued in FDR (Corpus Fund) 2213237.00 1803366.0 (3) On Loans and Advances (4) Others (Specify) Training Cost Accrued But not Received 883975.00 238375.0 0.0 (4) Expenses payable towards capital/fixed Assets (1) Grant in Aid (2011-12) 0.00 0.0 (2) Grant in Aid (2011-12) 0.00 0.0 (3) Research Project (2013-14) (1552560-182120) 1370440.00 386349.0		Advance for expenses (Research Projects) (3000+7482)	10482.00	119566.0
Column C		Land Acquisition Charges (Deposited in Hon'ble High Court)	18000000.00	18000000.0
Adv for civil work to CPWD 13490124 850500 14340624.00 284206.0 Loan for World Environment Day (MoEF) 280984.00 280984.0 Advance Payment-GIA 2621259.00 0.0 0 (2) Advances and other amounts recoverable in cash or in kind or (1) On Capital Accounts 2 Prepayments (3) Others (Specify) Security Deposit for Electricity Connection 412283.00 412283.00 Advance payment to firm (Training-Firm) 0.00 100000.0 To 5 to be refunded by the ITO (Pension Fund) 2093212.00 1638104.0 To 5 to be refunded by the ITO (GPF) 572892.00 288557.0 To 5 to be refunded by the ITO (Corpus fund) 453105.00 187176.0 (3) Income Accrued (1) On Investments from Earmarked / Endowment Funds (2) On Investments from Earmarked / Endowment Funds (2) Interest Accrued in FDR (GPF) 3473340.00 2415243.0 Interest Accrued in FDR (Pension Fund) 10599686.00 7556154.0 Interest Accrued in FDR (Corpus Fund) 2213237.00 1803366.0 (3) On Loans and Advances (4) Others (Specify) Training Cost Accrued But not Received 838375.0 838375.0 Pre-receipted bill issued but not received 883875.0 Pre-receipted bill issued but not received 108253.00 0.0 (4) Experses payable towards capital/fixed Assets (1) Grant in Aid (2011-12) 0.0 0.0 0.0 0.0 (2011-12) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.		(2) Other entities engaged in activities /objectives similar to		
Loan for WGrld Environment Day (MoEF) 280984.00 302533.00 302533.00 302533.00 302533.00 3025333.00 302533		(3) Others (Specify) GIA Training 0		
Loan for WCF workshop 30253.00 2621259.00 0.0		Adv for civil work to CPWD 13490124 850500	14340624.00	284206.0
Advance Payment-GIA 2621259.00 0.0		Loan for World Environment Day (MoEF)	280984.00	280984.0
(2) Advances and other amounts recoverable in cash or in kind or (1) On Capital Accounts (2) Prepayments (3) Others (Specify) Security Deposit for Electricity Connection 412283.00 412283.00 Advance payment to firm (Training-Firm) 0.00 100000.0 TDS to be refunded by the ITO (Pension Fund) 2093212.00 1638104.0 TDS to be refunded by the ITO (GPF) 572892.00 288557.0 TDS to be refunded by the ITO (Corpus fund) 453105.00 187176.0 (3) Income Accrued (1) On Investments from Earmarked / Endowment Funds (2) On Investments from Earmarked / Endowment Funds (2) On Investments from Earmarked / Endowment Funds (2) On Investments from Earmarked / Endowment Funds (3) Interest Accrued in FDR (GPF) 3473340.00 2415243.0 Interest Accrued in FDR (Pension Fund) 10599686.00 7556154.0 Interest Accrued in FDR (Corpus Fund) 2213237.00 1803366.00 (3) On Loans and Advances (4) Others (Specify) Training Cost Accrued But not Received 838375.00 838375.0 Pre-receipted bill issued but not received 108253.00 0.00 (4) Expenses payable towards capital/fixed Assets (1) Grant in Aid (2011-12) 0.00 0.0 (2) Grant in Aid (2013-14) (2687135-1106474) 1580661.00 0.00 (3) Research Project (2013-14) (1552560-182120) 1370440.00 386349.0		Loan for WCF workshop	30253.00	30253.0
(1) On Capital Accounts (2) Prepayments (3) Others (Specify) Security Deposit for Electricity Connection 412283.00 412283.0 Advance payment to firm (Training-Firm) 0.00 100000.0 TDS to be refunded by the ITO (Pension Fund) 2093212.00 1638104.0 TDS to be refunded by the ITO (GPF) 572892.00 288557.0 TDS to be refunded by the ITO (Corpus fund) 453105.00 187176.0 (3) Income Accrued (1) On Investments from Earmarked / Endowment Funds (2) On Invesments - Others Interest Accrued in FDR (GPF) 3473340.00 2415243.0 Interest Accrued in FDR (GPF) 3473340.00 2415243.0 Interest Accrued in FDR (Corpus Fund) 10599686.00 7556154.0 Interest Accrued in FDR (Corpus Fund) 2213237.00 1803366.00 (3) On Loans and Advances (4) Others (Specify) Training Cost Accrued But not Received 838375.00 838375.0 Pre - receipted bill issued but not received 108253.00 0.0 (4) Expenses payable towards capital/fixed Assets (1) Grant in Aid (2011-12) 0.00 0.0 (2) Grant in Aid (2013-14) (2687135-1106474) 1580661.00 0.0 (3) Research Project (2013-14) (1552560-182120) 1370440.00 386349.0		Advance Payment-GIA	2621259.00	0.0
(2) Prepayments (3) Others (Specify) Security Deposit for Electricity Connection Advance payment to firm (Training-Firm) O.00 100000.0 TDS to be refunded by the ITO (Pension Fund) TDS to be refunded by the ITO (GPF) TDS to be refunded by the ITO (Corpus fund) (3) Income Accrued (1) On Investments from Earmarked / Endowment Funds (2) On Invesments - Others Interest Accrued in FDR (GPF) Interest Accrued in FDR (Pension Fund) Interest Accrued in FDR (Corpus Fund) Interest Accrued in FDR (Corpus Fund) (3) On Loans and Advances (4) Others (Specify) Training Cost Accrued But not Received Pre-receipted bill issued but not received (5) Grant in Aid (2011-12) (6) Grant in Aid (2011-12) (7) Grant in Aid (2011-12) (8) 59886220.00 35903780.00	(2)	Advances and other amounts recoverable in cash or in kind or		
(3) Others (Specify) Security Deposit for Electricity Connection 412283.00 412283.00 Advance payment to firm (Training-Firm) 0.00 100000.0 TDS to be refunded by the ITO (Pension Fund) 2093212.00 1638104.0 TDS to be refunded by the ITO (GPF) 572892.00 288557.0 TDS to be refunded by the ITO (Corpus fund) 453105.00 187176.0 (3) Income Accrued (1) On Investments from Earmarked / Endowment Funds (2) On Invesments - Others Interest Accrued in FDR (GPF) 3473340.00 2415243.0 Interest Accrued in FDR (Pension Fund) 10599686.00 7556154.0 Interest Accrued in FDR (Pension Fund) 2213237.00 1803366.0 (3) On Loans and Advances (4) Others (Specify) Training Cost Accrued But not Received 83875.00 838375.0 Pre-receipted bill issued but not received 108253.00 0.00 (4) Experse payable towards capital/fixed Assets (1) Grant in Aid (2011-12) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.		(1) On Capital Accounts		
Security Deposit for Electricity Connection		(2) Prepayments		
Advance payment to firm (Training-Firm) 0.00 100000.00 TDS to be refunded by the ITO (Pension Fund) 2093212.00 1638104.00 TDS to be refunded by the ITO (GPF) 572892.00 288557.00 TDS to be refunded by the ITO (Corpus fund) 453105.00 187176.00 (3) Income Accrued (1) On Investments from Earmarked / Endowment Funds (2) On Invesments - Others Interest Accrued in FDR (GPF) 3473340.00 2415243.00 Interest Accrued in FDR (Pension Fund) 10599686.00 7556154.00 Interest Accrued in FDR (Corpus Fund) 2213237.00 1803366.00 (3) On Loans and Advances (4) Others (Specify) Training Cost Accrued But not Received 838375.00 838375.00 Pre-receipted bill issued but not received 108253.00 0.00 (4) Expenses payable towards capital/fixed Assets (1) Grant in Aid (2011-12) 0.00 0.00 (2) Grant in Aid (2013-14) (2687135-1106474) 1580661.00 0.00 (3) Research Project (2013-14) (1552560-182120) 1370440.00 386349.00		(3) Others (Specify)		
Advance payment to firm (Training-Firm) 0.00 100000.00 TDS to be refunded by the ITO (Pension Fund) 2093212.00 1638104.00 TDS to be refunded by the ITO (GPF) 572892.00 288557.00 TDS to be refunded by the ITO (Corpus fund) 453105.00 187176.00 (3) Income Accrued (1) On Investments from Earmarked / Endowment Funds (2) On Invesments - Others Interest Accrued in FDR (GPF) 3473340.00 2415243.00 Interest Accrued in FDR (Pension Fund) 10599686.00 7556154.00 Interest Accrued in FDR (Corpus Fund) 2213237.00 1803366.00 (3) On Loans and Advances (4) Others (Specify) Training Cost Accrued But not Received 838375.00 838375.00 Pre-receipted bill issued but not received 108253.00 0.00 (4) Expenses payable towards capital/fixed Assets (1) Grant in Aid (2011-12) 0.00 0.00 (2) Grant in Aid (2013-14) (2687135-1106474) 1580661.00 0.00 (3) Research Project (2013-14) (1552560-182120) 1370440.00 386349.00		Security Deposit for Electricity Connection	412283.00	412283.0
TDS to be refunded by the ITO (Pension Fund) 2093212.00 1638104.00 208557.00 288		Advance payment to firm (Training-Firm)	0.00	100000.0
TDS to be refunded by the ITO (GPF) 572892.00 288557.00 TDS to be refunded by the ITO (Corpus fund) 453105.00 187176.00			2093212.00	1638104.0
TDS to be refunded by the ITO (Corpus fund) 453105.00 187176.00			572892.00	
(1) On Investments from Earmarked / Endowment Funds (2) On Invesments - Others Interest Accrued in FDR (GPF) Interest Accrued in FDR (Pension Fund) Interest Accrued in FDR (Corpus Fund) Interest Accrued in FDR (GPF) Interest Accrued in FDR (Corpus Fund)				
(2) On Invesments - Others Interest Accrued in FDR (GPF) Interest Accrued in FDR (Pension Fund) Interest Accrued in FDR (Pension Fund) Interest Accrued in FDR (Corpus Fund) Interest Accrued in FDR (Corpus Fund) (3) On Loans and Advances (4) Others (Specify) Training Cost Accrued But not Received Pre-receipted bill issued but not received 108253.00 (4) Expenses payable towards capital/fixed Assets (1) Grant in Aid (2011-12) (2) Grant in Aid (2013-14) (2687135-1106474) (3) Research Project (2013-14) (1552560-182120) TOTAL (B) 59886220.00 3473340.00 2213237.00 1803366.00 838375.00 838375.00 838375.00 0.00 0.00 0.00 0.00 35903780.00	(3)	Income Accrued		
Interest Accrued in FDR (GPF) 3473340.00 2415243.00 10599686.00 7556154.00 10599686.00 7556154.00 10599686.00 7556154.00 10599686.00 7556154.00 10599686.00 7556154.00 10599686.00 7556154.00 10599686.00 7556154.00 10599686.00 7556154.00 10599686.00 105996		(1) On Investments from Earmarked / Endowment Funds		
Interest Accrued in FDR (Pension Fund) 10599686.00 7556154.00 Interest Accrued in FDR (Corpus Fund) 2213237.00 1803366.00 (3)		(2) On Invesments -Others		
Interest Accrued in FDR (Corpus Fund) 2213237.00 1803366.00		Interest Accrued in FDR (GPF)	3473340.00	2415243.0
(3) On Loans and Advances (4) Others (Specify) Training Cost Accrued But not Received 838375.00 Pre-receipted bill issued but not received 108253.00 (4) Expenses payable towards capital/fixed Assets (1) Grant in Aid (2011-12) 0.00 0.0 (2) Grant in Aid (2013-14) (2687135-1106474) 1580661.00 0.0 (3) Research Project (2013-14) (1552560-182120) 1370440.00 386349.0 TOTAL (B) 59886220.00		Interest Accrued in FDR (Pension Fund)	10599686.00	7556154.0
(4) Others (Specify) Training Cost Accrued But not Received 838375.00 Pre-receipted bill issued but not received 108253.00 (4) Expenses payable towards capital/fixed Assets (1) Grant in Aid (2011-12) 0.00 0.00 (2) Grant in Aid (2013-14) (2687135-1106474) 1580661.00 0.0 (3) Research Project (2013-14) (1552560-182120) 1370440.00 386349.0 TOTAL (B) 59886220.00		Interest Accrued in FDR (Corpus Fund)	2213237.00	1803366.0
Training Cost Accrued But not Received 838375.00 838375.00 Pre-receipted bill issued but not received 108253.00 0.00 (4) Expenses payable towards capital/fixed Assets (1) Grant in Aid (2011-12) 0.00 0.00 (2) Grant in Aid (2013-14) (2687135-1106474) 1580661.00 0.00 (3) Research Project (2013-14) (1552560-182120) 1370440.00 386349.00		(3) On Loans and Advances		
Pre-receipted bill issued but not received 108253.00 0.00 (4) Expenses payable towards capital/fixed Assets (1) Grant in Aid (2011-12) 0.00 0.00 (2) Grant in Aid (2013-14) (2687135-1106474) 1580661.00 0.00 (3) Research Project (2013-14) (1552560-182120) 1370440.00 386349.00		(4) Others (Specify)		
(4) Expenses payable towards capital/fixed Assets (1) Grant in Aid (2011-12) 0.00 0.00 (2) Grant in Aid (2013-14) (2687135-1106474) 1580661.00 0.0 (3) Research Project (2013-14) (1552560-182120) 1370440.00 386349.0 TOTAL (B) 59886220.00		Training Cost Accrued But not Received	838375.00	838375.0
(1) Grant in Aid (2011-12) 0.00 0.0 (2) Grant in Aid (2013-14) (2687135-1106474) 1580661.00 0.0 (3) Research Project (2013-14) (1552560-182120) 1370440.00 386349.0 TOTAL (B) 59886220.00 35903780.00		Pre-receipted bill issued but not received	108253.00	0.0
(2) Grant in Aid (2013-14) (2687135-1106474) 1580661.00 0.0 (3) Research Project (2013-14) (1552560-182120) 1370440.00 386349.0 TOTAL (B) 59886220.00 35903780.00	(4)	Expenses payable towards capital/fixed Assets		
(3) Research Project (2013-14) (1552560-182120) 1370440.00 386349.0 TOTAL (B) 59886220.00 35903780.00		(1) Grant in Aid (2011-12)	0.00	0.0
TOTAL (B) 59886220.00 35903780.00			1580661.00	0.0
·		(3) Research Project (2013-14) (1552560-182120)	1370440.00	386349.0
TOTAL (A+B) 97521383.74 85204911.0	TOTAL	L (B) 59886220.00	35903780.00	
	TOTAL	(A+B)	97521383.74	85204911.0





(Dr. V.B. Mathur) Director



FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2013-14

			(AIIIL. RS.)
	Schedule	Current Year	Previous Year
INCOME			
Income from Sales/Services	12	0.00	0.00
Grants/Subsidies	13	205656380.27	184081828.00
Fees/Subscriptions	14	21634860.00	16812030.00
Income from Investments (from earmarked/endowment Funds Transferred to funds)	15	0.00	0.00
Income from Royalty, Publication etc	16	2071887.02	1574629.00
Interest Earned	17	2070387.00	1734608.00
Other Income	18	0.00	0.00
Increase/decrease) in stock of Finished goods and works-in-pro	ogress 19	0.00	0.00
TOTAL (A)		231433514.29	204203095.00
EXPENDITRUE			
Establishment Expenses (Plan & Non Plan)	20	140894891.00	134501222.00
Other Administrative Expenses (Plan & Non Plan)	21	71492464.14	65916151.00
Expenditure on Grants, Subsidies etc.	22	0.00	0.00
Interest	23	0.00	0.00
Depreciation (Net Total at the year end - corresponding to Scheo	dule 8)	18533034.08	20422073.69
Total (B)		230920389.22	220839446.69
Balance being excess of Income over Expenditure (A-B)		513125.07	-16636351.69
BALANCE BEING SURPLUS (DEFICIT) CARRIED TO CORPUS/CAPITAL FUND		513125.07	-16636351.69



FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2013-14

(Amt. Rs.)

			(AIIIL. RS.)
DULE	:13 GRANTS/SUBSIDIES	Current Year	Previous Year
(1)	Central Government		
	Grant -in- Aid from MoEF	213149000.00	194320000.00
	Amt capitalized (-)	7492619.73	10238172.00
	Total	205656380.27	184081828.00
(2)	State Governments (s)		
(3)	Government Agencies	0.00	0.00
(4)	Institutions/Welfare Bodies	0.00	0.00
(5)	International Organisations	0.00	0.00
(6)	Others (Specify)		
	WII Contribution (Pension A/c)	0.00	0.00
TOTA	L	205656380.27	184081828.00

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2013-14

		,
DULE :14 FEES/ SUBSCRIPTIONS	Current Year	Previous Yea
(1) Entrance Fees		
M.Sc.Course Fee	1289700.00	803839.00
(2) Annual Fees/ Subscriptions	0.00	0.00
(3) Seminar/ Program Fees		
Seminar/ Workshop Fees	0.00	0.00
(4) Consultancy Fees		
Consultancy refund		0.00
(5) Others (Specify)		
Other Receipt (Training)	13736907.00	5834652.00
Receipt for Training courses	6500000.00	9000000.00
Misc. Receipt (Corpus Fund)		0.00
Pre-receipted bill issued but not received	108253.00	1173539.00
Receipt for Training Cost	0.00	0.00
TOTAL	21634860.00	16812030.00



FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2013-14

(Amt. Rs.)

EDULE :16 INCOME FROM ROYALTY, PUBLICATION ETC.	Current Year	Previous Yea
(1) Income from Royalty		
(2) Income from Publications		
(3) Others (Specify)		
Income from Research Project	12000.00	0.0
Income from Library	82152.02	0.0
Misc. Receipts	674830.00	465124.0
WII Products	41916.00	24815.0
House Licence Fee	621730.00	652170.0
Bus Charges	268250.00	71199.0
Electricity & Water Charges	367173.00	354483.0
Telephone	3836.00	6838.00
TOTAL	2071887.02	1574629.00

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2013-14

CHEDULE :	17 INTEREST EARNED	Current Year	Previous Year
(1)	On Term Deposits		
	(1) With Scheduled Banks		
	Int. on Bank Deposit	0.00	0.00
	Interest on FDR		0.00
	Interest on Investment	0.00	0.00
	(2) With Non-Scheduled Banks	0.00	0.00
	(3) With Institutions	0.00	0.00
	(4) Others (Specify)		
	Int. on Investment(Training)	0.00	0.00
	Interest (Training)	239451.00	0.00
(2)	On Savings Account		
	(1) With Scheduled Banks		
	Int. on Savings Account	1830936.00	1634791.00
	Interest on Saving A/c (Training A/c)		61837.00
	Interest Received		0.00
	(2) With Non-Scheduled Banks		0.00
	(3) Post Office Savings Account		0.00
	(4) Others (Specify)		0.00
(3)	On Loans		
	(1) Interest on Loan & Advance		37980.00
	(2) Others	0.00	0.00
(4)	Interest on Debtors and Other Receivables		
TOTA	L	2070387.00	1734608.00



FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2013-14

SCHE	DULE :20 ESTABLISHMENT EXPENSES		Current Year		Previous Year
		Plan	Non Plan	Plan	Non Plan
(1)	Salaries and Wages				
	Salary & Wages (Training A/c)	283837.00		0.00	
	Honorarium	53900.00		74400.00	
	Medical	7301346.00		6765916.00	
	Salaries & Allowances	103029806.00	10349000.00	87466994.00	10000000.00
	Stipend	438925.00		406677.00	
	Wages	0.00		11249634.00	1520000.00
	Fellowship & Wages (Research Project)	3156926.00		4301957.00	
(2)	Allowances and Bonus				
	Bonus	410618.00		436523.00	
	OTA	416251.00		419715.00	
	LTC	2066179.00		941645.00	
	Corps Fund (Training)	0.00		0.00	
	Transferred to Corpus Fund	0.00		0.00	
	Honorarium (Training A/c)	0.00		237947.00	
(3)	Others (Specify)				
(4)	Contribution to Other Fund (Specify)				
	Leave Salary and Pension Contr.	9395073.00		7771374.00	
(5)	Staff Welfare Expenses				
	Uniforms	0.00		0.00	
(6)	Expenses on Employees Retirement and Terminal Beno	efits			
	Final Payment				
	Leave Encashment & Gratuity	3847769.00		2789747.00	
(7)	Others (Specify)				
	Camp Expenses (Research Project)	145261.00		118693.00	
TOTA	L	130545891.00	10349000.00	122981222.00	11520000.00



FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2013-14

SCHEDULE :21 OTHER ADMINISTRATIVE EXPENSES		Current Year		Previous Year
	Plan	Non Plan	Plan	Non Plan
AMC of Computers	1899252.00	0.00	1438777.00	0.00
Annual Research Seminar	856965.00	0.00	673987.00	0.00
Contingencies/Misc. (Research Project)	1511742.00	0.00	2504056.00	0.00
Cont./Misc. (Training Account)	1806782.46	0.00	5722555.00	0.00
Electricity and Water Charges	7550067.00	0.00	7685500.00	0.00
Estate Maintenance	790029.00	0.00	756422.00	0.00
Estate Security	12233271.00	0.00	9619826.00	0.00
Govt. Contribution to Pension Fund	0.00	0.00	0.00	0.00
Lab Expenses (Research lab)	426976.00	0.00	944074.00	0.00
Lab Expenses (Forensic Lab)	1840941.00	0.00	1266281.00	0.00
Lab Expenses (Genetic Lab)	190730.00	0.00	201357.00	0.00
Lab Expenses (Health Lab)	0.00	0.00	13000.00	0.00
Legal Expenses	233335.00	0.00	94775.00	0.00
M.Sc. Course Expenditure	2859256.00	0.00	1705158.00	0.00
Operational Expenses (104655+855986.47+99872+220647) (Newspaper+Contin+Guest+Hospitality)	1281160.47	0.00	1246281.00	0.00
Pension Contribution	0.00	0.00	1338595.00	0.00
POL & Maintenance of Vehicle (Research Project)	1691513.00	0.00	1273700.00	0.00
POL & Maintenance of Vehicle (Training A/c)	655568.00	0.00	207191.00	0.00
POL for Vehicles	1705609.00	0.00	2144546.00	0.00
Postage & Telegrams	284850.00	0.00	187485.00	0.00
Printing & Binding	305086.00	0.00	935168.00	0.00
Borading & Lodging (Training Account)	4586155.00	0.00	0.00	0.00
Publication	0.00	0.00	190159.00	0.00
Repair & Maintenance of Vehicles	954437.00	0.00	1016738.00	0.00
Repair of Vehicle (Training Account)	631154.00	0.00	0.00	0.00
Repair & Maintenance furniture & Fixture	245164.00	0.00	150702.00	0.00
Sharing of cost of Kendriya Vidyalaya	0.00	0.00	2000000.00	0.00
Sports Goods	217301.00	0.00	394154.00	0.00
Sport Goods (Training Account)	19058.00	0.00	0.00	0.00



		Current Year		Previous Year
	Plan	Non Plan	Plan	Non Plan
Stationery	534482.00	0.00	432497.00	0.00
Training Allowance	395111.00	0.00	288265.00	0.00
Telephone & TC	939795.00	0.00	697490.00	0.00
Training & Skill Upgradation of Staff	26000.00	0.00	23000.00	0.00
Training Cost Expenditure	6500000.00	0.00	9000000.00	0.00
Travel Exp. (Grant in Aid)	2749468.00	0.00	3129660.00	0.00
Travel Exp. (Research Project)	471376.00	0.00	990828.00	0.00
Travelling Expenses (Training A/c)	4392347.76	0.00	5682546.00	0.00
Corpus fund transfer	4185576.00	0.00	0.00	0.00
Maintinancae of civil work	856833.00	0.00	0.00	0.00
Add : Expenditure wrongly less shown in 2012-13 (As pointed out by Audit)	2129253.95	0.00	0.00	0.00
Harberium	58018.50	0.00	0.00	0.00
Sales for Complementary-Lib.	90377.00	0.00	0.00	0.00
Repair of Building (Training Account)	126424.00	0.00	0.00	0.00
Fund Transfer to GIA-(Intt. For Corpus)	3261000.00	0.00	0.00	0.00
GPF Expenses	0.00	0.00	100000.00	0.00
Payment Outstanding of Grant in Aid(2013-14)	0.00	0.00	1113794.00	0.00
Payment Outstanding of Research Project (2013-14)	0.00	0.00	747584.00	0.00
TOTAL	71492464.14	0.00	65916151.00	0.00

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2013-14

(Amt. Rs.)

SCHEDULE :23 EXPENDITURE ON GRANTS, SUBSIDIES ETC Current Year Previous					Previous Year
EDULE .	23 EXPENDITURE ON URANTS, SUBSTIDIES ETC		Current rear		Previous rear
		Plan	Non Plan	Plan	Non Plan
(a)	On Fixed Loans	0.00	0.00	0.00	0.00
(b)	On other Loans (including Bank Chargs)	0.00	0.00	0.00	0.00
(c)	Other (Specify)	18533034.08	0.00	0.00	0.00
TOTA	L	18533034.08	0.00	0.00	0.00





(Dr. V.B. Mathur) Director



ANNEXURE - 1

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS) FIXED ASSETS PURCHASED FORM FUNDS REFLECTED IN SCHEDULE - 3

Particulars	Gross Block				
	Cost as the beginning of the year	Addition during the year	Deducation during the year	Costs as at the end of the year	Cost as the previous year end
Equipment					
Camp equipment	10131290.29	147841.00	0.00	10279131.29	10131290.29
Office Equipment	1616908.38	23899.00	0.00	1640807.38	1616908.38
Books	368549.00	122587.00	0.00	491136.00	368549.00
Total	12116747.67	294327.00	0.00	12411074.67	12116747.67





CAPACITY BUILDING

FORM OF FINANCIAL STATEMENTS (NON PROFIT ORGANIZATIONS) SCHEDULES FORMING PART OF THE ACCOUNTS FOR THE PERIOD ENDED ON 31ST MARCH 2014

SCHEDULE - 25 SIGNIFICANT ACCOUNTING POLICES (Notes on Accounts)

ACADEMIC & TRAINING

- Accounts of the institute have been prepared on accrual basis and accrued interest has been accounted for the Accounts.
- Depreciation has been allowed on Assets at the rate prescribed by the Income Tax Department, Govt. of India and being charged on pro-rata basis. For equipments which are being used in field, higher rate of depreciation is being charged than those at office.
- The balance available and expenditure incurred on Externally funded projects (Consultancy accounts) is in reflected in Schedule-3 of Balance Sheet. The Fixed Assets created from these funds are mentioned Annexure-1
- 4 The institute has created a Corpus Fund as per decision of XLVII Governing Body meeting. The receipts on account of unspent balance of externally funded projects which are not required to be refunded back, interest credited by Bank, saving from the Consultancy project and other petty misc. receipts etc are being deposited in Corpus Fund. Separate Receipt & Payment Account for transactions relating to Corpus Fund has been maintained as per direction of Audit (C&AG)
- 5 Being a Research Institute of Govt. of India, it is exempted from Custom Duty on imported scientific items.
- 6 Institute has been directed by Finance Committee to keep its investments only in FDR with Nationalized Bank/RBI Bonds.

(P.K. Aggarwal) Finance Officer

RESEARCH

(Dr. V.B. Mathur)

PROFESSIONAL SUPPORT



GENERAL PROVIDENT FUND ACCOUNT NO. 518502010001297 INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2013-14

GPF				
Income		Expenditure		
Particulars	Amount	Particulars	Amount	
Opening Balance	361319.00	Final Payment	3713484.00	
Interest received on Savinig Account	2998.00	Advance/Withdrawl	9647496.00	
Interest earned on FDR	94524.00	Auto Sweep FDR	4965000.00	
GPF Contribution	17185743.00	Loan to Deputationists	400000.00	
Encashment of FDRs	1003702.00	Interest on FDRs	385851.00	
Interest on FDR- TDS	385851.00	Closing Banlance [Cash]	10573.00	
TDS received from ITO	101607.00	Closing Banlance [Bank]	13340.00	
Grant Total	19135744.00	Grant total	19135744.00	

PENSION FUND ACCOUNT NO. 518502010000018 INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2013-14

PENSION			
Income		Expenditure	
Particulars	Amount	Particulars	Amount
Opening Balance	419057.00	Investment on FDR	0.00
Interest received on Savinig Account	36830.00	Commuted Value of Pension	1170899.00
Interest earned on FDR	1047742.00	Family Pension/Pension	5544124.00
WII Contribution	3907315.00	Interest Accured and Invested	1047742.00
Encashment of FDRs	2588479.00	TDS on Interest on FDRs	0.00
Pension Contribution	0.00	Bank Balance	829292.00
Interest Accrued	592634.00		
Grant Total	8592057.00	Grant total	8592057.00



WII MANAGEMENT EFFECTIVENESS EVALUATION (MEE) OF PROTECTED AREAS RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening Balance	2530740.00	Travel Expenses	962824.00
Interest received 2013-14	87275.00	Sitting Fee	162000.00
Grant received for MEE Tiger Reserve Project	1360000.00	Per diem to evaluation team	22090.00
Grant received for MEE of NPs & WLS Project	1500000.00	Report Writing Cost	60000.00
Refund of advance	55000.00	Project Management Cost	615522.00
		Miscellaneous & unforeseen Expenses/Overheads	71429.00
		MEE Tiger Reserve	306318.00
		Bank Balance A/C No - 62	3332832.00
Grant Total	5533015.00	Grant Total	5533015.00

WII SURVEY & MAPPING OF MEDICINAL PLANTS IN UTTRAKHAND RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening Balance	892304.00	Fellowships	5200.00
Interest received 2013-14	35295.00	Expenditure of Sand Mining Project	98300.00
		Bank Balance A/C No - 50188	824099.00
Grant Total	927599.00	Grant total	927599.00

PROJECT TIGER CO-PREDATOR, PREY & HABITAT PHASE IV RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening Balance	610386.00	Fellowships	203612.00
		Consumeable	29125.00
Interest received 2013–14	12382.00	Travel	112299.00
		Contingencies	39095.00
		Wages to Field Assistants	83800.00
		Equipment	4750.00
		Bank Balance A/C No - 50673	150087.00
Grant Total	622768.00	Grant total	622768.00



HOUSING & ENCLOSURE ENRICHMENT OF SOME SPECIES IN SELECTED INDIAN ZOOS RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening Balance	560731.00	Fellowships	596599
Gerant Received from Central Zoo Authority, New Delhi	532000.00	Stationery	47166
Interest received 2013-14	16956.00	Travel	50767
		Miscellaneous & Contingencies	33113
		Equipment	36229
		Development of Enrichment	161882.00
		Bank Balance A/C No - 50912	183931.00
Grant Total	1109687.00	Grant total	1109687.00

MACROECOLOGY OF THE TERRESTRIAL HERPETOFAUNA IN ANDAMAN & NICOBAR ARCHIPELAGO RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening Balance	217519.00	Fellowships	369380
Interest received 2013-14	16019.00	Consumeable	6844
Grant received	600000.00	Travel	65548
Refund of advances	30000.00	Contingencies	34900
		Bank Balance A/C No - 51031	386866.00
Grant Total	863538.00	Grant total	863538.00

ECOLOGY OF LEOPARD PANTHERA PARDUS IN RELATION TO PREY ABUNDANCE & LAND USE PATTERN IN KASHMIR VALLEY

RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening balance	205235.47	Fellowships	221849
Interest received 2013-14	7595.00	Consumeable	33879
Grant received	400000.00	Travel	140493
		Contingencies	51344
		Equipment	11192.9
		Wages to Field Assistants	36000.00
		Overhead expenses	53613.00
		Bank Balance A/C No - 51480	64459.57
Grant Total	612830.47	Grant total	612830.47



ECOLOGICAL ASSESSMENT OF BANJ OAK FORESTS IN KEDARNATH WILDLIFE SANCTUARY, WESTERN HIMALAYA WITH REFERENCE TO INVASION BY PINE RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening balance	276948.00	Fellowships	210387
Interest received 2013-14	11995.00	Consumeable	37419
Grant received	250000.00	Travel	20000
		Contingencies	9020
		Bank Balance A/C No - 51671	262117.00
Grant Total	538943.00	Grant total	538943.00

DIVERSITY OF MOTHS ASSEMBLAGE AND THEIR POTENTIAL ROLE AS CONSERVATION TOOL IN DIFFERENT PROTECTED AREAS OF UTTRAKHAND RECEIPT & PAYMENTS FOR THE PERIOD OF 01.11.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Science & Engineering Research Board (SERB))	411269.00	Fellowships	153600
Interest received 2013–14	11202.00	Consumeable	46343
		Travel	55615
		Contingencies	53760
		Overhead incl maint of Equipment	29754
		Bank Balance A/C No - 53258	83399.00
Grant Total	422471.00	Grant total	422471.00

PREPARING AND UPDATING STUD BOOKS OF 34 ENDANGERED SPECIES (14 OLD AND 20 NEW) RECEIPT & PAYMENTS FOR THE PERIOD OF 01.09.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Central Zoo Authority, New Delhi	940110.00	Salaries	255887
Interest received 2013-14	30847.00	Travel (Data colletion from Zoos)	252672.92
		Stationery	57682
		Miscellaneous & contingencies	3978
		Bank Balance A/C No - 53274	400737.08
Grant Total	970957.00	Grant total	970957.00



PATTERN OF BIOMASS PRODUCTION BY WETLANDS & ITS USE BY WILD UNGULATES IN KAZIRANGA LANDSCAPE RECEIPT & PAYMENTS FOR THE PERIOD OF 01.09.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Science & Engineering Research Board (SERB))	1958000.00	Equipment	368197.00
Interest received 2013-14	38073.00	Manpower	336038.00
		Consumables	618521.00
		Travel	338718.00
		Contingencies	290669.00
		Bank Balance A/C No - 53439	43930.00
Grant Total	1996073.00	Grant total	1996073.00

RADIO TELEMETRY MONITORING SOURCE POPULATION OF TIGERS IN KANHA TR RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening Balance	1928671.18	Fellowship/Wages	359100.00
Grants received	4000000.00	Travel	12198.00
Interest received 2013-14	68051.00	POL	171036.00
		Contingency	82950.00
		TA	4000.00
		Bank Balance A/C No -50685	5367438.18
Grant Total	5996722.18	Grant Total	5996722.18

ECOLOGICAL MONITORING OF TIGER POPULATION IN PANNA LANDSCAPE (MP) RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening Balance	5496451.58	FA	130000.00
Grants received	3000000.00	Equipment	4322915.20
Interest received 2013-14	128725.00	Fellowship	441213.00
		Wages	172428.00
		V/Hiring	778066.00
		Contingency	513992.00
		Bank Balance A/C No - 50908	2266562.38
Grant Total	8625176.58	Grant Total	8625176.58



DEVELOPMENT OF APPROPRIATE TECHNIQUES FOR MINIMIZING MAN ANIMAL CONFLICT RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening Balance	292844.00	Intellectual fees as per Institute consultancy rules approved by MOEF	39645.00
Interest received 2013-14	11022.00	Bank Balance A/C No - 50710	264221.00
Grant Total	303866.00	Grant Total	303866.00

OKHALA BIRD SANCTUARY MANAGEMENT PLAN RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening Balance	263096.00	Travel cost for the project personnel including DA	9660.00
Interest received 2013-14	10386.00	Bank Balance A/C No - 50885	263822.00
Grant Total	273482.00	Grant Total	273482.00

PROCUREMENT OF SATELLITE AND VHF COLLARS FOR STUDY OF TIGER BEHAVIOUR RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening Balance	574562.00		0.00
Interest received 2013-14	23213.00	Bank Balance A/C No - 50709	597775
Grant Total	597775.00	Grant Total	597775.00

MONITORING OF RE-INTRODUCED TIGERS IN SARISKA TIGER RESERVE RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening Balance	280286.88	Fellowship	162065.00
Grants received	1800000.00	Field Asstt	550643.00
Interest received 2013-14	25438.00	Vehicle Hiring	395230.00
		Purchase of Radio Collars	55612.72
		Satellite Data acquiring Charge	514779.42
		Misc/Contingency	68972.00
		Bank Balance A/C No - 50545	358422.74
Grant Total	2105724.88	Grant Total	2105724.88



MONITORING OF SOURCE POPULATION OF TIGERS IN RANTHAMBORE TIGER RESERVE RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening Balance	3313552.81	Contingency	119395.00
Interest received 2013-14	104831.00	Fellowship & Wages	273155.00
		Travel	23006.00
		Vehicle Hiring	209179.00
		Procurement of Radio Collars & Accessories	216253.97
		Bank Balance A/C No -64	2577394.84
Grant Total	3418383.81	Grant Total	3418383.81

RADIO COLLARING OF TIGERS IN SUNDERBANS TIGER RESERVE RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening Balance	915144.13	FA	80000.00
Interest received 2013-14	28049.00	TA	13000.00
		Fellowship & Wages	319200.00
		Veh & Boat hiring	127971.00
		Travel	9179.00
		Contingencies	12647.00
		Bank Balance A/C No - 50546	381196.13
Grant Total	943193.13	Grant Total	943193.13

MONITORING RE-INTRODUCED GAUR IN BANDHAVGARH TIGER RESERVE (MP) RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening Balance	260354.15	TA/DA for the researcher/Investigators	104149.00
Grants received	890000.00	Misc/Contingency	43069.00
Interest received	14600.00	Purchase of radio telemetry items (4 GPS,11 VHF radio collars, 2 receivers, 2 antenas)	89318.00
		Fellowship & wages	492786.00
		Vehicle POL and maintenance	187016.00
		Bank Balance A/C No - 50629	248616.15
Grant Total	1164954.15	Grant Total	1164954.15



IMPACT OF GLOBAL CHANGES ON SPECIES COMPOSITION IN WESTERN HIMALAYAS:HP RECEIPT & PAYMENTS FOR THE PERIOD OF 01.04.2013 TO 31.03.2014

Receipt	Amount	Payment	Amount
Opening Balance	34771.00		
Interest received	683.00		
Interest received	715.00	Bank Balance A/C No - 51164	36169.00
Grant Total	36169.00	Grant Total	36169.00

WII-BUILDING PARTNERSHIP TO SUPPORT UNESCO WORLD HERITAGE PROGRAMME RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Opening Bal.	26,04,998.48	Fellowship and Wages	11,74,158.00
Grant Received	33,27,031.20	Travelling Expenses	2,85,411.00
Intt. Received	90,132.00	Scholarship	4,69,500.00
		Training & Workshop	6,18,222.00
		Office Equipment	61,300.00
		Base Camp Expenditure	51,500.00
		Misc. & Contigencies	5,14,742.06
		Bank Balance A/c No. 50246	28,47,328.62
Grant Total	6022161.68	Grant Total	6022161.68

WII-ENVIS PROJECT RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Opening Balance	13,71,279.75	Fellowship and Wages	7,07,000.00
Intt. Received	51,060.00	Travelling Expenditure	55,282.00
Grant Received	11,10,000.00	Contigency	77,913.00
Misc. Income (Entry Fee of QuiZ-2013)	7,000.00	Report Writing	2,15,715.00
M/s Strategic Marketing	71,228.00	Office Equipment	75,728.00
		Doon Wildlife Environment Quiz-2013	7,767.00
		Advance for Expenses	5,000.00
		Bank Balance A/c No. 32	
Grant Total	2610567.75	Grant Total	2610567.75



WII-UNESCO PROJECT RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Opening Balance	36,96,290.25	Travel Expenditure	2,28,670.00
Intt.Received	1,38,533.00	Bank Balance A/c No. 44	
Grant Total	3834823.25	Grant Total	3834823.25

WII-DGH SEATURTLE TELEMETRY PROJECT RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Opening Balance	84,94,974.08	Logistic Expenses	50,000.00
Intt. Received	3,39,054.00	Travelling Expenses	2,108.00
		Contingency	5,816.80
		Loan D/WII A/c No. 52529	24,900.00
		Bank Balance A/c No. 59	87,51,203.28
Grant Total	8834028.08	Grant Total	8834028.08

AVIAN MALARIA PROJECT RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Opening Balance	8,042.00	Expenditure Total	0.00
Intt. Received	325.00	Bank Balance A/c No. 50650	8,367.00
Grant Total	8367.00	Grant Total	8367.00

TIGER RESPONSE TO PRAY HUMAN DISTURBANCE RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Opening Balance	13,28,229.30	Expenditure Total	0.00
Interest Received	53,658.00	Bank Balance A/c No. 60	13,81,887.30
Grant Total	1381887.30	Grant Total	1381887.30



ISRO-GBP PROJECT ON LULC DYNAMICS RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Opening Balance	3,81,962.00	Fellowship & Wages	6194.00
Intt. Received	7,542.00	Office Equipment	148880.00
		Contigencies	56610.00
		Camp Equipment	46785.00
		Bank Balance A/c No. 51241	1,31,035.00
Grant Total	389504.00	Grant Total	389504.00

INTERRATED DEVELOPMENT OF WILDLIFE HABITATS RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Opening Balance	2,60,720.00	Fellowship & Wages	113664.00
Intt. Received	9,135.00	Travel Expenditure	16568.00
		Contigency	15415.00
		Bank Balance A/c No. 51240	1,24,208.00
Grant Total	269855.00	Grant Total	269855.00

WII-MONITORING LAND-USE BY WILDLIFE. LIVESTOCK AND HUMAN IN KHANGCHENDZONGA BIOSPHERES RESERVE RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Opening Balance	2,026.00	Fellowship & Wages	225412.00
Grant Received	7,24,000.00	Lab. Expenditure	72052.00
Intt. Received	2,614.00	Contigencies	12470.90
		Base Camp Expenses	39000.00
		Travel Expenses	685.00
		Advance for Expenses	10000.00
		Loan Refund	235000.00
		Bank Balance A/c No. 51411	1,34,020.10
Grant Total	728640.00	Grant Total	728640.00



I U C N CELL RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Opening Balance	4,35,777.24	Travel Expenditure	84626.00
Intt. Received	15,908.00	Misc. Expenses	35842.35
Member Ship Fees	1,22,000.00	Office Equipment	4500.00
		Office Stationery	10694.00
		Bank Balance A/c No. 41	4,38,022.89
Grant Total	573685.24	Grant Total	573685.24

WESTERN TRAGOPAN PROJECT RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Opening Balance	14,71,103.00	Fellowship & Wages	407871.00
Intt. Received	49,832.00	Travel Expenses	55003.00
Grant Received	9,50,000.00	Office Equipment	199705.00
		Contigencies	88079.00
		Advance for Expenses	53000.00
		Bank Balance A/c No. 52465	16,67,277.00
Grant Total	2470935.00	Grant Total	2470935.00

STRUCTURAL AND FUNCTIONAL ATTRUBUTES OF PLANT COMMUNITIES IN COLD ARID REGION OF NANDA DEVI BIOSPHERES RESERVE, UTTARAKHAND RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Opening Balance	1,404.00	Fellowship & Wages	45111.00
Intt. Received	140.00	Travel Expenses	1990.00
Loan:-D/WII A/c No. 59	24,900.00	Contigencies	4920.00
Loan Refund A/c No.	35,000.00	Bank Balance A/c No. 52529	9,423.00
Grant Total	61444.00	Grant Total	61444.00



ASSESSMENT OF DUGONG DISTRIBUTION, HABITAT AND RISKS DUE TO FISHERIES AND OTHER ANTHROPOGENIC RELATED ACTIVITIES IN INDIA

RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Grant	3,56,456.00	Fellowship & Wages	41342.00
Intt. Received	13,320.00	Travel Expenses	23330.00
		Report Writing	20810.00
		Contigencies	7340.00
		Bank Balance A/c No. 53244	2,76,954.00
Grant Total	369776.00	Grant Total	369776.00

ASSESSMENT OF ECOLOGICAL SETTING AND BIODIVERSITY VALUES OF PAPIKONDA NATIONAL PARK AND INDIRA SAGAR (POLAVARAM) MULT. PROJECT RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Grant	13,08,100.00	Fellowship & Wages	191253.00
Intt. Received	40,990.00	Travel Expenses	301162.00
		Office Equipment	6627.00
		Base Camp Expenditure	36557.00
		POL & Maint. Of Veh.	32447.00
		Camp Equipment	54224.00
		Contigencies	19668.00
		Advance for Expenses	9327.00
		Bank Balance A/c No. 53223	697825.00
Grant Total	1349090.00	Grant Total	1349090.00



WII - BCRLI PROJECT RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipts	Amount	Payments	Amount
Opening Balance	25,868.09	Consumables	1,65,068.00
Grant Received	69,79,119.00	Regional Workshops	1,48,101.00
Loan from DWII	30,00,000.00	Course for mid level forest officers	3,87,672.00
Advances of TA/FA recovered	5,003.00	Ecological mapping	3,05,300.00
		International Expert	9,02,120.01
		Biological Indicators for assessing conservation objectives	12,14,507.00
		GIS Hardware & Software	24,45,978.00
		Lessons learnt visits	2,02,046.00
		Orientation for policy makers	8,25,624.00
		Salary / Fellowship	6,65,140.00
		Training of Spearhead Teams	48,163.00
		Vehicle hiring	3,30,284.00
		WII Input/support	1,00,469.00
		Equipment	19,30,677.00
		Refund of Loan to DWII	5,000.00
		Advances given for TA/FA	1,35,944.00
		Bank Balance A/C No - 10033049	1,97,897.08
Grant Total	1,00,09,990.09	Grant Total	1,00,09,990.09

"CAUSES OF AVIAN DIVERSITY GRADIENTS ALONG THE HIMALAYAS" RECEIPT & PAYMENT FOR THE PERIOD OF 24-06-2013 TO 31-03-2014

	Bank Balance A/c No. 53582	791887.23
	Contingencies	30146.00
	Travel	70931.00
23575.00	Consumables	106284.77
5322.00	Manpower	235718.00
1278000.00	Equipment	71930.00
	5322.00	5322.00 Manpower 23575.00 Consumables Travel Contingencies



"CLIMATE CHANGE ON RIVERINE FORESTS ALONG RIVER GANGA" RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Balance B/F	903072.00	Equipment	0.00
Bank Interest	47461.00	Manpower	179550.00
		Consumables	48127.00
		Travel	163237.00
		Contingencies	23205.00
		Overhead Charges	80724.00
		Bank Balance A/c no 53319	455690.00
Grant Total	950533.00	Grant Total	950533.00

DISTRIBUTION, POPULATION STATUS & CONSERVATION GENETICS OF CHEER PHASANT (CATERUS WALLICHI) IN HIMACHAL PRADESH

RECEIPT & PAYMENT FOR THE PERIOD OF 12-08-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
1St Installment received from SERB, New Delhi	600000.00	Equipments	55000.00
Interest received 04.02.14	8528.00	Manpower	311613.00
		Consumables	37137.00
		Contingencies	4565.00
		Travel	26681.00
		Bank Balance A/C No - 53669	173532.00
Grant Total	608528.00	Grant total	608528.00

"DIVERSITY OF SPIDER (ARACHNIDA: ARANEAE) ASSEMBLAGES IN ASKOT WILDLIFE SANCTUARY" UTTARAKHAND, WESTERN HIMALAYA RECEIPT & PAYMENT FOR THE PERIOD OF 26-09-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Science & Engineering Research Board (SERB)	1000000.00	Equipments	0.00
Interest received 2013-14	11718.00	Manpower	258387.00
		Consumables	27499.00
		Travel	10800.00
		Contingencies	13992.00
		F.A.	38221.00
		Over head Charges	32500.00
		Bank Balance A/c No - 53752	630319.00
Grant Total	1011718.00	Grant total	1011718.00



"ECOLOGY OF SLOTH BEAR IN AND AROUND RATAN MAHAL, JAMBUGHODA SANCTUARIES" RECEIPT & PAYMENT FOR THE PERIOD OF 16-07-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
1St Installment receive from SERB, New Delhi	600000.00	Equipments	0.00
Interest received F.Y. 2013-14	9521.00	Manpower	314339.00
		Consumables	53209.00
		Contingencies	2291.00
		Travel	51801.00
		Bank Balance A/c No - 53632	187881.00
Grant Total	609521.00	Grant total	609521.00

ECOLOGY OF THE ENDANGERED ASIATIC LIONS USINGH SATELLITE AND GPS TELEMETRY RECEIPT & PAYMENT FOR THE PERIOD OF 24-06-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Science & Engineering Research Board (SERB)	1324000.00	Equipment	29500.00
Interest received 2013-14	31959.00	Manpower	138749.00
		Travel	19047.00
		Contingencies	2530.00
		Bank Balance A/c No - 53583	1166133.00
Grant Total	1355959.00	Grant Total	1355959.00

"ECOLOGY TAXONOMY AND CONSERVATION OF FISHT DIVERSITY IN SUBANSIRI RIVER BASIN OF ARUNANCHAL PRADESH"

RECEIPT & PAYMENT FOR THE PERIOD OF 29-10-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
1St Installment receive from SERB, New Delhi	856000.00	Equipments	25921.00
Interest received 04.02.14	8632.00	Manpower	13471.00
		Consumables	60349.00
		Contingencies	14768.00
		Travel	1886.00
		Overhead Charges	42181.00
		Bank Balance A/c No - 53803	706056.00
Grant Total	864632.00	Grant total	864632.00



"PLANT PHENOLOGICAL RESPONSES TO CLIMATIC VARIATIONS ALONG TIMBERLINE ECOTONE IN OUTER FRINGES OF ASKOT WILDLIFE SANCTUARY" RECEIPT & PAYMENT FOR THE PERIOD OF 05-07-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
1St Installment receive from SERB, New Delhi	900000.00	Equipments	150252.00
Interest received 04.02.14	17414.00	Manpower	321413.00
		Consumables	78597.00
		Contingencies	19400.00
		Travel	42393.00
		Bank Balance A/c No - 53605	305359.00
Grant Total	917414.00	Grant Total	917414.00

"KAILASH SACRED LANDSCAPE CONSERVATION AND DEVELOPMENT INITIATIVE (KSLCDI)" RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Loan received from Account no. 08	5000.00	Equipment	262182.00
1st Grant received	2000102.79	Manpower	874613.00
2nd Grant received	2000102.79	Workshop	1016990.00
3rd Grant received	5014486.18	Travel	677212.00
Interest received during F.Y. 2013-14	55253.00	PNRM	316667.00
		Material Supply	170381.55
		Contingency	132077.00
		Overhead/ Institutional Charges	521766.00
		Loan refund to Account no 08	5000.00
		Consumables	100217.00
		Bank Charges	23.65
		Bank Balance A/c No. 53475	4997815.56
Grant Total	9074944.76	Grant Total	9074944.76



PATTERN OF SPATIAL AND TEMPORAL HABITAT OCCUPANCY IN RELATION TO CROP RAIDING BEHAVIOUR AND GENETIC VARIATION OF FREE-RANGING ASIAN ELEPHANT (ELEPHAS MAXIMUS) IN NORTH WEST INDIA USING NON-INVASIVE GENETIC SAMPLING" UNDER PROJECT ELEPHANT-UTTARAKHAND RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Ist Installment Grant Received	400000.00	Wages & Salary	10885.00
		Consumable	246619.00
		Bank Balance A/c No. 53957	142496.00
Grant Total	400000.00	Grant Total	400000.00

REVISION OF NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN (NBSAP) UNDER GEF DIRECT ACCESS PROJECT TITLED "STRENGTHENING THE ENABLING ENVIRONMENT AND MANAGEMENT IN INDIA" RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
National Biodiversity Authority	1280000.00	Project Associates	464560.00
Balance of previous project "Strategic Vision for Development of National Biodiversity Information Outlook (NBIO)	10679.00	Travel Cost of WII faculty/Consultant/Project Associates & Misc. Costs	123457.00
Ist Installment National Biodiversity Authority	3358898.00	Consultants	616129.00
Interest received 2013-14	52887.00	Manpower Costs	817999.00
lind Installment Received	2739690.00	Activity Costs	1591509.00
		Bank Balance A/c No - 53203	3828500.00
Grant Total	7442154.00	Grant Total	7442154.00

HYDRO ELECTRICAL PROJECT & BELLARY MACRO LEVEL STUDY RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipts	Amount	Payments	Amount
HEP	548174.00	Misc (HEP)	22600.00
BEL	2531.00		
Interest	21725.00	Bank Balance A/C No - 52127	549830.00
Grant Total	572430.00	Grant Total	572430.00



WII - RE-INTRODUCTION OF CHEETAH PROJECT RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Opening Balance	5,72,733.00	Biologists / sociologist	2,42,984.00
Intrest	18,320.00	Wages	0.00
		Office staff	0.00
		Casual Labour	0.00
		POL & Veh Main	0.00
		Travel Exp	9,957.00
		International TA	0.00
		contingences	10,095.00
		Bank Balance A/C No-52366	3,28,017.00
Grant Total	5,91,053.00	Grant Total	5,91,053.00

WII - LONG TERM MONITORING OF TIGER AT TATR, EVALUATING PATTERN OF DISPERSING TIGER, TRACKING OF GREAT INDIAN BUSTARD AND MAPPING RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Receipt	Amount	Payment	Amount
Opening Balance	15,36,152.00	Salaries & Wages	5,49,060.00
Grant Received	6,85,000.00	Consumables	1,155.00
Intrest	78,779.00	Travel	8,26,167.00
Grant Received Evaluation Pattern	8,00,000.00	contingences	4,26,848.90
Grant Received GIB & Mapping	27,92,600.00	Equipment	10,00,743.85
		Advance for expenses	17,915.00
		Bank Balance A/C No-53431	30,70,641.25
Grant Total	58,92,531.00	Grant Total	58,92,531.00



AITEP 2013-15/MSTRIPS/EVA PHY STREES & REPRODUCTIVE POTENTIAL IN REINTRODUCED TIGER PROJECT RECEIPT & PAYMENT FOR THE PERIOD OF 01-04-2013 TO 31-03-2014

Particulars	Amount	Particulars	Amount
Opening Balance	1,67,59,502.00	Equipment (Camera Trap, Compass, Range Finder, Binoculars, GPS, Computers, Software etc.)	91,88,027.00
Grant received MEE Proj	19,67,022.00	Contractual tech for data collection	49,12,469.00
Grant received (Sariska)	18,00,000.00	Vehicle hiring for data collection	36,94,905.00
Interest	8,56,590.00	Wages for field assistant	9,13,880.00
Grant Received (Bilal Proj)	8,00,000.00	Travel exp(including International for Conferences)	1899118
A/c No 8	13,60,000.00	Training Workshop (Six)	1065539
MSTrIPS	62,93,600.00	GIS Staff (Contructual for Data Analysis)	786100
K Ramesh	14,52,500.00	Contingencies	5183415
AITEP 2013-15	2,01,88,510.00	Pub & Trg material	119619
AITEP 2013-15 (Gao)	2,92,000.00	Grant tfr to MOEF	15000000
AITEP 2013-15	55,00,000.00	Grant for Sariska	1800000
Grant of Malik Project	15,20,000.00	A/c No 8	13,60,000.00
		Grant for K Ramesh	4,19,520.00
		Grant for Long Term TATR	8,00,000.00
		Advance for expenses	467758
		Bank Balance A/C No-50968	1,11,79,374.00
Grant Total	5,87,89,724.00	Grant Total	5,87,89,724.00



RESEARCH ACADEMIC & TRAINING CAPACITY BUILDING PROFESSIONAL SUPPORT VISITORS GOVERNANCE PUBLICATIONS TALKS & MEETINGS ACCOUNTS

WILD LIFE INSTITUTE OF INDIA FOREIGN CONTRIBUTION ACCOUNT RECEIPT & PAYMENT ACCOUNT FOR THE PERIOD ENDING 31ST MARCH, 2014

Receipts	Total	Payments	Total Amount
Balance as on April,1 2013		Fellowship & Wages	12,46,056.00
		Travel Expenditure	11,62,471.00
UBI A/c No 518502010000010	1,29,07,832.72	POL & Vehicle of Maint.	-
Interest Received	6,16,704.00	Contigencies	4,82,262.59
Fund Received		Office Equipment	6,05,719.18
		Field Equipemt	1,05,856.00
IPBES-Indo Nowgian Pilot Project-Phase-2		Base Camp Expenses	1,34,214.00
Global Biodiversity Information Facility Secretariat, Universitetsparken 15 DK-2100 Copenhagen, Denmark	22,25,130.00	Boarding & Lodging	4,99,271.00
GBIF-Govt. Bocy 21 Meeting in India		Report Writing	8,350.00
Global Biodiversity Information Facility Secretariat, Universitetsparken 15 DK-2100 Copenhagen, Denmark	8,45,306.00	Workshop Expenses	2,30,919.03
GBIF-Indo Nowgian Pilot Project-Phase-1		Corpus Funds	19,63,948.00
Global Biodiversity Information Facility Secretariat, Universitetsparken 15 DK-2100 Copenhagen, Denmark	22,33,416.00	Advance for Payment	3,89,417.00
		Total Expenditure	68,28,483.80
Workshop of WII-NINA-GBIF Project "Capacity Building	in Biodiversity Inform	natics"	
Promtion of Metadata Use and Data P. Publisher	2,93,771.00		
GTZ, New Delhi			
Travel Expenses	24,732.00	Balance as on 31st, March 2013.	
Sandee Collobative Project		UBI A/c No 518502010000010	16104407.92
International Centre for Integated Mountain Development, Kathmandu, Nepal	6,86,000.00		
GOI-UNDP-GEE Godavari Project			
Govt. of Andhra Pradesh Forest Department	31,00,000.00		
Total Rs	2,29,32,891.72	Total Rs	22932891.72





(Dr. V.B. Mathur) Director

