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Wildlife Institute of India

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OUR MISSION

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

INTRODUCTION

Early eighties of the last century brought about the realization of rapidly diminishing natural resources and environmental degradation all over the world including India. At the same time, the understanding of environmental issues was still a little hazy, and the initial remedial responses to complex environmental problems had mixed outcomes of successes and failures.

The limitations of the early initiatives also brought into focus the inadequacy of trained manpower for wildlife management and of wildlife biologists to conduct research and overcome the paucity of researched information for promoting proper conservation planning. A need was felt for establishing an organization which through multi-disciplinary research at field level could help to respond to the challenges of biodiversity conservation and develop holistic approaches for managing wildlife and its habitats across the country and the region. This led to the setting up of the Wildlife Institute of India (WII), at Dehra Dun, in 1982.

In 1986 WII was granted the status of an autonomous institution of the Ministry of Environment & Forests, Government of India. WII 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, UNESCO. These collaborations have helped the Institute to 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 provide a more practical and realistic direction to the concept and practice of wildlife conservation by seeking the involvement and cooperation of the local communities. By learning from its own and others' experiences, WII is traversing a path of hope and aspiration, which 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.

AIMS AND OBJECTIVES

- Build up scientific knowledge on wildlife resources
- Train personnel at various levels for conservation and management of wildlife.
- Carry out research relevant to management including the development of techniques appropriate to Indian conditions.
- Provide information and advice on specific wildlife management problems.
- Collaborate with international organizations on wildlife research, management and training.
- Develop as a regional centre of international importance on wildlife and natural resource conservation.

RESEARCH

Sharmila Jayaram

Completed

Ongoing

Initiated

COMPLETED PROJECTS

Study of Impacts of Biotic Disturbances on Forest Birds Communities in Selected Areas of Uttar Pradesh and Uttarakhand and Development of a Bird-Habitat Monitoring Protocol

Funding Source	:	Grant-in-Aid
Investigators	:	Dr. Dhananjai Mohan and Shri Pratap Singh
Researcher	:	Monica
Date of Initiation	:	May 2009
Date of Completion	:	July 2012

Objectives: Minor extractive disturbances such as lopping, grazing, firewood collection, fires and biological invasions are the most widespread pressures on forests in developing countries. Biodiversity is facing serious threats due to such activities in most protected areas in India, but little work has been done to understand the impact of such disturbances on the flora and fauna. Considering the need to decipher the role of these small and gradual disturbances on the faunal components of the forest, the present study was formulated with the following objectives: (i) to study the influence of biotic disturbances on the avifauna of the western Himalayan foothills tract; (ii) to identify indicator birds for various disturbance regimes; and (iii) to develop a simple bird habitat monitoring protocol based on the above findings.

Progress: To find out the relationship between habitat disturbance and birds, sampling plots were located and marked across a disturbance gradient in three dominant types of vegetation, namely Dry Sal in the southern part of Rajaji National Park (RNP), Moist Sal in the northern part of RNP and Dehradun Forest Division and *Anogeissus latifolia* tracts in the hilly slopes of RNP. A total of 30 study plots along a disturbance gradient (10 each in the three forest types) with nine sampling points in each were surveyed during summer and winter from 2009 to 2011. The draft final report of the project was submitted during the current year.

Outputs & Outcomes: The species accumulation curves of all three forest strata showed that the sampling effort is sufficient as the plot of the number of bird species against the number of sampling plots was asymptotic. The results show that grazing pressure is a major disturbance factor in all three forest strata. In mixed hill forest strata, regression analysis revealed a linear relationship between habitat and PC1. Additionally, the average basal area, canopy cover and average GBH decreased linearly with increasing disturbance level. However, the tree density increased with increasing disturbance level. The response of the vegetation structure to the disturbance gradient in Dry and Moist Deciduous Sal forests seems to support the intermediate disturbance hypothesis. Segregation of sites using PCA and cluster analysis corresponds closely with that made a priori by investigators. Distance analysis shows that the density of birds is higher in the Dry Sal Forest.

Response of bird community to disturbance variables: In the dry forest, the bird richness decreased with increasing timber extraction during the breeding season, but during the non-breeding season, it was influenced negatively by grazing but positively by firewood collection. Increased lopping and occurrence of fires during the breeding season led to a decrease in the bird richness in the hill forest, whereas in the non-breeding season bird richness was influenced negatively only by lopping. None of the estimated parameters, however, was significant at the p=0.01 level. In the moist forest, lopping significantly influenced the bird richness positively during both the breeding and non-breeding seasons. During the breeding season, firewood collection and timber extraction significantly reduced the bird richness in the moist forest. During both the breeding and non-breeding seasons, bird densities were highest in the hill forest. Across all forest types, bird densities were high during the breeding season compared with the non-breeding season. However, a few plots in the dry (Sukh) and hill (Kharasot and Sukh) forests exhibited higher densities during the non-breeding season.

Disturbance and lantana presence and abundance: The results indicate that timber extraction is the disturbance factor responsible for lantana presence in both the dry and hill forests. Further, generalized linear modeling using the data set after data points without lantana were removed indicated that lantana abundance in the dry and hill forests is related to disturbance; however, none of the explanatory variables was found to be significant in the moist forest. In the dry forest, lantana abundance was found to be influenced negatively by timber extraction and firewood collection but positively by grazing. In the hill forest, only lopping pressure was selected in the best fit model, and the relationship was positive.

Response of bird guilds to small-scale extractive disturbances: As the response of birds to habitat variables is often exhibited better at the guild level, the birds were classified into five major and nine fine feeding guilds on the basis of the published literature and field observations. Lopping and firewood collection resulted in decreases in the density of canopy insectivores in the hill forest. Fire in the hill and moist forests negatively influenced the density of canopy insectivores. Timber extraction and grazing led to a decrease in the understorey insectivores, whereas lopping resulted in an increase in the dry and hill forests. Sallying insectivores decreased with disturbance-mediated canopy openings in the hill forest, whereas they increased in the moist forest. Trunk-bark feeders were not affected by small-scale extractive disturbances. Increasing lantana density resulted in an increased density of the frugivorous guild. The granivorous and omnivorous guilds increased in density with increasing small-scale extractive disturbances and fires. Grazing, firewood collection and fires led to decreases in the density of the nectar-insectivore guild.

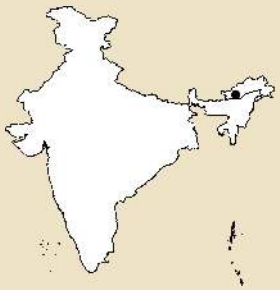
Birds as indicators of small extractive disturbances: To study this aspect, the bird observations were subjected to indicator species analysis. The study plots were classified into high, medium and low disturbance categories based on the overall disturbance. In all, 66 species of bird emerged as statistically significant indicators ($p<0.05$) of disturbance in different forest types across the two seasons. In this set of indicator species, many species showed a strong relationship with specific

Milestone: The following paper was published as an outcome of the study:
Kaushik, Monika, Dhananjai Mohan and Pratap Singh, 2012. Response of resident and migrant bird communities to anthropogenic disturbances in Shiwalik landscape, Uttarakhand, India. *J. Bombay Nat. Hist. Soc 109 (1&2) Jan.–Aug. 2012.*

disturbances and thus had a value for monitoring them.

Bird-habitat monitoring protocol: A simple indicator-based protocol was developed for use in monitoring habitats. The indicator birds identified earlier were evaluated against the four criteria of ease of delectability, availability across seasons, widespread occurrence and response to multiple stressors. A total of 12 bird species were finally selected based on the above criteria as robust indicators of disturbance, half of them responding positively and half negatively to disturbance. Their densities were presented for low and high disturbance situations, and simple census methods indicated which of the species could be used for the final protocol.

Conservation of the Endangered Asiatic Wild Dog, *Cuon alpinus* in Western Arunachal Predesh: Linking Ecology, Ethnics and Economics to Foster to Better Coexistence



Funding Source	:	Department of Science and Technology
Investigators	:	Dr. Gopi G.V. and Dr. Bilal Habib
Researchers	:	Salvador Lyngdoh and K. Muthamizh Selvan
Date of Initiation	:	May 2009
Date of Completion	:	May 2012

Objectives: The objectives of the project were to (i) estimate the abundance and population structure of the dhole (wild dog) and its prey species in protected areas of western Arunachal Pradesh; (ii) examine the food habits, prey selection and patterns of predation of the dhole on different prey species; and (iii) quantify the current people–wild dog conflicts by assessing the livestock depredation by dholes and retaliatory killing by local people.

Progress & Outcomes: Population status and abundance estimates were made through individual identification using camera trapping and mark–recapture methods. A sign survey was carried out along roads, streams and trails to identify suitable locations for camera trapping and to derive the encounter rate of carnivore signs in Pakke Tiger Reserve (PTR). The study area was divided into a 2×2 km^2 grid. Each grid had at least one pair of Moultrie digital cameras. A total of 40 cameras were operated in 40 locations for 60 to 100 days. Capture histories (X-Matrix) were developed for each adult tiger and leopard and population sizes were estimated using the program MARK. The densities of tigers and leopards estimated from the population sizes (N) were divided by the effective sampled areas (A). The photographic encounter rate was used to estimate the dhole abundance. For individually non-identifiable species, the photographic rates seemed to correlate well with the animal abundances. A total of 2,200 trap nights over a period of two years resulted in 50 tiger photographs with seven individual tigers, 41 leopard photographs with seven individual leopards and 27 photographs of wild dogs, with a maximum pack size of three individuals. The estimated population size of the tiger was 7 to 10.2 and that of the leopard was 8 to 14. The estimated population density of the tiger was 2.12±0.04 and that of the leopard was 4.48±0.15. The relative abundance index (RAI) of dhole captures/100 trap nights was found to be 0.15 in 2010 and 1.7 in 2011.

The density, structure and composition of the populations of the major prey species were studied in PTR in western Arunachal Pradesh. The estimated density of ungulates was 17.5/km^2, with an overall density of 48.7/km^2. The wild pig had the highest density (6.7±1.2/km^2) among all the prey species, followed by the barking deer (3.9±0.6/km^2), sambar (3.8±0.5/km^2) and gaur (3.5±0.9/km^2). The estimated total ungulate biomass density was 2182.56 kg/km^2. The estimated density of minor prey species (capped langur, red jungle fowl, kalij Pheasant, grey peacock pheasant and Malayan giant squirrel) was 31/km^2. The study documented population estimates of the major prey species for the first time in PTR, which will be of help in carnivore conservation.

A total of 422 scats were analysed, of which 109 were tiger scats, 150 were leopard scats and 163 were dhole scats. The multinomial likelihood ratio test was used to estimate the prey selectivity, and significant selection (P>0.05) was found among the prey species. Sambar (P>0.05), barking deer (P>0.05) and wild pig (P>0.05) were taken more than their availability. The Ivlev index showed that barking deer and sambar were the preferred prey of the tiger, whereas the leopard preferred sambar and avoided barking deer. The dhole showed a preference for wild pig and barking deer. The results show that despite the immense human pressure, PTR supports a moderate abundance of wild prey, which in turn can support a good population of large carnivores.

The study also documented the socio-economic factors that drive the decline of wild dog populations. A total of 809 households were interviewed from 50 villages across the East Kameng, Papum Pare and Lower Subansiri districts. The overall literacy rates of Apatani Valley, Seppa and Seijosa were greater than 35%. The lowest literacy rate was recorded in *Itanagar Wildlife Sanctuary* followed by Pakke, Kessang and Segalli. Apatani Valley had a very high child literacy rate, about 90%. Seijosa and Naumura had child literacy rates of roughly 60%. Nearly 180 cases of livestock depredation were attributed to the dhole. The mithun was the animal most preyed on. Approximately 25% of the mithun stock was preyed on annually in the sampled houses of the villages surveyed. This high loss of mithun can be attributed to the fact that it is semi-domesticated cattle. Preying did not vary significantly across districts (Kruskal–Wallis, P>0.354, two-tailed, DF 2). It did not vary significantly even with respect to circles (Kruskal–Wallis, P>0.458, two-tailed, DF 6). The hunting pressure per household was calculated. It was found that the Segalli circle had more than 3 small mammals, 1.6 medium-sized mammals and <1 large mammal hunted per house. The main motive for hunting was found to be sustenance. The sustenance mentioned here refers to the meat used only for local consumption and non-commercial use. Sixty-eight percent of the respondents said that the reason for hunting was mainly sustenance. Most of the hunting activities, except for bird species, were concentrated in winter and early summer. There was a significant difference in hunting across Pampumpare, East Kameng and Lower Subansiri (Kruskal–Wallis, P<0.008, DF 2). The Kruskal–Wallis test showed that there were significant differences between the three districts in the attitude towards the dhole (P<0.008, DF 2).

An Assessment of Entomofauna for Management and Conservation of Biodiversity in the Gangotri Landscape

Funding Source : Grant-in-Aid
Investigator : Dr. V.P. Uniyal
Researchers : Manish Bhardwaj and Abesh Kumar Sanyal
Date of Initiation : January 2008
Date of Completion : January 2013

Objectives: The objectives of the project were to (i) assess the ecological diversity and distribution pattern of beetles (*Coleoptera*) and butterflies (*Lepidoptera*) in the Gangotri Landscape; (ii) determine the status of beetles (*Coleoptera*) as pests in different forest types in the landscape; (iii) determine the impact of anthropogenic pressures on assemblages of butterflies and beetles; and (iv) develop and suggest long-term management strategies for conservation of invertebrate diversity in the landscape.

Progress: The study was conducted in two protected areas of the Gangotri Landscape, *viz.,* Gangotri National Park and Govind National Park and Wildlife Sanctuary. Sampling plots were laid to record the diversity of moths and beetles in the elevation zones between 1,200 and 4,000 m. Topographic, climatic, vegetation and disturbance parameters were quantified on the same plots to gain an understanding of the possible environmental correlates of insect diversity in the Gangotri Landscape. Taxonomic experts were consulted and insect repositories of various institutions were visited for identification of species. A large number of moth, butterfly and beetle species collected over four years from the landscape were identified up to the species and morphospecies levels. The identification work is still in progress and may lead to many new species to science being discovered.

Outputs & Outcomes: Over 950 morphospecies falling in two major insect orders (Coleoptera and Lepidoptera) were sampled from the landscape. A total of 460 species were identified, including 159 species of butterfly, 174 species of moth and 127 species of beetle. Elevation and temperature were observed to be the most influential factors controlling the species richness of the Lepidoptera. The species richness was observed to decrease with elevation, showing bimodal peaks between 1,200 and 1,800 m and between 2,300 and 2,500 m ($r=-0.81$, $P<0.01$) for butterflies and between 1,800 and 2,200 m ($r = -0.83$, $P<0.01$) for moths. The highest species richness and diversity were recorded in mixed riparian forest and broadleaf forest for all taxa. The plant species richness was highly and significantly positively correlated with ($r=0.81$, $P<0.01$) butterfly species richness ($r=0.87$, $P<0.01$) and moth diversity ($r=0.48$, $P<0.0001$). Livestock abundance and signs of fire were observed to be major predictors of insect diversity. The findings of the study support the 'water-energy' hypothesis of species richness gradients. The study found significant positive cross-taxon correlations between butterfly, moth and beetle species across sites, suggesting that butterflies can be used as

Milestone: *Significant findings.* More than 100 species of moth and 12 species of beetle were identified as new records for protected areas in Uttarakhand, of which a few were new records for the western Himalaya. A nocturnal insect trapping protocol was developed for sampling moths in remote and rugged areas at high altitudes. Butterflies were identified as successful surrogate indicator taxa for identifying diversity in other hyper-diverse groups of insects (moths and beetles). A set of forest-specific indicator species was identified. Rapid assessments of habitats using butterflies as indicators were found to be a quick and cost-effective protocol for identifying areas important for monitoring and conservation of insect fauna in the Gangotri Landscape.

surrogate indicator taxa for insect assessment and monitoring. The study identified and highlighted the areas important for insect conservation in the Gangotri Landscape, such as Nilang Valley, in Gangotri National Park, and the Istragad and Jakhol watersheds, in Govind National Park and Wildlife Sanctuary.

Determining the Offshore Distribution and Migration Pattern of Olive Ridley Sea Turtles *Lepidochelys olivacea* along the East Coast of India

Funding Source	:	Director General of Hydrocarbons
Investigators	:	Dr. K. Sivakumar, Sh. B.C. Choudhury, Dr. C.S. Kar and Dr. P. Bhadhury
Consultant	:	Dr. Naveen Namboothri
Researcher	:	Satya Ranjan Behera
Date of Initiation	:	October 2006
Date of Completion	:	March 2013

Objectives: The objectives of the project were to (i) estimate the abundance and spatial distribution of adult and mating turtles off the mass nesting sites in Odisha to determine their critical marine habitat requirements during the breeding season; (ii) study the movement of satellite-tagged turtles in the coastal waters along the east coast of India, in the Bay of Bengal (BoB) and beyond; (iii) track the long-range migratory route of the adult olive Ridley and determine the non-breeding area of the Ridleys that use the east coast of India for nesting; and (iv) determine various other environmental parameters and possible impacts of developmental activities in both marine and coastal nesting habitats.

Progress & Outcomes: During the reporting period, a draft of the 'Best Practice Guideline for the Hydrocarbon Exploration Activities Including Mitigation Measures' was finalized. The draft emphasizes the need to balance the development aspirations of a country with sustainability concerns while ensuring equity in development. It is proposed to organize a consultative meeting of the representatives of the DGH, oil operators and MoEF officials to make a presentation of the guidelines *vis-à-vis* some of the existing guidelines of other countries so that a consensus document may be drawn up after consultations.

The benthic biota monitoring study, which has been taken up in collaboration with *Indian Institute of Science Education and Research* (*IISER*), Kolkata, has progressed satisfactorily, and IISER has provided an interim report. Recent near-shore benthic Foraminifera from three vulnerable sites encompassing 23 sampling stations along coastal Odisha were studied for the first time for their composition, distribution and assemblage patterns. Thirty-nine species of benthic foraminifers (from six orders and 23 families) were identified, of which all 39 were present in Rushikulya, 22 were present in Devi and 12 were present in Gahirmatha, with abundances ranging from 35 to 2,620 individuals/10 cm^3 in the sediments. The communities across the sites were dominated by eurytopic rotalids, followed by miliolids and textularids. The benthic foraminifer assemblages were found to be dominated by the *Ammonia* species complex (up to 38% in Rushikulya, 64% in Devi and 22% in Gahirmatha). Agglutinated foraminifers were infrequent in the sediments

(seven species in Rushikulya, four species in Devi and three in Gahirmatha) on the other hand, being dominated by *Quinqueloculina agglutinans* in Rushikulya and *Trochammina macrescens* and *Ammobaculites agglutinans* in Devi and Gahirmatha. The substrates along the study sites were found mostly to be sand dominated, and in some of the stations the sediment composition influenced the foraminifer distribution pattern. The present findings regarding the assemblage patterns of benthic foraminifers from three coastal settings in Orissa along the BoB are comparable with those of previous work from other sandy coastal ecosystems in the world. Overall, these data provide valuable insights into the distribution and assemblage patterns of benthic foraminifers from the coastal regions of the BoB.

Research Strategies for Conservation of Coastal and Marine Biodiversity in the East Godavari River Estuarine Ecosystem, India

Funding Source	:	UNDP-GEF Marine Programme
Investigator	:	Dr. K. Sivakumar
Researcher	:	Gitanjali Katlam
Date of Initiation	:	January 2012
Date of Completion	:	October 2012

Objectives: Identification and prioritization of research gaps in conservation of coastal and marine biodiversity in the East Godavari River Estuarine Ecosystem (EGREE), India, were the main objectives of the project.

Progress & Outcomes: EGREE has a rich biodiversity, and a part of this area is gazetted as Coringa Wildlife Sanctuary (CWLS). An extensive literature review involving about 700 research publications published between 1871 and 2012 from this region was carried out during the reporting period. About 29% of the studies have been carried out on fauna of the Godavari estuary and its adjoining areas. Most of these studies have highlighted different aspects of the ecology, biology, taxonomy and distribution of different types of fauna. From the literature review, it was evident that there were several areas such as socio-economics and climate change that have been studied very little in this region and that require immediate attention. Most of the previous studies were focused on geochemical, geophysical and geological aspects. Since there have been intensive anthropogenic interventions such as industrialization, overfishing and shipping in the area recently, there is a need to undertake scientific assessments of these.

The Wildlife Institute of India, in consultation with various stakeholders, has identified and prioritized about 58 research programmes that need to be undertaken in the Godavari region as part of the development of the knowledge management system of this project. A total of 58 research programmes were identified and prioritized into three categories. These research programmes are expected to help coastal and marine spatial planning, development of an integrated management plan for the region, restoration of threatened species and their habitats in the region, improving the livelihoods of local communities, gaining a better understanding of the biodiversity

value and ecological services of EGREE and preparing a plan with respect to climate change and other potential future threats. Two key research priorities identified were: (i) evaluating the economic value of ecosystem goods and services of the Godavari ecosystem; and (ii) studying the impacts of climate change on the Godavari Delta.

Ecology of Tigers *Panthera tigris L.* in Pench Tiger Reserve, Madhya Pradesh and Maharashtra

Funding Source	:	Grant-in-Aid
Investigators	:	Dr. K. Sankar, Dr. Y.V. Jhala, Shri Qamar Qureshi, WII; & Dr. Rajesh Gopal, National Tiger Conservation Authority
Researcher	:	Aniruddha Majumder
Date of Initiation	:	September 2005
Date of Completion	:	March 2013

Objectives: The objectives of the project were to (i) collect information on the ranging, movement and dispersal patterns of tigers; (ii) study the use of the habitat by tigers; (iii) gather information on the food habits of the tiger; (iv) assess the populations of the prey species; and (v) prepare a habitat suitability map for the tiger and its prey and suggest recommendations for effective management of the tiger population in Pench Tiger Reserve and adjoining areas.

Progress & Outcomes: One adult female (AF), one adult male (AM) and one sub-adult male (SAM) tiger were radio-collared and monitored to study the home ranges of tigers. The availability of prey species was estimated using the line transect method in an intensive study area of 410 km² between January 2007 and June 2012. In this study, a forest beat was considered as a sampling unit, and line transects were laid on each beat (n=44) of the intensive study area. Forty-four line transects, which varied in length from 2 to 4 km, were walked in winter (total effort=1,016 km) and summer (total effort=2,852 km). The biomass of different prey species was computed by multiplying their mean densities (pooled for all years) with the body weight of the respective species. Ten vehicle transect routes, ranging in length from 2.7 to 13.6 km were monitored in winter and summer from 2007 to 2009. Data on the population structures of wild ungulates collected from both line and vehicle transects were pooled for the two seasons. Prey selection and food habits were evaluated from scat and kill data. The survival rate, growth rate and recruitment pattern of tigers were estimated using the camera trap mark–recapture technique between May 2006 and March 2013 in an area >274 km². Based on information about the forest cover, potential prey base, water availability and anthropogenic disturbances, habitat suitability model (environmental niche factor analysis) for the tiger was developed for Pench Tiger Reserve and its 5 km buffer.

Using the 95% fixed kernel (FK), the estimated home ranges of AF, AM and SAM were 32.1 km², 64.1 km^2 and 19.1 km^2, respectively. The core area of individual activity for each tiger, as determined by the 65% FK, was 10.3 km² for AF, 20.3 km^2 for AM and 6.6 km^2 for SAM. The common langur was found to be the most abundant prey species both in winter and summer in the study area (73±7.6 SE/km² in winter and 110.7±12.7 SE/km² in summer), followed by the chital (50±7.1 SE/km² in winter and 91.7±15.7 SE/km² in summer), sambar (6±0.5 SE/km² in winter and 9.5±0.7 SE/km² in summer), nilgai (2±0.5 SE/km² in winter and 2.8±0.7 SE/ km² in summer), wild pig (5.2±1.2 SE/km² in winter and 13.8±2.5 SE/km² in summer) and gaur (1.4±1 SE/km² winter and 3.3±0.9 SE/km² in summer). The estimated mean biomass for six

potential prey species as estimated from the line transects was 4894.4±1046.3 kg/km² in winter and 8885.5±1573.4 kg/km² in summer, with the chital contributing the maximum in both winter and summer, followed by the gaur in winter, the sambar in summer and the common langur, nilgai and wild pig in both summer and winter. In total, 469 tiger scats and 123 tiger kills were collected during winter, and 157 tiger scats and 162 tiger kills were collected during summer. Scat analysis revealed that tigers utilized a wide range of prey species, especially medium and large bodied prey species. In terms of biomass consumed, the chital was found to be the important prey species of the tiger. Kill data showed high predation of wild ungulates by the tiger, especially adult male chital (20.3% of the overall prey species preyed on by the tiger in winter and 34% in summer). The overall tiger density±SE/100 km² estimated using the maximum likelihood spatial explicit capture–recapture method was 4.7±1.2 in the first trapping year and 4.1±0.7 in the last trapping year. The estimated survival rate of all tigers (n=66) was 0.66 (±0.04), whereas for all male tigers (n=22) it was 0.59 (±0.09), for all female tigers (n=44) it was 0.7 (±0.06), for adult male tigers (n=7) it was 0.83 (±0.07), for all breeding female tigers (n=14) it was 0.86 (±0.05), for sub-adult tigers (n=45) it was 0.57 (±0.29), and for cubs (n=52) it was 0.73 (±0.05). The estimated mean annual growth rate (±SE) for all tigers was 1.15 (±0.11), followed by 1.23±0.13 for all males, 1.17±0.27 for all females, 1.1±0.01 for adult male tigers and 0.98±0.11 for all adult breeding female tigers. The estimated mean recruitment (±SE) for all tigers in the population was 9.2±2.2, followed by 2.8±0.8 for all male tigers, 6.4±2.3 for all female tigers, 1.04±0.4 for adult male tigers and 1.2±0.2 for breeding female tigers. The sex ratio (male:female) was found to be female biased, and more than 80% of the overall recruitment was contributed by female tigers.

An area of 281 km² was found to be highly suitable habitat, and an area of 133 km² was found to be moderately suitable. Areas of 156 km² and 518 km² were found to be unsuitable for tigers in Pench and the surrounding areas, respectively. Most of the unsuitable and poorly suited tiger habitats were found outside the Pench protected area (Pench National Park and Pench Wildlife Sanctuary), *i.e.* the buffer habitat of the study area. As the tiger is a large ranging animal and requires a large space to grow and disperse in, it is important to have habitats suitable for tigers in the buffer areas as well. Converting unsuitable habitats to highly suitable ones for the tiger is essential for its long-term survival and growth in this landscape. Maintenance of functional corridors connecting Pench with other source population sites of the tiger, *i.e.* Kanha Tiger Reserve and Satpura Tiger Reserve, is the need of the hour for forming meta-population structures of the tiger in this landscape.

Ecology of Leopard in Sariska Tiger Reserve, Rajasthan

Funding Source : Grant-in-Aid
Investigators : Dr. K. Sankar, Shri Qamar Qureshi and Dr. Y.V. Jhala
Researchers : Krishnendu Mondal and Pooja Chourasia
Date of Initiation : September 2007
Date of Completion : March 2013

Objectives: The objectives of the project were to (i) understand the factors influencing the ranging pattern and home range of the leopard; (ii) collect information on prey selection and habitat use by the leopard; (iii) collect information on the population structure, survivorship and dispersal pattern of the leopard; and (iv) develop a conservation action plan for the leopard in semi-arid landscapes.

Progress & Outcomes: Radio-telemetry was used to estimate the home ranges of leopards. The estimated home range of the male leopard SP1 with 100% MCP was 84.3 km^2, and that of the male leopard SP2 was 63.2 km^2. With the 90% kernel, the estimated home range of SP1 was 72.4 km^2 and that of SP2 was 25.9 km^2. These two leopards significantly used more habitats with higher encounter rates of nilgai and wild pig and used habitats with higher encounter rates of chital and common langur less. The encounter rate of the tiger had a negative correlation with resource use of trans-located leopards, but it was not found to be significant. The prey species abundance in the study area was estimated using the line transect method with a distance sampling technique. In total, 32 line transects varying in length from 1.6 km to 2 km were laid, covering an area of 160 km^2 in the intensive study area. The total transect length of 60.4 km was walked three times in the early morning, resulting in a total effort of 181.2 km. The scat analysis method was chosen to estimate the proportion of different prey species consumed by leopards, the method being a widely used and cost- and time–effective one. In total, 145 leopard kills were recorded during the study period. In the study area, the peafowl was the most abundant prey species throughout the study period. In 2012, the nilgai (36.62/km^2) was the most abundant wild ungulate prey species, followed by the chital (37.12/km^2), wild pig (20.51/km^2) and sambar (15.82/km^2), in the study area.

The density of common langur in the study area varied from 22.06/km^2 in 2008 to 11.42/km^2 in 2009, 4.28/km^2 in 2010, 23.40/km^2 in 2011 and 40.27/km^2 in 2012. Since there are 10 villages inside the Sariska National Park area, the abundance of livestock was comparatively high in the study area. The density of goat in the study area was recorded as 54.1/km^2 in 2008, 60.9/km^2 in 2009, 58.9/km^2 in 2010, 45.69/km^2 in 2011 and 8.65/km^2 in 2012.

From the scat analysis, it was found that sambar contributed the maximum (40.4%) to the leopard diet in 2008, followed by chital, nilgai, common langur, hare, cattle, porcupine, wild pig, peafowl and domestic dog. In 2009, sambar contributed the most (45.5%), followed by chital, nilgai, cattle, common langur, peafowl, porcupine, hare and wild pig. In 2010, sambar contributed the maximum (33.7%) to the leopard diet, followed by chital, cattle, common langur, peafowl, nilgai, rodents, wild pig, porcupine and hare. In 2011, sambar contributed the maximum (31.4%), followed by chital, common langur, cattle, peafowl, rodents, nilgai, wild pig, hare and goat. In 2012, chital contributed the maximum (38.6%) to the leopard diet, followed by sambar, nilgai, rodents, peafowl, common langur, cattle, buffalo and wild pig.
The data on the utilization and availability of prey species were compared, and an index of selection of each species was obtained. It was found that, in 2012, sambar ($P<0.01$), chital ($P<0.01$) and common langur ($P<0.01$) were preyed more than their availability, while nilgai ($P<0.01$) was preyed less than its availability. Cattle and peafowl were preyed in proportion to their availability ($P>0.05$).

In total, 145 kills made by leopards were recorded in the study area during the study period. From these kills, it was found that sambar and nilgai contribute the maximum (12.6% and 11.1%, respectively) to the leopard's diet, followed by peafowl, chital, wild pig and common langur in terms of wild prey species. In terms of livestock, cattle contribute the maximum (36.4%) to the leopard's diet, followed by goats (21.6%) and buffaloes (3.1%). The high contribution of livestock kills was mainly from the peripheral areas of Sariska Tiger Reserve. The findings of a previous study were compared with those of the present work. It was found that leopards largely used to prey upon rodents when there was an established population of 20–24 tigers in Sariska Tiger Reserve. The leopards shifted their diet from lesser prey species to large ungulates after the extermination of tigers from Sariska TR.

The camera trapping method was used under a mark–recapture framework to estimate the population structure of leopards between 2008 and

2012. At each grid, a pair of passive infrared analogue or digital camera traps was placed facing each other between 5 and 8 m from the centre of the trail so as to photograph both flanks of passing leopards. The camera trapping resulted in a total of 64 photographs of 17 individuals in 2008. Sixty-one photographs of 14 individuals were obtained in 2009, 34 photographs of 8 individuals in 2010, 42 photographs of 14 individuals in 2011 and 76 photographs of 38 individuals in 2012. The estimated population (*N*) of leopards was 17.9±3.0 in 2008, 16.3±3.3 in 2009, 9.0±1.5 in 2010, 16.9±3.4 in 2011; and 40.0±1.7 in 2012. The half normal detection function was used to estimate the density of leopards in the study area. The densities were determined using the multiple likelihood model (MLDens) as 9.3±2.2 individuals/100 km^2 in 2007, 7.7±1.9 individuals/100 km^2 in 2008, 5.3±1.4 individuals/100 km^2 in 2009, 3.1±0.4 individuals/100 km^2 in 2010, 7.1±2.0 individuals/100 km^2 in 2011 and 16.8±2.2 individuals/100 km^2 in 2012. The overall survival rate of leopards in the study area was estimated as 0.75±0.12 during 2007–2008, 0.72±0.13 during 2008–2009, 0.92±0.16 during 2009–10, 0.62±0.14 during 2010–11 and 0.98±0.21 during 2011–12. The overall survival rate of the leopard population in the entire sampling period was estimated to be 0.79±0.04. The overall geometric mean rate of the population change was estimated as λ_t=1.32±0.38 (estimated mean±SE), representing an approximate 4% increase in population over the entire study period. The estimated population of leopards declined from 16.3±3.3 in 2009 to 9.0±1.5 in 2010, which may be attributed to temporary emigration due to the re-introduction of tigers. After the extermination of tigers in Sariska, leopards took over the entire tiger habitat, which was the best habitat available in Sariska, and became the top predators. The density estimates for leopards were comparatively higher in 2007 and 2008, when there was no tiger in the study area. Six tigers were re-introduced between 2008 and 2010, and after that the density of leopards declined significantly (from 6.2±0.8 in 2009 to 3.1±in 2010). But after the tigers established their home ranges in Sariska, the abundance of leopards again went up to 40.0±1.7 in 2012, and the density went up to 16.8±2.2. The overall survival rate of leopards in the study area was 79%. The critical tiger habitat (CTH) of Sariska is 881.4 km^2. A buffer area of 322.23 km^2 around the CTH has recently been notified. Hence the effective total area of the tiger reserve is 1,203.63 km^2, which can ensure the long-term survival of tigers and leopards in the semi-arid landscape of the Aravalli Hills, provided the anthropogenic activities are reduced in these areas and habitat management efforts are undertaken to improve the prey base of tigers.

Land Use and Land Cover Dynamics and Impact of Human Dimension in Lower Ganga Basin

Funding Source	:	National Remote Sensing Centre, ISRO, DOS
Investigator	:	Dr. Gautam Talukdar
Researcher	:	Indranil Mondal
Date of Initiation	:	August 2010
Date of Completion	:	March 2013

Objectives: The objectives of the project were to (a) generate a land use/land cover database with a uniform classification scheme for 1984–85, 1994–95 and 2004–05 using satellite data at a 1:250,000 scale; and (b) develop a database on the impacts of the human dimension.

Progress: Land use land cover (LULC) data were generated for the years 1985, 1995 and 2005 by visual interpretation of satellite images. Data pertaining to drivers of LULC change were compiled from various sources. The changes in LULC and transformation from one LULC category to another were calculated, and logistic regression was used to investigate the main drivers behind some major transformations.

Outputs & Outcomes: LULC maps of the basin were generated for 1985, 1995 and 2005 using satellite data at a scale of 1:250,000.

Cropland is the most dominant LULC class in the Lower Ganga Basin. The total area under Cropland was about 65.42% of the basin's total geographical area in 1985, which decreased to 64.83% in 1995 and to 64.23% in 2005. In contrast, Fallow Land increased from 3.4% in 1985 to 3.68% in 1995 and to 3.88% in 2005. Improving the educational and income status may have made people abandon agriculture and move on to other occupations. This shift may have promoted an increase in Scrubland (SL) at the expense of Fallow Land (FL). Barren Land (BL), Deciduous Broad-leafed Forests (DBF), Grassland (GL) and Mixed Forest (MF) show very small changes or no change at all. The DBF in the study area mainly occur inside the protected area. Therefore, there has been no change in this category. Classes such as Built Up (BU), Plantation (PL), Permanent Wetlands (PW) and Scrubland have shown a very gradual increase in area coverage from 1985 through 2005. The increase in BU is obviously due to the increase in size of the population. The study area consists of banana, mango, litchi and guava plantations, which make for a more profitable form of agriculture. This may account for the increase in area under plantations. Water Bodies (WB) and Wasteland (WL) have shown a gradual decrease in area from 1985 to 2005. In the study area, the WL category is mainly characterized by rocky outcrops. These places are rich in minerals and are ideal places for setting up mines—cement, limestone and coal. Project guidelines categorize mining under the BU category. Therefore, with an increase in mining activity, there has been a land transformation from WL to BU.

The dynamics of LULC changes in the Lower Ganga Basin during the period of study were analysed. The maximum transformation is seen from Cultivated Land (CL) to WB and vice versa

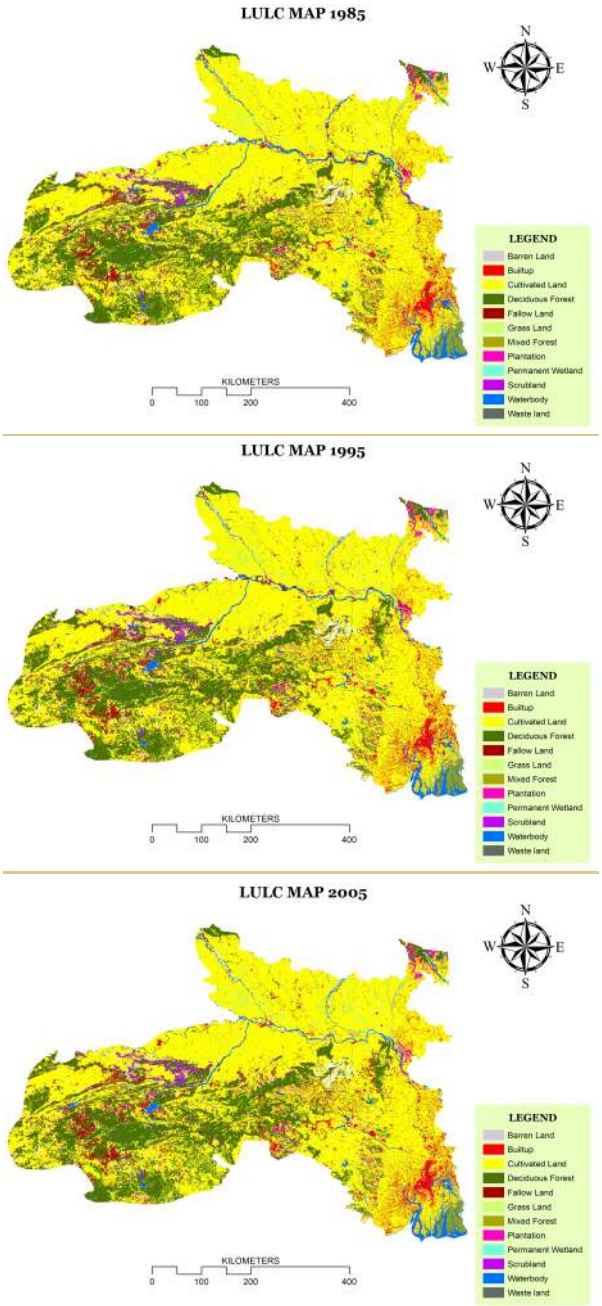


Figure : Land use land cover maps of the Lower Ganga Basin for the years 1985, 1995 and 2005

(956 and 1,111 km^2, respectively). This is because of a very dynamic drainage system in the study area, with frequent floods and changes in river courses. It is interesting to note that this change from CL to WB and back is balanced. The ransition from CL to PL (98 km^2) is also largely due to agro-forestry practices. The next significant transformation is from FL to SL, which is about 838 km^2. This is obviously through the natural phenomenon of secondary succession. Similar transformations are from WB to SL (407 km^2) and from WL to SL (118 km^2), but these are probably be due to the process of primary succession. Another important transformation is the increase in BU, with this category acquiring acreage from CL (401 km^2), FL (114 km^2), SL (53 km^2), etc.

Future LULC scenarios were modelled using the SaarS model. Before using all the LULC images and the driver images in the model, it was ensured that all had the same spatial resolution and geographical extent. The drivers to be used in the model were selected on the basis of the correlation values between LULC classes and the drivers. The LULC images of 1985 and 2005 were used for predicting the LULC scenario for 2025. The drivers used belonged to 2005.

In 2025, there will be significant rises in BU, FL and SL. CL shows a significant decrease in acreage, which may be due to the conversion of CL to BU, FL and SL. Minor changes can be seen in the case of PL and Wetlands, where there are slight increases, and in the case of WB, where is a decrease in acreage.

Milestones: An LULC database was generated with a uniform classification scheme for 1984–85, 1994–95 and 2004–05 using satellite data at a 1: 250,000 scale. A database on some key demographic, socio-economic and infrastructure parameters was created for the Lower Ganga Basin.

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 ecological effects of a proposed road up-gradation (four laning from two laning) project with and without mitigation measures; (iii) evaluate the effectiveness of proposed mitigation based on a study of a road project implemented previously; and (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 report writing is under progress. The findings of the report were presented at the annual research seminar of the institute and to the National Tiger Conservation Authority.

ONGOING PROJECTS

Landscape Ecology of Large Mammals in the Shivalik-Terai Landscape with Focus on Flagship Species and Ecosystem Services

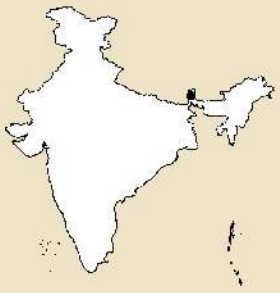
Funding Source	:	Grand-in Aid
Investigators	:	Dr. K Ramesh and Dr. Bivash Pandav
Researchers	:	Rohini Mann, Abishek Harihar, and Pranav Chanchani
Date of Initiation	:	February 2012
Date of Completion	:	February 2016

Objectives: The objectives of the project are to (I) determine the spatial pattern of distribution and abundance of tigers in the landscape; (ii) quantify the impact of anthropogenic disturbance on tigers and livestock-mediated competition on the distribution and abundance of wild ungulate species; and (iii) evaluate the landscape permeability and long-term survival probability of tiger populations in this landscape.

Progress: During the reporting period, a detailed literature review was carried out and information on habitat and corridor status was compiled. Occupancy sampling was carried out for the tiger in the western and eastern portions of the landscape. The sampling and analyses involved hierarchical grid-based procedures, with a 166 km^2 cell size for the tiger and 5–10 km^2 for prey species, considering the home range sizes of these species respectively. Surveys were carried out along forest roads and minor forest trails for establishing the occupancy distribution of the tiger and its prey species. Additionally, camera trap sampling was carried out to estimate the densities of the tiger in representative sites in the western and eastern parts of the landscape.

Outputs & Outcomes: Tigers in the Indian Terai Arc Landscape (TAL) occur within nine disjunct habitat blocks known as Tiger Habitat Blocks or THBs, and are potentially connected by 13 corridors (Johnsingh *et al.* 2004). It was found that the Rajaji–Corbett corridor provides functional connectivity, which has aided the recovery of tigers in eastern Rajaji through immigration and colonization by individuals (Harihar & Pandav 2012). *The total fraction of the area that was occupied by tigers (in the north-western TAL was 0.588 (0.071), resulting in an area of 4,109 km^2 (SE = 492 km^2) of the 6,979 km^2 of potential habitat.* Similarly, the occupancy estimate obtained for central TAL was 0.90 (0.05). Camera trap sampling suggested that the minimum number of tigers in the western and eastern parts of Rajaji National Park, Lansdowne Forest Division and Kalagarh Tiger Reserve were 3, 13, 14 and 65. In the eastern part of the landscape, photographs of tigers were obtained in all five ranges of Pilibhit Forest Division, including Deoria Range. In all, tiger captures were obtained at 68 camera trap stations (43% of the locations), and there were 69 independent tiger captures over eight sampling occasions. Further work and analyses are under way in this part of the landscape. The previous results, obtained in 2003 and the interim period, will be used as a basis for undertaking further surveys and to evaluate the conservation status of the landscape.

Developing Spatial Database on the Mammal Distributions and Monitoring Programme for large Carnivores, Prey Populations and their Habitats in Khangchendzonga Biosphere Reserve



Funding Source	:	Grant-in-Aid
Investigator	:	Dr. S. Sathyakumar
Researchers	:	Tapajit Bhattacharya, Tawqir Bashir and Kamal Poudyal
Date of Initiation	:	January 2008
Date of Completion	:	April 2013

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; and (iii) develop a monitoring programme for monitoring large carnivores and their prey (ungulates, Galliformes) and their habitats in KBR.

Progress: During the reporting period, field investigations were completed at *Prek Chu,* the intensive study area. The field surveys that were proposed to be carried out in northern parts of KBR were completed despite delays in the grant of permits from various agencies. The surveys for mammals and Galliformes were carried out in the two valleys located in the northern portions of KBR using sign surveys, visual encounters and camera trapping. Species such as the Tibetan wolf, blue sheep, marmot and snow cocks were photo-captured, and signs of the snow leopard were recorded. Samples collected from the field were analysed at a laboratory in the Wildlife Institute of India to analyse the diets of the large carnivores. Using the data on the distribution and habitat use of mammals and Galliformes, species distribution models were prepared in the GIS lab and were tested in the field for validation. The data analyses have been completed, and writing of the final report writing is approaching completion.

Outputs & Outcomes: Monitoring protocols for indicator species were developed and standardized on the basis of the findings of the research project,. Monitoring methods such as sign surveys, trail/transect walks, scan sampling, call counts (Galliformes) and camera trapping were used, but due to the remoteness and ruggedness of the terrain, most of the methods were found not 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. Since the results are mainly based on the results of the efforts in the *Prek Chu* catchment, there is a need for intensive surveys in other catchments of the biosphere reserve. Based on the habitat suitability models developed for the entire biosphere reserve, this information could be used in identifying the species hotspots within the area as well as priority sites for conservation and management. The research team recommends that

these monitoring methods be continued in the future by the forest department so as to understand population trends and detect areas that require immediate management attention.

Milestones: With the present work being the pioneering study on the mammals of KBR, many mammal species have been confirmed from this area on the basis of field work and camera trap pictures. Species-specific field monitoring methods have been identified and standardized. These protocols will be used to impart training for frontline staff as well for future monitoring.

Reintroduction of Cheetah *Acinonyx jubatus* in India

Funding Source	:	Ministry of Environment & Forests
Investigator	:	Dr. Y.V. Jhala
Researchers	:	Bipin C.M., Ridhima Solanki, Anant Pande and Anirudhkumar Vasava
Date of Initiation	:	March 2011
Date of Completion	:	June 2013

Objectives: The project aims to establish free-ranging breeding populations of cheetahs in and around Kuno Wildlife Sanctuary (WLS) and Nauradehi WLS, Madhya Pradesh (MP) and the Shahgarh Landscape, Rajasthan. Two or three populations of cheetah are proposed to be established in India and managed as a meta-population, with occasional "immigrants" brought in from southern Africa, as and when needed. Within this larger goal, the project will strive to achieve the following objectives: (i) develop site-specific action plans for re-introduction of the cheetah; (ii) provide adequate security to the local flora and fauna and ecosystem processes; (iii) revive and maintain the grassland and scrub forest systems existing in the landscape in the optimal productive state and thereby evolve management techniques and practices for better conservation of these habitats; (iv) build the capacity of the forest departments of MP and Rajasthan in habitat and prey management, especially grasslands, in view of the emerging needs, and in handling cheetahs themselves; (v) build the capacity of the MP and Rajasthan forest departments in mass translocation of herbivores, particularly blackbuck and nilgai, in view of the emerging need for protection of crops and scientific management of wildlife populations; (vi) conserve and enhance the faunal diversity, especially

threatened species, such as the chowsingha, the endemic white-browed bushchat and the houbara bustard and provide a safe haven in the future for even more endangered species such as the great Indian bustard, lesser florican, gharial and caracal; (vii) generate benefits for the local people through development of wildlife tourism and ancillary activities; and (viii) develop the capacities of local communities to coexist with wild animals, particularly large carnivores.

Progress: Following the decision of Government of India to start the process of cheetah re-introduction, a fresh assessment of the status of the prey base, habitat and perceptions of local communities towards wildlife in Nauradehi WLS was carried out in 2012. To assess the prey base and perceptions of local communities, 49 line transects (effort 110 km) and 24 villages (52 interviews), respectively, were sampled in Nauradehi WLS (surveyed area 700 km^2). The status of large mammalian predators and prey was assessed in Kuno WLS. To assess predator densities, camera trapping was conducted for a period of 37 days (effort 1,110 trap days). Twenty-four line transects were walked three times (effort 208 km) to estimate the prey densities (surveyed area 344 km^2). In the line transect survey conducted in Kuno WLS, data were collected by forest department staff, while the sampling design, supervision and data analysis were carried out by project personnel.

Outputs & Outcomes: The estimated density of all prey species including livestock in Nauradehi WLS is 43.35 ±9.16/km^2 and that of chinkara is 1.34±0.35/km^2. In the questionnaire regarding interactions with wildlife in Nauradehi WLS, crop depredation was reported by 98% of the respondents, loss of livestock by 47%, trapping/ snaring of wildlife by 40% and bushmeat consumption by 48%.

The density estimates of prey species in Kuno WLS are the following: chital, 51.59±8.84/km^2; sambar, 3.59 ±1.01/ km^2; nilgai, 2.32±0.59/km^2; wild pig, 4.68±1.54/km^2; chinkara, 0.99±0.35/ km^2; gray langur, 17.2±4.6/km^2; peafowl, 6.44±2.34/km^2; and feral cattle, 1.83±0.77/km^2. During the camera trapping sampling in Kuno WLS, the research team obtained three photo-captures of one tiger, 40 photo-captures of 10 striped hyaenas and 42 photo-captures of leopards, from which the team identified 10 adults and one cub. The abundance of adult leopards, obtained using program CAPTURE with the best fit heterogeneity (Mh jackknife) model was 13±3.6 (95% CI: 11–29), with an individual capture probability (p-hat) of 0.05. The population was found to be closed during the 37 day sampling period (z value=0.76, p-value=0.78). Using the heterogeneity (Mh jacknife) estimator with the closed population maximum likelihood spatially explicit capture recapture (Mlsecr) model in the program DENSITY, the density of leopards in 2012 was estimated as 5.5/100 ±1.9 km^2 (95% CI: 2.8-10.8). Due to the judgement of the Supreme Court quashing the order of the MoEF to re-introduce cheetahs in Kuno WLS, further work was stopped in Kuno WLS.

Milestones: An action plan for re-introduction of cheetah in Nauradehi WLS was drafted in collaboration with the state forest department, the Cheetah Task Force (CTF) and the National Tiger Conservation Authority (NTCA) and submitted to the MoEF. The site-specific action plan for cheetah re-introduction in Kuno WLS and the Shahgarh Landscape was submitted to the MoEF earlier, in 2011–2012.

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
Consultant	:	Dr. Anupam Srivastav
Researchers	:	Sitendu Goswami, T. Ajay Kumar and Malemleima Ningombi
Date of Initiation	:	January 2011
Date of Completion	:	January 2014

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; and (iv) developing protocols for enclosure enrichment for the well-being of target captive wild animals.

Progress: *Enclosure assessment.* A reconnaissance survey of enclosures of identified species in selected zoos was carried out using questionnaires developed to assess the existing housing and husbandry practices in zoos. A review of the literature was carried out prior to designing the assessment framework; however, no such framework was available from the literature. Accordingly, a questionnaire was framed based on the guidelines of the Central Zoo Authority for recognition of zoos (Recognition of Zoo Rules, 2009—Animal Housing, Display of Animals and Animal Enclosures) and similar standards and guidelines from different zoo associations and regulating agencies. The questionnaire focussed on the following aspects: (i) visitor viewing area; (ii) enclosure details (dimensions, substrate, vegetation, etc.); (iii) enclosure enrichment (presence and utilization of enrichment devices); (iv) retiring area (dimensions, substrate, ventilation, etc.); (v) vegetation type in the enclosure (number, species, height, etc. of vegetation in the enclosure); (vi) captive animal behaviour (social interactions, aberrant behaviours exhibited, etc.); (vii) availability of nutrition and drinking water (quantity and quality of feed, feeding regime, drinking water availability, etc.).

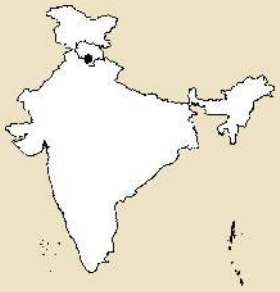
Outputs & Outcomes: Based on an assessment of the enclosures of identified species in selected zoos, the following outcomes have been completed as of 31 March 2013: (i) identification of minimum requirements for housing the identified species in captivity; (ii) an assessment of existing housing and enrichment practices of the identified species in zoos outside India; and (iii) development of enrichment plans relevant to the Indian context for identified species.

During the last year, the project personnel visited 10 zoos and evaluated the enclosures of the identified species present there. Assessment of the captive environments of 36 species and the behavioural responses elicited for 32 species has been carried out for identified species in selected zoos. Based on the findings, assessment draft evaluation reports of the captive environments of 26 species housed in Indian zoos have been prepared. These assessment reports have been the basis of draft enclosure-specific enrichment plans developed for three species, namely, the sloth bear, Asiatic elephant and sangai, housed in the National Zoological Park, Delhi.

Milestone: Based on the outcomes of the study, minimum standards will be drafted for suitable housing and enclosure enrichment.

Impact of Global Change on Species Composition in Western Himalaya - Himachal Pradesh

Funding Source	:	Department of Space, National Remote Sensing Agency, Hyderabad
Investigators	:	Dr. B.S. Adhikari, Dr. G. Talukdar and Dr. G.S. Rawat
Researcher	:	Vinod Kumar Yadav
Date of Initiation	:	May 2010
Date of Completion	:	May 2013



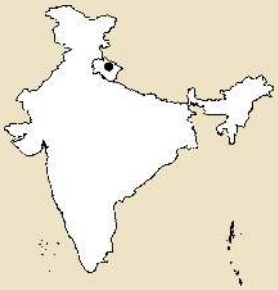
Objectives: The objective of the project is to study the impacts of global change, such as changes in the climate and land use, on the floristic diversity of Himachal Pradesh, with emphasis on changes in the species composition.

Progress & Outcomes: The structure and composition of the woody vegetation along an altitudinal gradient was studied in Sirmaur District of Himachal Pradesh. The study area lies in the outer Himalaya and has an extent of ~1,300 km^2, and the elevation ranges from 500 m (tropical) to 3,400 m (alpine). Stratified random sampling was carried out, wherein 10 plots were laid within a 1 ha site. A total 183 sites, consisting of 1,830 plots of 10×10 m^2, were laid to quantify the phyto-resources, structure and composition across the elevation gradient.

Ten major plant communities were identified in the study area using TWINSPAN. *Shorea robusta* was dominant in association with *Mallotus philippensis* and forms the major plant community in the elevation zone below 800 m. In the elevation zone between 800 and 1,500 m, *Pinus roxburghii* forms the dominant community, whereas in the temperate-to–sub-alpine zone (>1,500 m—treeline), one or more species of oak (*Quercus* spp.) form the dominant forest communities. The highest tree density (683 trees/ha) with the lowest total basal area (TBA; 15.5 m^2/ha) was recorded in the *Pinus* community, indicating a young forest stand, while the *Shorea* community had a high TBA (31.9 m^2/ha) with a comparatively low density (459 trees/ha), indicating a mature forest stand. The tree species richness and evenness decreased with increasing elevation, indicating isolated and pure stands, restricted in the specific micro-topography and site conditions. The relationship between density and TBA shows a positive correlation (R^2=0.607, P<0.05), whereas the TBA increases with increasing altitude.

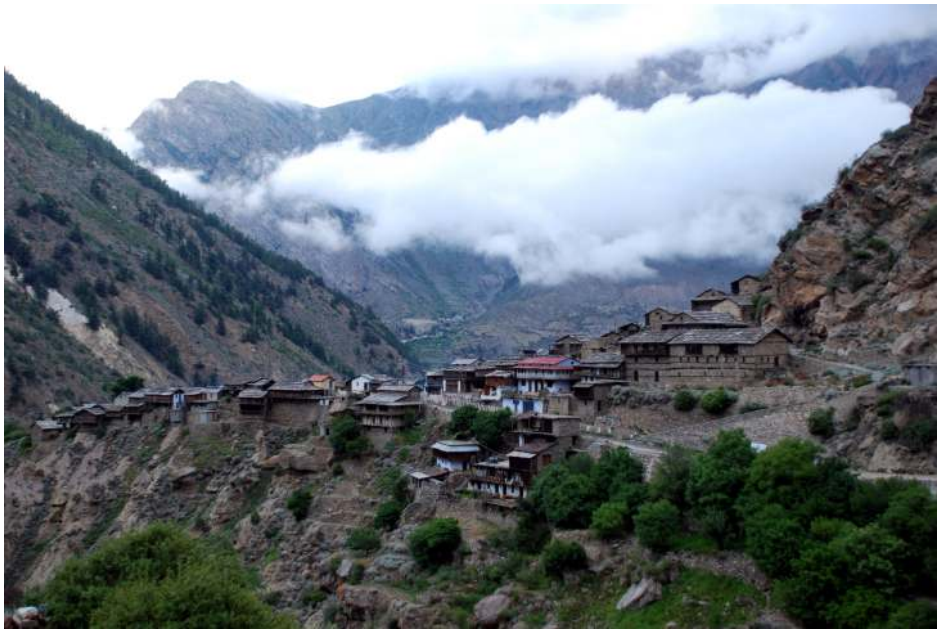
Structural and Functional Attributes of Plant Communities in Cold Arid Region of Nanda Devi Biosphere Reserve, Uttarakhand in Relation to Resource Use Pattern

Funding Source	:	MAB Programme, Ministry of Environment & Forests
Investigator	:	Dr. B.S. Adhikari
Researchers	:	Amit Kumar and Monideepa Mitra
Date of Initiation	:	June 2011
Date of Completion	:	May 2014



Objectives: The project has the following objectives: (i) assessment of the floral (angiosperms and gymnosperms) diversity with special reference to habitat specificity and spatial distribution of threatened and endangered species with respect to their population; (ii) assessment of alpine pastures in terms of carrying capacity, *i.e.* biomass production; (iii) determination of the spatio-temporal changes that have taken place over the past 20 years in land use/land cover using remote sensing and geographical information systems (GIS); and (iv) determination of the patterns of traditional resource use and management strategies.

Progress & Outcomes: The present study was carried out in Upper Dhauli Valley, including the Amrit Ganga, Ganesh Ganga and Satyagad catchments, which fall in the trans-Himalayan zone of Nanda Devi Biosphere Reserve, in Chamoli District of Uttarakhand, in the western Himalaya. Vegetation sampling was conducted during the growing season, *viz.,* June to October. In order to understand the floristic diversity of the region, several landform units *viz.,* scrub steppes, camping sites or animal resting places, forest patches, morainic deposits, screes, rocky outcrops and riverine were identified, and extensive vegetation sampling was carried out. Information on the locality, altitudinal ranges, habits and habitats of species, number of species and distribution of species was gathered. A total of 72 sampling sites of area 50×50 m^2 (*i.e.* 720 5×5 m^2 plots for shrubs and 1,800 1×1 m^2 plots for herbs) were selected for quantification of the vegetation. A total of 206 plant species, consisting of 9 trees, 39 shrubs and 158 herbs, were sampled from the valley. The Amrit Ganga harbours the maximum number of species, *i.e.* 26 shrub species, followed by Ganesh Ganga (22 species) and Satyagad (13 species). Among the herb species, 33 species were found to be common (total herb species sampled 158) to all the catchments. Eighty-nine herb species were sampled in Amrit Ganga and Ganesh Ganga each.



TWINSPAN (two way indicator species analysis) in PCORD 4 was used for identification of vegetation communities. Eight major shrub communities and 10 major herb communities were identified in the study area.

In order to assess the status of the alpine pastures of the region with respect to their carrying capacity (*i.e.,* for estimating the grazing potential or stocking rate of the area), sites were selected through a reconnaissance survey. Plots were marked for biomass harvesting, and the above-ground biomass was harvested on a monthly basis. Herders were interviewed to gain an understanding of the movement patterns of domesticated animals. From June 2012 to August 2012, eight migratory herders visited the area. Three consecutive surveys were carried out in July, September and October in 2012. Information regarding the socio-economic and demographic status was obtained through informal open-ended questions from the villagers and the panchayat members of seven villages (Niti, Ghamsali, Bampa, Pharkiya, Gurgutti, Kailashpur and Margaon) to understand the floristic and socio-economic status of the rural people. Interviews were conducted to find out details about the migratory patterns and habitat utilization patterns of the livestock.

Assessment of Pollinators on Different Agro Ecosystem and Forest Types around Dehradun

Funding Source	:	State Biotechnology Department, Department of Science and Technology, Govt. 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 project are to (i) assess the types of pollinators in different agro-ecosystems and forest types around Doon Valley; (ii) assess the species diversity of different pollinator groups; and (iii) find out the cause of decline of pollinators.

Progress: Several sampling methods have been used to assess pollinator diversity and abundance. Observation plots and/or transects as well as the passive methods of pan traps are among the sampling methods. The research team used both active and passive methods for sampling pollinators. The active methods included counting pollinators (belonging to four major orders - Coleoptera, Diptera, Hymenoptera and Lepidoptera) and sweeping nets over vegetation. The passive sampling methods included yellow pan traps (YPTs). Random belt transects with an area of 500 m^2 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 diversity patterns of pollinators. The minimum spatial distance between two transects was 200 m. These were walked thrice in a day: at 0800 hours,

1200 hours and 1600 hours. The time of sampling was based on preliminary observations of active periods of insects and studies carried out on pollinators by various workers. The values of 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 on each quadrat were recorded. YPTs are considered to be the most efficient, unbiased and cost-effective method for bee sampling.

Outputs & Outcomes: So far, 44 morphospecies of pollinator were documented. These represented different orders, *viz.* Coleoptera (1), Hymenoptera (22), Lepidoptera (14) and Diptera (7). Five species of pollinator from the above orders were exclusively found in the forests, while 9 species were exclusively found in agro-ecosystems. The two habitats had 21 species in common. Seven species of pollinator were found at the edges of the forests and agro-ecosystems. Various micro-climate variables such as the relative humidity (RH), temperature and time of the day were recorded. Repeated sampling will permit a precise and accurate determination of the diversity pattern of the study area.

Milestone: Preliminary work carried out in the project was presented at the 7th Uttarakhand State Science and Technology Congress, held by the Uttarakhand State Council for Science and Technology (UCOST). It won the award for the best presentation under the Young Scientist Category 1 in Zoology. A literature review titled "Pollinators: Indicators for Changing Ecosystem Services—A Brief Review" was published in the Uttarakhand State Biotechnology Department's *Volume of Biotechnology: Issues, Opportunities and Challenges* (2012).

Monitoring Source Population of Tigers in Ranthambhore Tiger Reserve, Rajasthan

Funding Source	:	National Tiger Conservation Authority
Investigators	:	Dr. Y.V. Jhala and Shri Qamar Qureshi
Researcher	:	Ayan Sadhu
Date of Initiation	:	September 2011
Date of Completion	:	September 2013

Objectives: This project aims to (i) monitor the source population of tigers in Ranthambhore Tiger Reserve by intensive camera trap surveys and will obtain survival and mortality information through a capture–mark–recapture study; (ii) understand and monitor tiger dispersal patterns and land tenure systems; and (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 intensive study area (Ranthambhore National Park) has been surveyed in a systematic camera trap survey. The entire study area was divided into 2×2 km^2 spatial grids, and a pair of camera traps was placed in each grid. The camera traps were operated for a minimum of 45 days (total effort 2,700 trap nights) to ensure population closure. Twenty-two individual (adult) tigers were photo-captured and identified from 307 independent tiger photo-captures.

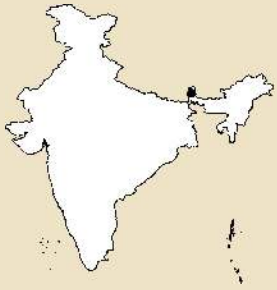
Outputs & Outcomes: The effective trapping area (ETA) has an extent of 243 km^2, and non-habitat areas were masked out from the ETA. The M_{th} (time and individual heterogeneity) model fitted the data best, providing an abundance estimate (of 22 (±0.00). The density was estimated at 5.58 (±0.38) using the conventional ½MMDM technique and at 5.69 (±1.22) using the spatially explicit capture–recapture (SECR) technique.

Since the tiger population in Ranthambhore is known fairly accurately, this exercise provided an opportunity to evaluate various models of density estimation, especially those to determine the effective trapping area (ETA). The team estimated the density using the ½MMDM technique as well as the SECR technique for different spatial scales and compared the results with the absolute density. The team found that the density discrepancy between the ½MMDM and SECR techniques was greater when the trapping area was smaller but that it almost disappeared with increasing trapping area. Hence, it is concluded that an area greater than 240 km^2 should be sampled in Ranthambhore to eliminate discrepancies between the various density estimation methods.

Findings: The research has reported the presence of the fishing cat *Prionailurus viverrinus* for the first time ever from Ranthambhore and confirmed the presence of seven felid species (tiger, leopard, caracal, fishing cat, jungle cat, desert cat, rusty spotted cat) in Ranthambhore.

Monitoring Land Use by Wildlife, Livestock and Humans in Khangchendzonga Biosphere Reserve

Funding Source	:	Ministry of Environment & Forests
Investigators	:	Dr. S. Sathyakumar and Shri S.K. Gupta
Researchers	:	Rupak Raj Karki and Nand Kishore Dimri
Date of Initiation	:	June 2011
Date of Completion	:	May 2014



Objectives: The objectives of the project are to (i) assess the distribution and land use patterns of carnivores, ungulates, livestock and humans in Khangchendzonga Biosphere Reserve (BR) and (ii) develop a monitoring programme for monitoring patterns of land use by carnivores, ungulates, livestock and humans in Khangchendzonga BR.

Progress: Field activities were carried out in the *Prek Chu* catchment, the intensive study area. Camera trapping was carried out to develop a spatial database of the distribution of wild mammals (carnivores and ungulates) and domestic livestock. Visual encounters were noted and sign surveys were carried out along trails, ridges and nullahs. Non-invasive DNA-based techniques are being

used to estimate the abundance of large carnivores. Samples were collected for laboratory analysis using these techniques. Direct observations of the land use by local communities and tourists were made by monitoring important entry/exit points, trekking routes and forested areas near the villages to assess the human use of the BR. Questionnaire surveys were administered in some of the villages of the buffer zone to assess the land use by local communities for natural resources and by visitors for ecotourism, as well as wildlife–human conflicts. Samples collected from the field were subjected to analysis in the laboratory, at WII. DNA was extracted using standard protocols for species identification.

Outputs & Outcomes: Questionnaire surveys were conducted in Yuksam village (n=27). The livestock holdings of the local communities in Yuksam village included cows, *dzo*, goats, sheep, horsew and poultry. About 50% of the farm animals in Yuksam village were poultry, followed by goats (24.5%), while sheep formed the smallest percentage (<1%). The local communities were partially dependent upon forest resources as there were other conventional resources available in the village. Only 6 of the 27 respondents reported substantial dependence on forests for firewood. All respondents were dependent the on forests for fodder and timber.

In addition to questionnaire surveys, regular field visits were made to villages, and all direct observations of damaged crops, attacked livestock and/or human injuries were recorded. Data were collated from departmental records, field and questionnaire surveys and other secondary sources for the eight villages of the western part of Khangchendzonga BR. In total, 65 conflict cases were recorded from eight villages from April 2011 to July 2012. The maximum number of human–wildlife conflict cases was recorded in Singlitam village (24), and the minimum was from Thingling (3). The Asiatic black bear was most involved (70.76%) in the conflicts reported with local people, followed by the jackal, wild pig, Himalayan crestless porcupine and yellow-throated marten. The wildlife–human conflicts were mostly (n=55) in the form of crop damage, followed by livestock depredation (n=8) and, in recent years, human attacks (n=2) by the Asiatic black bear. In July 2012, jackals killed two domestic fowls in Tashiding village. A structured questionnaire was used to collect detailed information about tourism. From April 2011 to March 2012, a total of 6,104 individuals, including 2,108 pack animals, came on the Yuksam–Dzongri–Gochela trek. DNA was successfully extracted from 24 samples from eight species, including barking deer, goral, serow, blue sheep, snow leopard, wild dog, red fox and jackal.

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 S.R. Sen and Dr. G.S. Bhardwaj
Researchers	:	Rubi Sharma, Omkar Dhavale and Sutanu Satpathy
Date of Initiation	:	May 2011
Date of Completion	:	May 2013

Objectives: The project has the following objectives: (i) 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; and (iii) initiation of Bengal florican conservation network and enhancing capacity building among forest staff, 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 rapidly due to habitat loss and poaching. Further, there is no information on the current status and distribution of this species across 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 the reporting period. The present population of the florican was assessed using the area search method, along with focal animal sampling for behaviour studies. The habitat parameters were collected using the vegetation quadrat sampling method. A stakeholders' workshop was also conducted to enhance the capacity of forest staff, non-governmental organizations 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. A total of 15 Bengal florican were sighted in various grasslands of Uttar Pradesh during 2012–2013, whereas only three birds were sighted in 2011–2012. Of the 15 birds, 8 males and a female were from Dudhwa National Park, 4 males and a female were from Pilibhit Reserve Forest and a male was from Kishanpur Wildlife Sanctuary.

Currently, the grass burning in Dudhwa National Park starts in February and continues up to March. This 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 the florican in this region, which might be due to habitat degradation or poaching outside the protected areas. Although most of the prime habitats of the florican in Uttar Pradesh are being protected, there was a continuous decline of the population here, which might be due to tiger-centric conservation plans that have largely failed to conserve some 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.

Monitoring Source Population of Tiger in Corbett Tiger Reserve

Funding Source	:	National Tiger Conservation Authority, New Delhi
Collaborating Agency	:	WII-NTCA-UK Forest Department
Investigators	:	Dr. Y.V. Jhala and Shri Qamar Qureshi
Researchers	:	Shikha Bisht and Sudip Banerjee
Date of Initiation	:	October 2009
Date of Completion	:	December 2013

Objectives: The objectives of the project are to (i) monitor the source population of tigers in Corbett Tiger Reserve (CTR) and to (a) estimate the tiger population within selected areas of the reserve; and (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; and (iii) gain an understanding of tiger dispersal patterns.

Progress: The team evaluated the density of tigers in the entire CTR during 2012. The Phase IV protocols evolved for the assessment and monitoring of tigers, co-predators, prey and their habitat were followed. Camera trap-based capture–recapture was carried out in an area of extent 931 km^2 (MCP) to estimate the population size, density and survival of tigers. A total of 229 camera locations were sampled in the area. The locations were identified based on a reconnaissance survey and the local knowledge of the forest staff. Camera trapping was conducted for a period of 30–45 days to ensure population closure. As a part of the monitoring in Phase IV, the tiger population dynamics is being assessed using the camera trap-based photo capture–recapture technique, employed in a constant trapping area (450–550 km^2) of Corbett National Park (CNP) across the years (2009 to the present). Tiger identification was performed using the program EXTRACTCOMPARE. Population estimation was carried out using the MARK software, and the spatially explicit density was estimated using DENSTIY 4.1.

Outputs & Outcomes: (A) Population and Density Estimation of Tigers. An effort of 7,158 trap nights yielded 1,511 photographs of 143 individual tigers in CTR. The camera trap grid (931 km^2) covered 80% of the tiger habitat (1,174.8 km^2) within CTR. Local densities obtained from the camera trap block were extrapolated to the remaining 20% of the tiger habitat to obtain the total population of tigers in CTR.

(B) Tiger Population Status in the National Park. Apart from implementation of the Phase IV protocols in the entire CTR, the tiger population was monitored on an annual basis in CNP. Only 24 individual tigers were common to all the three camera trapping sessions (2006, 2010–2011 and 2011–2012). Those common to 2006–2010, 2010–2011 and 2006–2011 were 10, 19 and 4 individuals, respectively. The study shows that the population has a high turnover rate that is characteristic of a high tiger density area. A total of 24 tiger individuals were common to 2010, 2011 and 2012. But the population estimates and the density have remained constant over the years. The minimum home-range sizes, based on a minimum of 12 temporal and three spatial photo-captures of resident males (n=7) and females (n=6), were 29.4 (S.E. 6.7) and 12.8 (S.E. 3.3), respectively.

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 2014

Objectives: The objectives of the project are to (i) monitor the source population of tigers in Kanha Tiger Reserve and to (a) estimate the tiger population within selected areas of the reserve; and (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; and (iii) gain an understanding of tiger dispersal patterns.

Progress: Monitoring the tiger population on an annual basis will give us not only estimates but also give us the trend and direction of change. As in previous years, our team camera trapped an effective area of 664 km^2 in the Kanha–Kisli–Mukki block and 350 km^2 in the Supkhar block with an effort of 3,293 and 1,900 camera trap nights this year. In all, 44 and 13 individual tigers were photo captured at the 2 sites.

Outputs & Outcomes: The tiger population in Kanha Tiger Reserve was estimated at 61 (59–64 SE range). The tiger density was computed to be 7.2 (0.55 SE) in Kanha and 3.7 (0.5 SE) in Supkhar From 2010 to 2012 the tiger population showed an exponential increase, with r=0.21 in Kanha block and r=0.11 in Supkhar.

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 the ungulates, the chital had the highest density, 33.2 (4.69 SE) per km^2.

Milestone: This camera trapping effort has resulted in the first photographic record of the mouse deer in Kanha Tiger Reserve, and the tiger population has increased by 20% from previous estimates.

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
Date of Completion	:	August 2014

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; and (ii) develop cost-effective methods for monitoring the population.

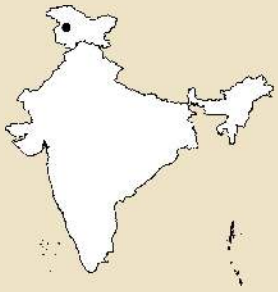
Progress: Transects were laid in the southern and eastern parts of the Wild Ass Sanctuary to estimate the density and abundance of the animals. Special care was taken to maintain a minimum distance of 500 m between two parallel transects to avoid double counting of the wild ass population. Every time an animal was encountered, its radial distance, the bearing of the animal, walk bearing, group size, sex and age class were noted. The survey work was designed with its focus on the fringe areas of the sanctuary. The fringe areas are the edges of the sanctuary. They are characterized by scrub and border crop fields. Transects have been laid in the areas between villages and the Rann and cover the southern and eastern fringes. These transects are the regular routes used by villagers to access the fringe areas and the Rann. A total of 63 transects were walked, covering both the southern and eastern fringes. The southern fringe comprises 17 villages and 40 transect, and on the eastern fringe there are 11 villages and 23 transects. Two aerial surveys were carried out in a high-wing Cessna aircraft to standardize aerial survey methods and assess the feasibility of using drones for population estimation. The data were analysed using the conventional distance sampling (CDS) method and the multi-covariate distance sampling (MCDS) method. The habitat type, distance and group size were taken as the covariates.

Outputs & Outcomes: The wild ass population is distributed largely over 5,000 km^2 in the arid saline desert of the Little and Great Ranns of Kutch. The *khur* is a highly endangered wild equid, with its range restricted now to India. A total effort of 232.89 km in transect walks and 300 km in an aerial survey was expended. The wild ass density was estimated at 7.41(SE 1.28)/km^2 and the density estimate for all wild animals together was 9.24 (SE 1.54)/km^2. The cluster size of the wild ass was found to be 1.21 (SE 0.147). The density of the nilgai was 1.29 (SE 0.36) and that of the wild/domestic pig was 0.12 (SE 0.07)/km^2. Chinkara and blackbuck were also seen, but there were too few sightings for density estimation.

This study will for the first time use aerial transects with high wing aircraft and drones to monitor the population trend and thus provide a cost-effective monitoring protocol for monitoring a large landscape in the semi-arid and arid region of the country.

Ecology of Leopard *Panthera pardus* in Relation to Prey Abundance and Land Use Pattern in Kashmir Valley

Funding Source	:	Department of Science and Technology, Govt. of India
Investigators	:	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 are 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; and (iv) study the movement patterns, home range size and social organization of leopards across different sites.

Progress: Preliminary analysis of 198 leopard scats shows that 68.7% of the scats contained a single prey item while 26.8% contained two items. The highest percent frequency of occurrence in the leopard's diet was that of small rodents (~56%), followed by the Himalayan gray langur (12.1%), and the lowest was that of the hangul (5.2%). The percent relative biomass consumption of leopards suggests that small rodents contribute the highest (50.66%), followed by the Himalayan gray langur (14.5%) and hangul (13.8%), with the lowest contribution being from domestic sheep (11.8%).

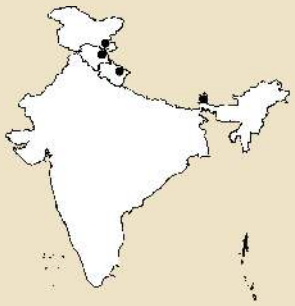
The human–leopard conflict surveys are continuing, and out of the three wildlife management divisions (North, Central and South) of Kashmir, one (Central Division) has been covered. A total of 14 villages around Dachigam National Park were covered for surveys pertaining to man–animal conflicts in the Central Division. A total of 56 families known to be affected were interviewed for human as well as livestock losses caused by leopards. Only two cases of human involvement were reported: in one a four year old girl was killed by leopard and in another a five year old boy was injured. Among livestock predation cases (n=54) sheep were attacked the most (32.14%), followed by cattle, goats, horses, dogs and donkeys. In 54 livestock predation cases, leopards attacked the animals in the presence of herders in 59.29% of the occasions, and in 40.74% of the cases herders were not present at the time of attack. Out of these 56 conflict cases, 80% took place very close to forest patches or 0–100 m away from forests. Only a small proportion (16.07%) of incidents took place 100–500 m away from forest patches. It was observed that 46.42% of the conflicts occurred in the afternoon, 26.78% in the evening hours, 14.28% during night and only 12.5% during the morning hours.

Two female leopards and one male leopard were collared with Vectronics GPS Plus collars abd are being monitored regularly. The GPS collars are functioning satisfactorily, providing 5–7 GPS fixes each day. The different MCPs (MCP 3 to MCP 1) show a gradual increase. MCP 3 shows the movements of a collared animal during the first 20 days. The area increases over the next 20 days (MCP 2, total 40 days). MCP 1 (57 days) is the largest. MCP 4 covers most of the area of activity, encompassing 50% of all the GPS fixes.

Milestone: Three animals (one male and two females) were collared with Vectronics GPS Plus collars.

Ecology and Conservation of Himalayan Wolf

Funding Agency	:	Grant-in-Aid
Investigators	:	Dr. Bilal Habib and Dr. Y.V. Jhala
Researcher	:	Shivam Shrotriya
Date of Initiation	:	August 2010
Date of Completion	:	May 2017



Objectives: The objectives of the project are to (i) estimate the distribution and abundance of the Himalayan wolf in India and to identify viable populations that need to be protected; (ii) 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) estimate the home-range/territory sizes of selected Himalayan wolf packs and their relation to the biomass of the major prey; (iv) estimate the critical Himalayan wolf habitat needs, especially for denning and rendezvous; (v) identify major factors of mortality and current and potential threats to surviving Himalayan wolf populations; (vi) evaluate the attitudes and concerns of local people living in and around Himalayan wolf habitats and conservation areas; and (vii) utilize the information obtained from achieving the above objectives for making management recommendations to conserve Himalayan wolf populations in India.

Progress: The distribution of the wolf in the entire Trans-Himalayan and Himalayan landscape, falling within the three states included in the study area, *viz.,* Jammu & Kashmir, Himachal Pradesh and Uttarakhand, was predicted using the maximum entropy model. The software package MaxEnt (ver. 3.3.3e) was used. MaxEnt has been used quite extensively because of its advantages over other techniques. The team used six uncorrelated variables as predictors that are supposed to have impacts on the distribution of wolves, *viz.,* diurnal temperature difference, ruggedness, slope, elevation, human footprint and NDVI as a surrogate for the distribution of prey species.

The team used 201 wolf presence locations, obtained from a public survey conducted in previous years and additionally from sporadically appearing reports. The public survey covered 40 settlements in Jammu & Kashmir, 50 settlements in Himachal Pradesh and 47 settlements in Uttarakhand. A total of 371 interviews were conducted in these surveys. Seventy-five percent of the locations were used to train the model, and the remaining 25% were used to test the accuracy level. MaxEnt's jackknife test was used to evaluate the importance of each predictor. The percent contribution and permutation importance of each predictor were also calculated. This exercise was aimed at identifying the key areas of wolf presence and carrying out intensive surveys.

The model of wolf distribution in the Himalaya and Trans-Himalaya was quite accurate, as indicated by the test gain and AUC curve.

The Ladakh region, Changthang WLS and Leh area in particular, was predicted to be the most probable area where wolves are present. Kashmir Valley, despite having quite different habitat characteristics from the Trans-Himalaya, is predicted to be in the distribution range of the Himalayan wolf with a probability of about 0.5. This model explains the presence of the wolf in Kashmir Valley as a natural occurrence. The accuracy of the model was

ascertained when the model predicted the distribution of the wolf in some areas in Pakistan occupied Kashmir (PoK), from where no prior information could be obtained. Checks were made for any records in that area, and there are reports of wolves from Deosai National Park, Pakistan occupied Kashmir.

The distribution of the wolf in the Himalaya is mainly governed by the annual temperature ruggedness of habitat and slope. The suitable annual temperature range was from -5.89°C to 18.80°C, with 6.45°C being most suitable. The suitable range of ruggedness of habitat was from 0% to 3%, and that of the slope was from 0° to 50°.

On the basis of these results, intense field surveys were initiated in Spiti Valley, in Himachal Pradesh and in the Ladakh region of Jammu & Kashmir. The surveys aimed to record the signs and presence of the wolf, its prey and competitors in the region. The occupancy framework was used to design the field surveys.

The first phase of surveying has been completed. But it is too early to formulate any recommendation for management. Generating a probability distribution map of a rare species is a big step, and we hope that subsequent research will provide much better insights into the ecology of the Himalayan wolf.

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 Y.V Jhala and Dr. G.S. Bhardwaj
Researcher	:	Omkar Dhavale
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; and (v) prepare a comprehensive conservation plan covering both the breeding and non-breeding ranges and the migration pathways of the lesser florican.

Progress & Outcomes: The lesser florican *Sypheotides indica*, a species endemic to the Indian sub-continent, is seen during the monsoon in 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 of the occurrence of the lesser florican in India during the non-breeding season.

The entire breeding range of the lesser florican in western India was stratified into 1 km^2 grids. Those grids that fall in the potential habitat of the florican were randomly surveyed for its distribution using distance sampling. The satellite tracking technique will be used next year to understand its migration pattern and to identify locations in its non-breeding habitats.

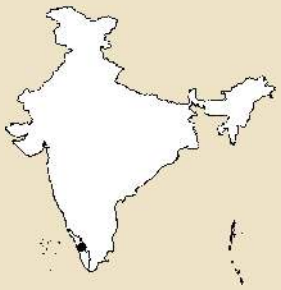
A total of 129 lesser floricans (128 males and 1 female) were sighted during the breeding season of 2012 in western India, *i.e.* Gujarat, Rajasthan and Madhya Pradesh. A total of 145 different sites were surveyed during the period. Lesser floricans were present in only 83 of these sites. Most of the sightings were from sites representing pure croplands (41%). Twenty-two percent of the sightings were from pure grasslands, 19% from mosaic grasslands, 13% from mosaic croplands and 3% from savannahs. The fewest sightings were from plantations (1%).

In Rajasthan, floricans were observed in only 47 sites located in 27 villages of four districts, namely Ajmer, Tonk, Bhilwara and Pratapgarh. The greatest number of birds was seen in the Saunkhaliya landscape (n=71). In Madhya Pradesh, floricans were observed in only 12 sites in three districts, namely Ratlam, Dhar and Jhabua, located mostly in the eastern part of the state. Nineteen floricans were seen in this region. The greatest number of floricans (n=9) was sighted in and around Sailana Wildlife Sanctuary, a protected area devoted to the conservation of bustards. In Gujarat, a total of 59 sites were surveyed in eight districts. covering total of 39 villages were covered, mostly in the Kathiawar peninsula, in the monsoon. Floricans were observed only in 25 sites. The greatest number of floricans (n=25) was observed in Velavadar National Park, followed by the Nalia grasslands in Bhuj District.

Milestone: The Ministry of Environment & Forests, Government of India has developed the Species Recovery Plan for Bustards using the findings of this study.

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



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 and (ii) to examine the genetic variation in the sambar population of the Western Ghats by using potential mtDNA and STR markers.

Progress: Detailed field studies were conducted in protected areas of Kerala and Madhya Pradesh for collecting the field data and biological samples. Analysis of the field samples was initiated at the Laboratory for Conservation of Endangered Species (LaCONES), Centre for Cellular and Molecular Biology, Hyderabad. Novel primers were

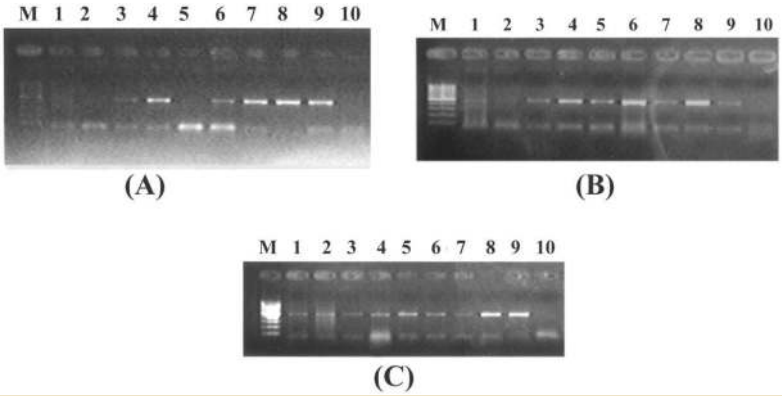


Figure: PCR amplification with the DNA extracted from various samples using PC (A), a Qiagen kit (B) and the Gu-HCl method (C). Lane M, 100 bp ladder; lanes 1–2, bone; lanes 3-4, antler; lanes 5–6 faeces; lanes 7–8, tissue lanes 9 and 10 are a positive control and extraction negative control, respectively.

designed for various genes and synthesized for further study. Visible morphological variations in various sambar populations were recorded.

Outputs & Outcomes: A research article, '*Extraction of PCR-Amplifiable DNA from a Variety of Biological Samples with Uniform Success Rate', was drafted. Subsequently, it was published* in a peer-reviewed international journal. It compares three protocols for successful extraction of DNA of PCR-amplifiable quality from bones, antlers and faeces of sambar *Rusa unicolor*. The protocols compared in this study were based on the use of phenol–chloroform (PC), column-based Qiagen kits and guanidine hydrochloride (Gu-HCl). The Gu-HCl protocol is an in-house method. The effectiveness of the protocols was compared for higher success rates of amplification of the extracted DNA through PCR. It was found that a silica-based indigenous DNA extraction protocol using Gu-HCl chaotropic salts yields DNA of better quality with a higher PCR amplification success rate.

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 tiger population; (ii) evaluate the MHC heterozygosity level in the tigers of Ranthambore and Bandhavgarh; and (iii) compare the heterozygosity levels of microsatellite and MHC markers.

Progress: Reagents and chemicals were procured during the reporting period. A field study was conducted by the researcher in protected areas of Madhya Pradesh for collecting field data and biological samples. Laboratory analysis of the field samples was initiated at WII. The project was revised at TRAC for obtaining permissions for extension of the project and procurement of necessary equipment for cloning work.

Outputs & Outcomes: Assessment of the quality and quantity of extracted DNA is imperative for many applications in molecular biology, especially in faecal DNA analysis. Quantification of scat DNA concentration is critical due to the content of inhibitor and secondary metabolites. Impurities in the extracted DNA can lead to inaccurate measurement of DNA concentration and could

potentially affect genotyping and sequencing. Studying genetic diversity using microsatellites and the major histocompatibility complex (MHC) in small and isolated populations may reveal the genetic fitness.

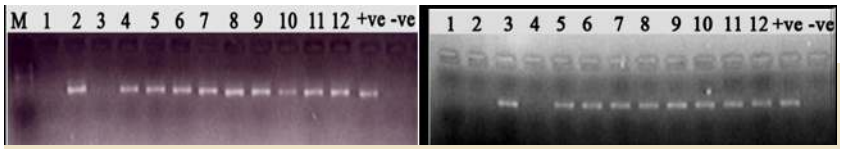


Figure: Image showing amplification of (a): MHC class I a1 265 bp and (b) MHC class I a2 246 bp

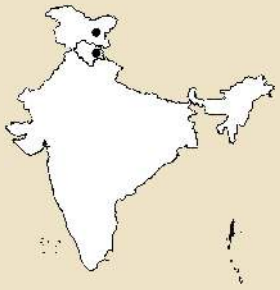
Our preliminary study found low genetic diversity in Ranthambore Tiger Reserve (RTR) populations with expected and observed heterozygosity values of 0.7 and 0.4, respectively. We estimated the amount of DNA obtained from tiger scats and formulated an efficient approach for accurate amplification and sequencing of the MHC gene. Two protocols, *i.e.* the Qiagen kit and guianidium hydrochloride (Gu-HCl) methods were assessed to compare their efficacy in yielding PCR-usable DNA from blood and scat samples. Quantification of DNA was done by using a UV–visible spectrophotometer (A260/A280 nm) and agarose gel electrophoresis.

Sixty-two samples extracted using the Qiagen kit and 20 samples extracted using Gu-HCl yielded an initial concentration of ~120 ng/µl and ~35 ng/µl, respectively, with an OD range from 1.20 to 2.00. We optimized and refined DNA extraction methods that permitted high amplification of MHC Class-I exon-2 and -3.

The MHC gene sequencing results suggest that further refinements in the technology are possible, and we expect that removal of ambiguous heterozygous nucleotides can be achieved through single strand conformation polymorphism (SSCP) or cloning of PCR products. The procurement process has been initiated for the necessary equipment.

A Survey of the Avifauna in the Important Bird Areas of the Trans-Himalayan 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
Date of Completion	:	February 2015



Objectives: The objectives of the project are to (i) document the current status of birds in Important Bird Areas (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 conservation of the avifauna of the region, especially with reference to the increasing anthropogenic pressures, including grazing, expanding agriculture, biomass removal, plantations and increasing tourism activities; and (iv) demarcate the exact boundaries of the existing IBAs and identify potential IBAs based on the IBA criteria.

Progress: During the reporting year, the following extensive field surveys were conducted: (i) An extensive field survey was conducted in March–April 2012 (15 days) for the late winter and early spring season. The survey covered 5 IBAs out of the 6 in the Jammu & Kashmir trans-Himalayan region. (ii) A survey of summer birds in Spiti Valley from Recong Peo, of Kinnaur, to Kunjum Pass, of Spiti Valley, including Kibber Wildlife Sanctuary

(WLS), of Himachal Pradesh, was conducted during 1–13 June 2012. (iii) In addition, field visits were undertaken to Kibber WLS during 1–17 June 2012 and from 22 August to 24 September 2012 in Kibber WLS and Pin Valley National Park (NP).

Transects were laid randomly in three different kinds of habitat, *viz.* within Kibber WLS, agricultural lands and meadows, to survey the avifauna of the region comprehensively.

The transects were 500 m long and were traversed on foot. For sighting of birds, a pair of 8×40 mm binoculars were used. An eTREX H GPS device was used for obtaining GPS locations and measuring the altitude and angle. The distance between the observer and the bird species was measured using rangefinders. Everyday, multiple transects were traversed. Disturbances were classified into 5 categories: (1) AP, agricultural plots; (2) VM, vehicular movement; (3) GZ, livestock grazing and collection of fodder grass for stall feeding of livestock; (4) TM, tourism; and (5) HS, human settlements.

Outputs & Outcomes: Birds were surveyed from 24 March to 5 April 2012 in Ladakh to assess the bird composition in late winter in this trans-Himalayan region. A survey of the Nubra Valley and the eastern highlands (including Pangong Tso, Chushul, Hanle, Tso Moriri, Tso Khar and the Indus Valley) near Leh yielded a total of 68 species. The survey also gives new insights into the spring/passage migrants in Ladakh. This survey documented the presence of several winter and passage migrants such as the Water Pipit *Anthus spinoletta* and Pine Bunting *Emberiza leucocephalos*.

A survey of summer birds was conducted during 1–13 June 2012 in Spiti Valley, from Recong Peo, of Kinnaur, to Kumjum Pass, of Spiti Valley, including Kibber WLS, of Himachal Pradesh. Seventy-nine bird species belonging to 22 families were found. During the survey, the family Fringillidae, having 13 bird species, was most abundant in terms of sightings, followed by the family Muscicapidae, though the species richness of the latter was high, with 23 species. The survey further revealed the geographical extension of some bird species such as the rufous-vented tit *Parus rubidiventris* and streaked laughing thrush *Garrulax lineatus up to Spiti Valley, which can be attributed to* changes in the life style of the local people, including a shift from traditional agricultural to horticultural practices in developing apple orchards and other fruit species, coupled with plantation activities of the state forest department and other agencies.

A bird survey was carried out during *10–31 July 2012* in Ladakh to assess the breeding birds in this trans-Himalayan region. In addition to the areas

surveyed in March–April 2012, areas of Hemis National Park and the Suru Valley were surveyed. Further, the entire trans-Himalaya between Kargil and Zozila Pass were surveyed. In all, about 87 species were recorded, including several noteworthy ones such as the Eurasian hobby *Falco subbuteo,* ibisbill *Ibidorhyncha struthersii,* white-browed rosefinch *Carpodacus thura,* curlew sandpiper *Calidris ferruginea,* little owl *Athene noctua* and red-mantled rosefinch *Carpodacus rhodochlamys*. It is suspected that some species such as the mallard *Anas platyrhynchos* may actually be breeding in places such as Nubra Valley.

All the IBAs proposed to be covered, including the Chushul marshes (IN-JK-01), Hanle plains (IN-JK-06), Hemis NP (IN-JK-07), Pangong Tso (IN-JK-15), Tso Kar Basin (IN-JK-18), Tso Moriri (IN-JK-19), Kibber WLS (In-HP-12) and Pin Valley (IN-HP-18), have been covered at least once during the project. In addition, several new areas are to be covered. These include Suru Valley, which has seen few ornithological surveys recently and was recommended by independent referees during the sanctioning of the project. About 9,300 observations of birds have been recorded. About 150 species have been documented, including several rare ones. During the survey, the rufous-necked snowfinch *Pyrgilauda ruficollis* was photographed. This is the first confirmed record for Ladakh.

In addition, field visits were undertaken by the researcher to Kibber WLS from 1 to 7 June 2012 and during 22 August—24 September 2012 to Kibber WLS and Pin Valley NP. A total of 25 species were recorded around the Kibber area during the survey period. More intensive studies are proposed to be carried out this year.

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) understand the ranging pattern and home ranges of the re-introduced gaur in Bandhavgarh; (ii) collect information on the habitat use; and (iii) understand the food habits of the gaur.

Progress: Between January 2011 and March 2012, 50 gaurs were translocated to Bandhavgarh Tiger Reserve (BTR) from Kanha Tiger Reserve. Of these, 27 gaurs (six males and 21 females) were fitted with radio-collars (VHF–GPS/satellite collars). The radio-collared gaur were monitored in BTR periodically through ground tracking using the "homing in" and "triangulation" techniques. The minimum convex polygon (MCP) technique was used for home-range calculation. Habitat variables such as terrain, broad vegetation type and distance to nearest water body, road and human settlement were recorded at each radio location to study the habitat use. Data on the food habits of gaur were collected using the scan sampling technique. The food plants eaten and dung samples of gaur were collected opportunistically.

During the study period, six radio-collars (2 males and 4 females) dropped off naturally, and one

radio-collar stopped functioning. Three mortalities occurred during the reporting period. Of these, one calf (2–3 months) and an un-collared sub-adult female went missing, and a male yearling was preyed upon by a tiger. Thirteen calves were born to the re-introduced stock during the reporting period.

Outputs & Outcomes: A total of 11,167 radio locations were recorded for four males (1,429) and 17 females (9,740) during the reporting period using a hand-held global positioning system (GPS). These positions, which are required for estimation of the home range, were later transferred to the Bandhavgarh beat map. During the study period, the area utilized by the gaur was 384.4 km^2. The annual home ranges of the males and females were calculated as 267.9 km^2 and 384.4 km^2, respectively, using the program Arc Map 9.3. The summer (April 2012 to June 2012) home ranges of males (n=301) and females (n=2794) were 205.5 km^2 and 384.4 km^2, respectively. During the monsoon and post-monsoon period (July 2012 to October 2012), the home ranges of males (n=346) and females (n=3454) were 267.9 km^2 and 314.1 km^2, respectively. In winter, the home ranges of males (n=782) and females (n=3492) were 248.8 km^2 and 254.2 km^2, respectively. In March 2013, the home ranges of males and females were 29.3 km^2 and 106.1 km^2, respectively. The large home range of the gaurs in March 2012 was attributed to initial exploration of new areas soon after their reintroduction. A few months after their release, the animals gradually settled down in smaller areas.

The gaurs were seen to feed on 53 different plant species during the study period. A total of 1,550 feeding records were collected using the scan sampling technique during the study period. Of these, 582 records were collected in summer (2012), 444 in the monsoon (2012) and 524 in winter (2012–2013). The percentage of time spent feeding on each plant part and species was calculated from the group scan data. It was observed that the leaves of *Dendrocalamus strictus* (bamboo) formed a major part of the diet of gaur throughout the year. Grasses also constituted a major part of the diet of the gaur in summer and during the monsoon, but the percentage of time spent feeding on grasses declined considerably in winter. Among the grasses, the major food species were *Vetiveria zizanoides and Saccharum spontaneum.*

Monitoring of Reintroduced Tigers in Sariska Tiger Reserve, Rajasthan

Funding Source	:	National Tiger Conservation Authority
Investigator	:	Dr. K. Sankar
Researcher	:	Subhadeep Bhattacharjee
Date of Initiation	:	February, 2009
Date of Completion	:	March, 2016

Objectives: The objectives of the project are to (i) study the home range and movement patterns of the re-introduced tigers and their dispersal pattern; (ii) assess the use of the habitat by the re-introduced tigers; (iii) study the food habits of the re-introduced tigers; (iv) estimate the population of the prey species; (v) prepare a habitat suitability map for the tiger and its prey species; (vi) study the effects of anthropogenic pressure on the distribution of the tigers; (vii) evaluate the response of the tigers and their prey species with respect to the removal of anthropogenic influence from the relocated villages; and (viii) suggest management recommendations for effective conservation of tigers in the tiger reserve.

Progress: The first re-introduced female, ST2, was photographed with two cubs in August 2012, signifying the success of the tiger re-introduction project in Sariska. In January 2013, two more tigresses, ST9 and ST10, were introduced to Sariska from Ranthambhore according to the re-introduction protocol as supplementary stock to the initial population. During the reporting period, all the seven re-introduced tigers (two males—ST4 and ST6—and five females—ST2, ST3, ST5, ST9 and ST10) were monitored periodically. The minimum convex polygon (MCP) technique was used to estimate the home range. In total, 50 line transects, varying in length from 1.6 to 2 km, were laid, covering an area of 500 km^2 in tiger-occupied landscapes. Three to nine replicates were walked on these transects in summer, during the monsoon and in winter. Altogether, the total effort on the line transects in the last year was 552 km. On each sighting of potential prey species on line transects, the total number of individuals, animal bearing and angular sighting distance were recorded. The program DISTANCE 6.0 was used to estimate the density of prey species.

A total of 78 tiger scats were collected to study the food habits. All the scats were washed, oven dried and subsequently preserved for future analysis. Micro-histological structures of hairs were used to identify the prey species. Along with the scats, 113 tiger kills were collected during the study period. A total of 546, 1,154, 1,293, 1,270 and 1,188 radio locations were recorded, respectively, for the tigers ST2 to ST6 (April 2012 to March 2013), and 236 locations were obtained for tigresses ST9 and ST10 (February and March 2013) using a hand-held GPS device. These positions were later transferred to the Sariska beat map required to estimate the home range. All the 28 villages situated inside the tiger reserve area were surveyed, and 1,148 plots were laid on 114 radial line transects (four radial line transects of length 2 km each around each village). Vegetation and habitat parameters were recorded, along with quantitative assessment of the human disturbance, for all these plots.

Outputs & Outcomes: The annual home ranges were estimated as 44.7, 137.7, 229.9, 89.9 and 146.8 km^2, for the five tigers ST2 to ST6, respectively. Range overlaps among male–male,

male–female and female–female tigers were also estimated all through the year in all three seasons.

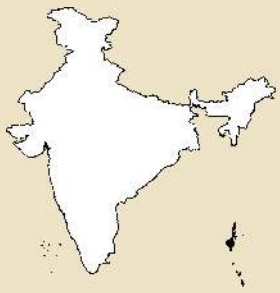
The individual prey densities and mean group sizes were estimated for all prey species. The density of peafowl was found to be the highest amongst all the prey species (136.91±7.68/km^2), followed by nilgai, livestock, chital, sambar, wild pig and common langur. The estimated encounter rate of peafowl was also the highest (1.36±0.001/km), followed by nilgai, livestock, sambar, chital, wild pig and common langur. Scat analysis revealed that the sambar was the most commonly found prey species (38.60%) in the diet of tigers, followed by livestock, chital, nilgai and wild pig. The common langur was the prey that occurred least in tiger scats. The prey preference of tigers was in the following order: sambar>chital>wild pig>common langur>livestock>nilgai. Livestock was found most frequently in tiger kills (49%), followed by sambar (30%), chital (10%), nilgai (8%) and occasionally wild pig (2%). Livestock was found equally frequently (66%) in the kills made by the two male tigers, ST4 and ST6. The tigress ST2 also killed livestock (55%) during the study period.

The habitat utilization patterns of five re-introduced tigers were studied in Sariska Tiger Reserve. The vegetation type of each tiger location was extracted from multispectral (Landsat 7 ETM+) high-resolution classified satellite imagery. The overall habitat preference was in the following order: riverine>*Zizyphus*>*Butea*>*Anogeissus*>*Boswellia*>*Acacia*>scrubland. Tigers chiefly utilized gently sloping terrain of elevation 400–550 m more (52.5%) than they did steeply sloping areas of more than 550 m altitude (30.3%) and flat terrain of less than 400 m altitude (17.2%). The mean elevation utilized was (441.4±6.8) m. The re-introduced tigers utilized all the other vegetation types, including *Anogeissus* forest, *Zizyphus* forest, *Boswellia* forest, *Acacia* forest, *Butea* forest and riverine forest, except scrubland. A total of 30 habitat variables were estimated for the resource selection function of the re-introduced tigers in Sariska Tiger Reserve.

The encounter rates of prey species such as sambar, chital, nilgai, wild pig and livestock were estimated from each of the 52 line transects walked. The encounter rates of human disturbance were estimated from circular plots of radius 15 m at every 200 m on 52 line transects (n=520), 112 radial line transects of length 2 km around each of 28 villages (n=1,148) and kills, scats and homing-in locations of tigers (n=1,470). The individual values recorded in these 3,138 plots were interpolated to develop a raster layer of human disturbance for the entire tiger reserve. A total of 10 resource selection models were tested for model significance. A generalized linear model (GLM) showed that a north-east aspect, availability of *Anogeissus* and *Zizyphus* forests, encounter rates of sambar, chital and livestock and distance to a village had a positive ß value with respect to the utilization distribution pattern of tigers, whereas distance to nearest waterhole and encounter rates of the anthropogenic disturbances such as wood cutting and lopping had a negative ß value. A similar trend was found in the resource selection of male and female tigers as well as in the seasonal variation of the resource selection. This signified that the tigers avoided human presence; whereas the locations of waterholes were important in their habitat utilization patterns.

Macroecology of terrestrial herpetofauna of Andaman and Nicobar Islands

Funding Source	:	Science Engineering Research Board, Department of Science and Technology
Investigators	:	Dr. Karthikeyan Vasudevan, Shri B.C. Choudhury, Dr. S.K. Dutta and Dr. Indraneil Das
Researcher	:	S. Harikrishnan
Date of Initiation	:	November 2009
Date of Completion	:	November 2013



Objectives: The objectives of the project are to (i) identify the factors that influence the spatial patterns in the species abundance and distribution of reptiles and amphibians in islands; (ii) test null models in the community structure of insular reptiles and amphibians; and (iii) identify the factors that influence the community structure of reptiles and amphibians in islands.

Progress: Fifteen islands in the Andaman Islands and one in the Nicobar Islands were sampled for amphibians and reptiles. Occurrence data for herpetofaunal species in quadrats were used to create a presence–absence matrix of herpetofauna in the islands. This was supplemented by visual encounter surveys (VES) carried out during day and night hours. Pitfall traps and opportunistic records were also used to supplement the distribution data.

10×10 m^2 quadrats were demarcated with a nylon rope for sampling forest floor and understorey herpetofauna. Quadrats were not sampled in Middle Andaman due to adverse weather conditions. For all species recorded, body size data were collected. The snout–vent lengths (SVL) of all species of frog and lizard were measured using a Mitutoyo dial vernier caliper (LC 0.01 mm). The SVLs of snakes were measured using a 1 m measuring tape. The body weight of all individuals caught was measured using Pesola spring balances.

Outputs & Outcomes: In all, 16 islands were sampled by March 2013. Forty-two bounded quadrats were sampled in 11 of these islands to estimate the density of the herpetofauna. The distribution of species was recorded in the form of occurrence data for all 16 islands sampled.

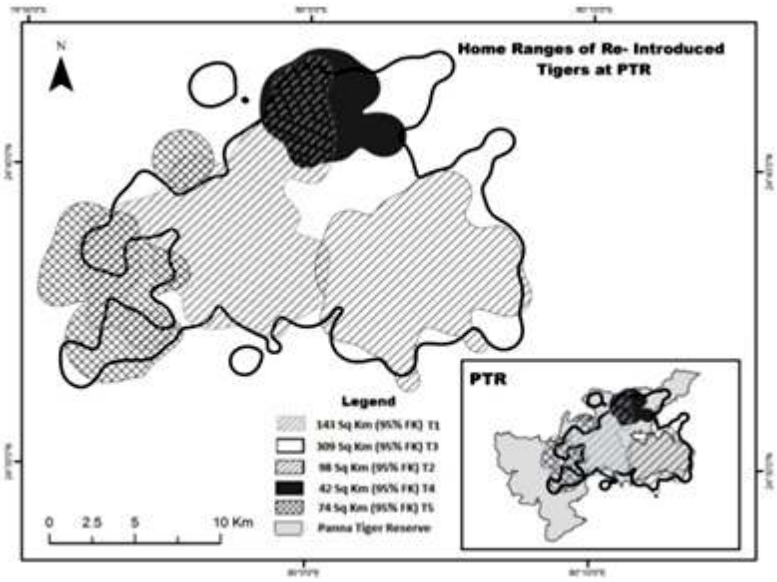
Eight species of frog, 18 species of lizard and 14 species of snake were recorded from 15 islands in the Andaman Islands. Fifteen species of lizard, 12 species of snake and eight species of frog were recorded in Great Nicobar Island. The average lizard density in the Andaman Islands was 14.1±8.4 individuals/100 m^2, while the average frog density was 9.3±10.9 individuals/100 m^2. The average lizard density in Great Nicobar was 4.6±3.3 individuals/100 m^2, while the average frog density was 2.2±2.1 individuals/100 m^2.

Data from bounded quadrats have revealed that rainforests in Andaman Islands have the highest density of herpetofauna reported from India. The larger islands have a herpetofaunal biomass exceeding 20 kg/ha in the rainforest floor. During fieldwork in Mt. Harriet National Park, South Andaman Island, a new species of lizard of the genus *Coryphophylax* Fitzinger was identified. The species was named *Coryphophylax brevicaudus* and described in the international taxonomic journal *Zootaxa*. A new species of small arboreal toad (Family: Bufonidae) was also discovered in Mt. Harriet National Park. Molecular data have revealed that it also belongs to a new genus.

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, Sunil Kumar, Sonal K. Romin and Naveen M.
Date of Initiation	:	April 2010
Date of Completion	:	January 2014

Objectives: The objectives of the project are to (i) monitor and study the population growth of the translocated/re-established tiger population in Panna Tiger Reserve, 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 other management interventions; and (iii) study the landscape ecology of the tiger, incorporating human interface issues and ecological correlates linked to economics and system services.



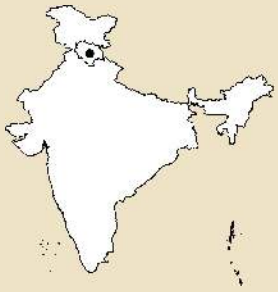
Progress: Seasonal and annual movements of the re-introduced tigers and the dispersal of cubs were monitored using radio-telemetry methods. During this period, many of the tigers (T1, T2, T3, T4, P111, P212 and P213) were re-radio-collared with VHF components, except T4, which was fitted with a radio-collar having VHF+GPS and Argos components. T2's cub from her first litter, P211, dispersed from the population and moved around 150 km towards the western side of the park. It was tranquilized; radio-collared with VHF and Iridium satellite components and translocated to Satpura Tiger Reserve. The radio-collared tigers were periodically monitored by ground tracking using "home-in" and "triangulation" methods and the VHF element and by direct downloads via the Argos satellite uplink. In the earlier stages, until the translocated tiger settled down, continuous monitoring (*i.e.* 24×7) was performed. Non-radio-collared adult tigers were monitored through indirect evidence such as pugmarks, scratch marks, scent marks and scat marks and through periodical camera trapping

around an individual tiger's probable habitat. All types of locations were used to estimate the home ranges seasonally and annually using the Hawths analysis tool in the ArcGIS platform. Two methods, namely the minimum convex polygon (MCP) and fixed kernel (FK) methods were used to analyse the home ranges of the tigers. The abundance of prey species was estimated using line transect surveys in conjunction with distance sampling methods. A total of 41 lines transects were laid grid-wise (4×4) across Panna Tiger Reserve, with each gird having an almost 2 km line, and sampled during summer and winter. Camera trapping of the area was performed using 80 Cuddeback camera traps, and the sampling was done in three blocks.

Outputs & Outcomes: At the end of March 2013, the tiger population in Panna was 16 individuals, including four adult females, one adult male, five sub-adult males, one sub-adult female and five male cubs. The time–area curve revealed that males explored large areas in a short time, while females took a long time and settled down in a smaller area. Interestingly, the home ranges of all the re-introduced animals were large in comparison with any other previous telemetry-based information on the home ranges of tigers noted in India. Following the dispersal and habitat occupancy of the first generation animals (P111, P112, P212 and P213), the home range of the adult male T3 was reduced by almost half, suggesting that the male was being challenged by first generation animals. In this population, the observed heterozygosity was 0.6308±0.281, and the results show that the population genetic diversity is moderate, requiring future genetic management. Population viability analysis (PVA) based on the current demographic and genetic data suggested that the population will reach the carrying capacity in another 3 years if the current growth pattern continues, but emigration or mortality of 2 dispersing females or a breeding female per year will force the population to decline to eventual extinction. It is plausible that the females require continued security-based monitoring for at least a few years to come.

Reproductive Biology and Behaviour of Captive and Wild Populations of Western Tragopan in Himachal Pradesh

Funding Source	:	Himachal Pradesh Forest Department
Investigators	:	Dr. K Ramesh and Dr. Parag Nigam
Researcher	:	Lakshminarasimha R.
Date of Initiation	:	June 2011
Date of Completion	:	May 2014



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 the 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 re-introduction strategy; and (vi) monitor and study the habitat occupancy, behaviour and population growth of released birds.

Progress: Data collection was initiated to study and document the behaviour of the western tragopan on a proximate level. A combination of focal animal sampling and *ad libitum* sampling was employed. Additionally, qualitative observations were employed whenever systematic observations were not possible. The husbandry of the birds was modified in accordance with the species' requirements, which included (a) re-development of the existing aviaries in accordance with the species' requirements, (b) development of a new feeding regime emphasizing the feeding ecology of the species and dietary specializations, (c) reproductive management in terms of quality nest sites and undisturbed breeding grounds. In the *in-situ* component of the project, an extensive spatial database was created and was used to develop species distribution and habitat suitability models to gain an understanding of the extent of habitat availability for the bird and to identify potential release sites that may be required for future release in the wild.

Outputs & Outcomes: The current global captive population of the western tragopan comprises 25 individuals housed at two different facilities, located in Kufri and Sarahan, in Himachal Pradesh. As on March 2013, the captive population of the western tragopan at the Sarahan pheasantry comprised 23 individuals (11 males and 12 females). Of these, 16 individuals (eight males and eight females) constitute adult breeding pairs, and the remaining seven individuals (three males and four females) are juveniles born in 2012. No signs of disease were observed during the breeding season in 2012. The current husbandry regime does not involve artificial reduction of the day-lengths available to the birds or spatial confinement of the birds to specific areas of the enclosures for extended periods. A new feeding regime was developed that took into account the natural feeding behaviours, digestive physiology, social needs, growth and reproductive status and basic nutritional concepts. The new feeding regime included a variety of fruits, greens and vegetables for the birds, and the times were also changed from the late morning and afternoon (1000–1030 hours/1300–1330 hours) to the early morning and late afternoon (0630–0700 hours/1400–1500 hours) to match the natural feeding time of the pheasants.

The breeding season in 2012 has recorded the highest number of females incubating the eggs

naturally, and the highest number of naturally hatched and reared chicks, since the establishment of the captive population. The results obtained after science-based interventions were carried out to optimize the housing conditions of the captive population are indicative that the improvements allowed the birds to display their full range of adaptive behaviours, mainly involving activities related to breeding such as nesting, egg laying, incubation and rearing of chicks. The 2012 breeding season is indicative that the existing captive population still has the potential to serve as a 'reserve and model' for wild populations. The field data were integrated with GIS data to derive a rough population estimate of the birds in Himachal Pradesh. The density obtained by this bird was in accordance with the findings of studies carried in *Great Himalayan National Park*, Daranghati and Chamba previously, and the population estimate for the state is 1417.7±831.3 birds, based on integration of density estimates and the habitat availability in the state. Three sites are currently under consideration as potential sites for re-introduction, *viz*., Manali Wildlife Sanctuary, Churdhar and Rupi.

INITIATED PROJECTS

Evaluation of Physiological Stress and Reproductive Potential in Reintroduced Tiger Populations in Sariska Tiger Reserve, Rajasthan and Panna Tiger Reserves, Madhya Pradesh

Funding Source	:	National Tiger Conservation Authority, New Delhi
Investigators	:	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 and (ii) identification of anthropogenic stressors and assessment of the magnitude of the pressures on the target tiger populations.

Progress: In the first year of this study, standardization of the protocol was achieved according to the MoU between the Wildlife Institute of India and National Tiger Conservation Authority. Between March 2012 and March 2013, scat samples of the re-introduced tigers as well as source populations were collected from Sariska (90), Panna (171), Ranthamabore (70), Kanha (60), Bandhavgarh (60) and Pench (20) tiger reserves and were sent to the Centre for Cellular and Molecular Biology for hormone analysis. In addition, to help explain different stress levels and reproductive potentials in the two target populations, data on prey abundance and anthropogenic disturbance were collected from both the re-introduction sites in winter and spring during 2012–2013 (48 transects in Sariska and 41 transects in Panna). The initial set of scat samples has been processed, and some results have been obtained regarding the stress level between the two re-introduced populations.

Outputs & Outcomes: The preliminary results indicate that the methods used are effective in detecting stress metabolites and the reproductive cycle of the target tiger population. Examination of progesterone levels in the faecal samples of two females obtained from Sariska reveals that they are cycling and are fertile, which is a significant finding as the fertility of the re=introduced animals has been questioned. A high concentration of cortisol was found in all the tested samples, indicating stress in the animals in Sariska Tiger Reserve. Significantly, the females showed higher levels of stress compared with the males. All the animals at Sariska had levels of more than 300 ng/g faecal cortisol, while the animals in Panna had an average of 40ng/g faecal cortisol, which is comparable with any captive tiger population, suggesting that the Panna tiger population has very less level of external stress. The stress analysis also indicated that animals preying upon livestock have higher cortisol levels. The findings re-affirm the need to further investigate the details to ascertain the

causes for high levels of the stress hormone and to explain the reasons behind the failed pregnancy in a female at Sariska. Furthermore, the results are providing an insight into the physiology of the tiger. They have implications for population management and conflict resolution.

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	:	Operation Eye of the Tiger, India; Asian Rhino and Elephant Action Strategy, World Wide Fund for Nature – International; University Grants Commission; WII - Grant-in-Aid
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

Objective: 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 the elephant individuals; (iv) documenting and testing for population genetic differentiation and a recent bottleneck, if any; (v) examining the existence of any age/sex-based patterns of crop depredation and incidences of habitual raiding in relation to cropping patterns; and (vi) investigating the social organization of Asian elephants.

Progress: The primary part of the project is to develop protocols for individual and sex identification from faecal samples of Asian elephants, which is required for understanding animal–habitat interactions. For optimization the protocols, therefore, we extracted high-quality DNA from 35 tissue samples and five blood samples from elephants of north-west India, acquired from the reference tissue repository of the Wildlife Forensic Cell. DNA was also extracted from 17 fresh elephant faecal samples collected from Barkot and Rishikesh forest ranges, Uttarakhand. These DNA samples were used to standardize laboratory protocols to identify individuals and their gender and estimate population genetic parameters through the polymerase chain reaction (PCR), followed by agarose gel and/or capillary electrophoresis and subsequent data analyses.

Outputs & Outcomes: Despite a high variability in DNA quality, we found that 50× dilutions of tissue extracts and 100× dilutions of faecal extracts can be universally used as DNA templates for downstream applications. Optimized microsatellite primers developed for Asian elephants yielded amplifications in the recommended relative fluorescence unit (RFU) range of 200–5,000. Four different multiplex PCR panels were developed with the success rate ranging between 91.6% and 100%. It was found that addition of bovine serum albumin (BSA) increases the amplification success of multiplex PCR by 12.5%.

Milestone: The research team developed a multiplex panel of eight microsatellite markers for rapid high throughput PCR. This panel was tested on 17 faecal DNA samples in triplicate. The amplification success rate was 92.64% (N=378). A majority of the amplifications (85.44%) generated

RFU values between 200 and 5,000. The Hardy–Weinberg probability of identity, $P(ID)_{HW}$, of the panel in this population was calculated as 7.44×10^{-5}, and the sibling probability of identity, $P(ID)_{sib}$, was 9.8×10^{-3}. This octaplex panel will thus be extremely useful for time- as well as cost-efficient identification and molecular tracking of elephant individuals.

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. P. Nigam and Dr. N.P.S. Chauhan
Researcher	:	Puneet Pandey
Date of Initiation	:	July, 2012
Date of Completion	:	August, 2013

Objectives: The present study was initiated with three main objectives: (i) to study 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; and (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: Biological samples of unrelated domestic pigs (n=65) were systematically collected from different villages around Ranthambhore National Park, as a zone of interaction, and from different parts of Sawai Madhopur city, as a control. Samples (blood) of six unrelated wild pigs representing the RNP population were analysed. Partial fragments (662 base pairs) of the control region from the mitochondrial genome were amplified for genetic characterization.

Out of the 65 domestic samples examined for amplification of partial fragments of the control region, 55 samples showed positive amplification, yielding approximately 590 base pairs of good quality (Q value>25). All the 6 wild pig samples examined for genetic analysis showed positive amplification. Mitochondrial control region sequences (560 base pairs) having good quality attributes were obtained for the wild pigs.

Outputs & Outcomes: *Genetic diversity of domestic pigs Sus scrofa domestica in and around RNP:* In total, 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 so far. 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 different geographic origins. The overall haplotype diversity of domestic pigs was found to be 0.79±0.04, whereas the nucleotide diversity was 0.01. On the basis of haplotype variation (N-J tree), 4 sub-groups were recorded.

Genetic diversity of wild pig Sus scrofa cristatus of RNP: Two haplotypes with one segregation site were recorded in 560 base pairs of the amplified sequence. 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±0.13, whereas the nucleotide diversity was 0.001. Out of a total of 15 haplotypes (13 in domestic pigs and 2

in wild pigs) recorded in the samples examined; none was shared by the two sub-species. The absence of any common haplotype between the wild and domestic pigs examined indicates an absence of genetic introgression at the mitochondrial level.

Milestone: The present study has been planned for genetic evaluation of wild and domestic pigs at two levels (mitochondrial and nuclear). For genetic evaluation at the mitochondrial level, we used a control region that has been extensively explored in wild and domestic animals due to its hypervariable nature. Fairly good genetic diversity was found in domestic pigs in the vicinity of RNP. The overall haplotype diversity (0.79±0.04) and nucleotide diversity (0.01) in the native domestic pig population was found to be concurrent with other pig breeds worldwide. The existence of two maternal lineages (two haplotypes) in the six wild pig samples examined indicates the healthy genetic status of the population.

The research team did not find any haplotype common between wild and domestic pigs, and thus the initial findings indicate the absence of mitochondrial genetic introgression in the wild pigs of RNP.

Assessment of Dugong Distribution, Habitat and Risks Due to Fisheries and Other Anthropogenic Related Activities in India

Funding Source	:	Ministry of Environment & Forests
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; and (vi) understand the perception of fishermen towards conservation of the dugong and other marine species.

Progress & Outcomes: The dugong *Dugong dugon*, also called the '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 and shallow reef areas that are protected against strong winds and heavy seas and that have extensive sea grass beds. Such sea grass habitats are still available in the Gulf of Mannar, Palk Bay, Gulf of Kutch and Andaman and Nicobar islands in India. 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. In addition to obtaining information on the occurrence and spatial and temporal variations in distribution of the dugong, threats faced by the dugong and its habitat, and status of and threats faced by marine turtles and cetaceans that share the dugong habitat with it, the

questionnaire also aimed to examine the perception of fishermen towards conservation. The questionnaire was translated into the local languages to facilitate data collection. Local interpreters conversant with the local as well as national language assisted with data collection.

The study found that the dugong populations are declining in the Gulf of Kutch, Gulf of Mannar and Palk Bay regions. Although there are small but fragmented populations of dugongs in the Andamans that seem to be stable, the species has declined in the Nicobar region, probably due to the tsunami, which adversely affected the sea grass beds around the Nicobars. 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 regions. The study could also identify region-specific threats to the dugong and its habitat in India. The spatial distribution of the fishery-induced pressure on the dugong and its habitat was mapped on the basis of the fishing months and types of craft and gear used by the respondents. Occupancy models were built to identify priority areas for dugong conservation using sighting data (2008–2012) from the past five years in the program PRESENCE. The dugong occupancy was highest in the Gulf of Mannar and Palk Bay, followed by the Andaman and 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.

Ecology and Conservation of the Yellow-headed Tortoise *Indotestudo elongata* in and around the Rajaji National Park, Uttarakhand

Funding Source	:	The Mohamed bin Zayed Species Conservation Fund, Abu Dhabi, UAE
Investigators	:	Shri R. Suresh Kumar and Dr. Bivash Pandav
Researcher	:	Zehidul Hussain
Date of Initiation	:	June 2012
Date of Completion	:	September 2013

Objectives: The objectives of the project are to (i) assess the status and distribution of the yellow-headed tortoise in and around Rajaji National Park; and (ii) collect detailed information on the population structure, habitat use and activity pattern of the yellow-headed tortoise.

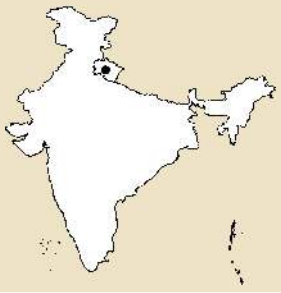
Progress: The members of the *Gujjar* tribe and staff of the forest department were first interviewed to collect information as to where they had seen tortoises in Rajaji National Park. An intensive search was carried out in selected areas in the Chilla Range was carried out during June–August 2012. On average, 4 or 5 people actively searched

the forest floor, under leaf litter and inside burrows. Upon capture, the date, time, GPS location and sex of the tortoise were recorded. The team classified the tortoises as hatchlings, juveniles and adults on the basis of their size. Adult tortoises were sexed as male if the plastron was concave. All captured tortoises were weighed using a digital weighing scale (in ggrams), and morphometric measurements (millimetres) were recorded. The approximate age of each tortoise was determined by counting the annular rings on the pleural scutes. Prior to release, each tortoise was marked by filing notches into the marginal scutes of the carapace. Three tortoises (one female and two males) were fitted with VHF radio transmitters to collect information on the movement pattern, home range size and habitat use.

Outputs & Outcomes: A total of 75 tortoises (38 males, 27 females and 10 juveniles) were captured and marked. Most tortoises were found buried under dense leaf litter along first order streams in close proximity to water before the monsoon rains arrived in the area. It appears that tortoises undergo a long period of inactivity, possibly brumation, given that the weather conditions in Rajaji NP range from cold winters to very hot summers. Upon the arrival of the monsoon rains, tortoises were no longer found in the areas where they were first captured. The age of the tortoises captured, based on the growth rings, ranged from 8 to 22 years. Male tortoises were found to be larger and heavier (SCL, 257.7±23.7; weight, 2,231.0±488.1; n=38) than females (SCL, 247.6±16.5; weight, 2,154.7±299.5; n=27). At given lengths, though, female tortoises were found to be heavier than their male counterparts. Currently, radio-transmitters have been attached to the tortoises to understand their home range size, movement, activity and micro-habitat utilization.

Ecology, Conservation and Status of House Sparrow *Passer domesticus* in Uttarakhand

Funding Source	:	Uttarakhand State Council for Science & Technology Government of Uttarakhand
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; and (ii) identify the factors influencing the distribution of the house sparrow.

Progress: Line transects and point count methods were used to survey different habitats, *viz.* rural, urban, forest and agrarian ecosystems, in Uttarakhand. It is proposed to cover each tehsil, which forms the smallest sampling unit for the study. Line transects of length 1 km were laid in various habitats, and five point counts were 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, the presence of predators (cats, raptors, etc.), the presence of competitors (doves and pigeons) and the presence of mobile towers were recorded. The Distance software package was used to analyse the data, and the 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: Seven tehsils in three districts of Uttarakhand were surveyed from December 2012 to March 2013. In each tehsil, five line transects were walked, and in each transect 5 nested points were chosen for a point count survey. The three districts covered were Dehradun (Tiuni, Chakratha, Dehradun and Rishikesh), Bageshwar (Bageshwar and Kapkot) and Rudraprayag (Rudraprayag). A total of 35 transects, along with three temporal replicates (105 transect walks) of each, were walked. A total distance of 105 km was walked during the morning and evening hours. House sparrows were seen in 24 out of 35 transects. 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, whereas the least number was found in Rudraprayag. Different aspects were covered in the questionnaire survey, which was conducted in Dehradun District. Occupations and major activities, *e.g.* the use of chemicals in agricultural farms, which can influence the sparrow's presence, were recorded during the survey. People's perspectives towards the sparrow were also considered, but it was noted that differentiating between the house sparrow, Sind sparrow and russet sparrow was a major difficulty in estimating the abundance of the house sparrow.

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

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
Researcher	:	Nilofer Begum
Date of Initiation	:	September, 2012
Date of Completion	:	September 2017

Objectives: The project was initiated with the objectives of development of population management plans for identified species in captivity: (i) updating studbooks for the Asiatic lion, Bengal tiger, lion-tailed macaque, and 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 And (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, pig-tailed 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 period from September 2012 to March 2013 the following activities were carried out: (i) updating the existing studbooks of the 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; and (ii) field visits to zoos for collection of pedigree data for species identified for compilation of studbooks.

The Wildlife Institute of India was assigned the task of maintaining studbooks of select species held in India zoos. The salient features of the updated database are summarized in figures.

Among the primates for which national studbooks have been compiled, only the lion-tailed macaque has an adequate number of founder animals in the current population; however, the population has a male sex bias. The Nilgiri langur and hoolock gibbon have small numbers of founders in the

current populations, but they both have an almost equitable sex ratio.

The founder numbers are low and the sex ratio is male biased for all three species of herbivore for which national studbooks have been compiled. However, the population size of the gaur in captivity is large.

The carnivores for which the national studbooks have been updated and the red panda have small founder numbers. The wild dog, Tibetan wolf and clouded leopard have a female sex bias, while the snow leopard and red panda have a female sex bias.

Butterflies of Satpura Tiger Reserve and their Ecological Values (including Presence, Abundance and Distribution)

Funding Source	:	Madhya Pradesh State Biodiversity Board, Bhopal
Investigators	:	Shri Aseem Shrivastava and Shri Subharanjan Sen
Date of Initiation	:	September 2012
Date of Completion	:	August 2013

Objectives: The objectives of the project are 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 (pollinator, food chain component, 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; and (v) assess the species richness and diversity pattern of butterflies in Satpura Tiger Reserve.

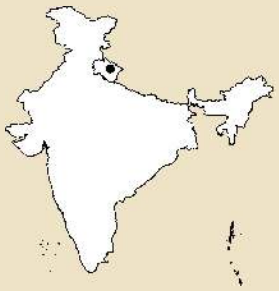
Progress: Four visits were undertaken during 22 September—7 October 2012, 16–31 December

2012, 30 March—14 April 2013 and 17–25 June 2013 respectively. Collection of data on the Pachmarhi Plateau area remains to be carried out, and this will be done in the first week of August 2013. So far, more than 30 species have been added to the official checklist of butterflies of Satpura Tiger Reserve. The revised list now has 103 species of butterfly.

Outputs & Outcomes: The major outcomes of the project during the reporting period are the following: (i) inventory of butterflies of Satpura Tiger Reserve, including a photographic catalogue; (ii) determination of relative abundance of various species of butterfly in Satpura Tiger Reserve; (iii) distribution maps of butterflies in Satpura Tiger Reserve; (iv) documentation of ecological role of the butterflies, including various indicator species that may be useful for the management of Satpura Tiger Reserve; and (v) digital database of the butterflies seen in Satpura Tiger Reserve.

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
Investigator	:	Dr. V.P. Uniyal
Researcher	:	Pritha Dey
Date of Initiation	:	November 2012
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; and (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 preliminary study of the diversity of moths across the state of Uttarakhand was conducted starting in December 2012. The winter months are not suitable for insect sampling due to the low ambient temperature persisting all over the state of Uttarakhand, with heavy snowfall occurring in many of the study areas, such as Nanda Devi Biosphere Reserve, Valley of Flowers, Gangotri National Park, Govind Wildlife Sanctuary and Kedarnath Wildlife Sanctuary. The appropriate season for moth sampling is from April to October. So during the three months of the reporting period, a checklist of moth species documented in

Uttarakhand was prepared by consulting much of the literature already published. As preparing a checklist is one of the objectives of the project, much effort has been put into the literature survey for that purpose.

Milestone: The sampling method for collecting nocturnal insects in a mountainous terrain was refined. The altitudes between 2,100 and 3,100 m were sampled, and 56 morphospecies of moth were collected. Trans-Himalayan areas were sampled for the first time, and the records of many species may be the first ones from Uttarakhand.

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
Investigators	:	Dr. K. Sivakumar and Dr. J.A. Johnson
Researchers	:	Gitanjali Katlam and Paromita Ray
Date of Initiation	:	November 2012
Date of Completion	:	February 2014

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, keystone habitats within the conservation area and the impact of the project on these values; and (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: Surveys were conducted during the reporting period in three forest divisions, *i.e.* West Godavari, East Godavari and Khammam, falling under the submergence zones of the Indira Sagar Multipurpose Irrigation Project. A total of 13 beats were selected along both the banks of the Godavari River within the submergence zone in Papikonda National Park for rapid assessment of the status of the flora and fauna as well as riparian vegetation of the study area. A total of 35.11 km of transect was walked, but only three sightings of common langur *Semnopithecus entellus* groups (n=18) were made during this walk. Opportunistic sightings of wild pig *Sus scrofa* (n=1) and hare (n=3) were also observed in the study area. The research team neither sighted nor found pellets of common wild ungulates of the region such as cheetal, sambar, nilgai and wild pig, but locals told them about the presence of these species in this region. However, there were three observations of sloth bear scats (n=3) on the hill transects. During

the surveys, scats of jungle cat *Felis chaus* (n=3, encounter rate=0.06/km) and sloth bear *Melursus ursinus (*n=4, encounter rate=0.08/km) were found in the agricultural and forest areas. A few unidentified scats were also collected and preserved for further confirmation.

A total of 312 point counts were carried out, with a survey effort of 390 in the study area. A total of 3,135 birds were observed in 1,088 observations. In all, 91 species of bird belonging to 42 families were observed in the impact zone. During the study, four Near Threatened species, *i.e.* Indian darter *Anhinga melanogaster,* river lapwing *Vanellus duvaucelii,* white-throated flower-pecker *Dicaeum vincens* and black-headed ibis *Threskiornis melanocephalus,* were reported from the impact zone. Two species of gecko *Hemidactylus* spp., *Psammophilus blanfordanus,* belonging to the family Agamidae *and* three species of snake, *viz.* Duméril's black-headed snake *Sibynophis subpunctatus*, common kukri *Oligodon arnensis* and checkered keel back *Xenochrophis piscator,* were identified in the impact zone.

More than 80 species of freshwater fish were reported from the impact zone of the Godavari River. Of these, the most common species reported were *Labeo rohita*, *L. calbasu, L. fimbriatus, Sperata aor* and *Mystus cavassius,* along with *Wallago attu*. The order Cypriniformes was most represented, followed by Siluriformes and Perciformes. The presence of several invasive fishes was also observed here. The fish sampling data show that there is a substantial diversity of fishes in the part of the Godavari River within the stretch from Polavaram to Kakinada, and it is expected that further sampling will provide more information. An endemic species of the Western Ghats, *Hypselobarbus kolus*, has been recorded for the first time from the Eastern Ghats through this study. This vulnerable species is supposedly common in the Karuturu region in Papikonda National Park.

ACADEMIC & TRAINING

XIII M.Sc. in Wildlife Science

Status of Doctoral Research

XXXIII PG Diploma Course

XXXIV PG Diploma Course

XXVIII Certificate Course

ACADEMIC PROGRAMMES

XIII M.Sc. (Wildlife Science)

During the period of report, the students were taken to Kedarnath Wildlife Sanctuary for High Altitude Ecology & Techniques Tour from 30 April - 10 May 2012. The teaching inputs for the III Semester started from July 2012. The students were taken to Sathyamangalam Tiger Reserve, Mudumalai Tiger Reserve, Mukurthi National Park, Silent Valley National Park, and Gulf of Mannar Marine Biosphere Reserve from 16 October - 5 November, 2012 as part of the Conservation Practice & Management Tour in the 3rd Semester. As part of the fourth semester the students carried out field dissertation projects from December 2012 to May 2013. They returned to WII on completion of the study in May 2013.

M.Sc. Theses Supervised

Basu Arnab, 2012. Abundance estimation of leopards in Girnar Wildlife Sanctuary, Gujarat. Forest Research Institute University, Dehradun. Supervisor: Dr. Y.V. Jhala.

Bhaskar Jyoti Bora, 2012. Food habits of Red Fox *Vulpes vulpes* in Dachigam National Park, Srinagar, Jammu & Kashmir, India, M.Sc. Natural Resource Management, Doon University, Dehradun. Supervisor: Dr. Bilal Habib.

Chatterjee, Anindhita, B. 2012. Estimation of occupancy and abundance of meso-carnivores in Corbett National Park, Uttarakhand. Forest Research Institute University, Dehradun. Supervisor: Dr. Y.V. Jhala.

Jaiyati Rawat, 2012. Traditional knowledge of resource use in context to wild edibles, ethno-medicine & ethno-veterinary practices in Nanda Devi Biosphere Reserve, Uttarakhand. Master of Science in Environmental Science. Doon University, Dehradun. Supervisor: Dr. R. Badola.

Rana, M., 2012. Agro-biodiversity and food security in context to climate change: A case study of Nanda Devi Biosphere Reserve, Uttarakhand. M.Sc. dissertation for the award of the degree in Environmental Science, School of Environment & Natural Resources, Doon University, Dehradun. Supervisor: Dr. S.A. Hussain.

Varsha, 2012. Impacts of climate change and the adaptation strategies of mountain communities, Nanda Devi Biosphere Reserve, western Himalayas. Master of Science in Biodiversity and Conservation. University School of Environment Management, Guru Gobind Singh Indraprastha University, New Delhi. Supervisor: Dr. R. Badola.

Status of Doctoral Research in WII

Thesis Submitted

Angom, S. 2012. Demographic status and genetic variation of sangai in Keibul Lamjao National Park, Manipur. Saurashtra University, Rajkot. 206 pp. Supervisor: Dr. S.A. Hussain.

Ghosh, Mousumi, 2012. Distribution and ecology of breeding *Phylloscopus* and *Seicercus* warblers in the Himalayas: Role of ecomorphology and competition. Saurashtra University, Rajkot. Supervisor: Dr. G.S. Rawat. Co-supervisor: Dr. Trevor D. Price.

K. Muthamizh Selvan, 2012. Ecology of sympatric large carnivores in Pakke Tiger Reserve, Arunachal Pradesh. Saurashtra University, Rajkot. Supervisors: Dr. S.A. Hussain and Dr. Gopi G.V.

Awarded

Ishwari Datt Rai, 2012. Ecological attributes of timberline vegetation with special reference to climatic variability in a part of west Himalaya, Uttarakhand. Kumaun University, Nainital. Supervisors: Dr. K. Bisht and Dr. B.S. Adhikari.

Karki, J.B., 2012. Occupancy and abundance of tigers and their prey in the Terai Arc Landscape, Nepal. Ph.D. dissertation, Forest Research Institute University, Dehradun. Supervisor: Dr. Y.V. Jhala.

Shivani, Chandola, 2012. An assessment of human-wildlife interaction in the Indus Valley, Ladakh, Trans-Himalaya. Saurashtra University, Rajkot. Supervisor: Dr. V.B. Mathur.

Sinha, Bitapi, 2012. Evaluating effectiveness of interpretive facilities in enhancing conservation awareness in select tiger reserves in India. Bharati Vidyapeeth, Pune. Supervisor: Dr. V.B. Mathur.

Umeshkumar L. Tiwari, 2011. *Systematics and ecology of Berberidaceae in Uttarakhand state.* Forest Research Institute University, Dehradun. Supervisors: Dr. G.S. Rawat and Dr. B.S. Adhikari.

Vyas, Pradeep, 2012. Biodiversity conservation in Indian Sundarban in the context of anthropogenic pressures and strategies for impact mitigation. Saurashtra University, Rajkot. Supervisor: Dr. V.B. Mathur.

Registered

Barve, Sahas, 2012. Determinants of altitudinal range limits in west Himalayan birds. Cornell University, USA. Co-supervisor: Dr. V.B. Mathur.

Chakrabarty, Pushan, 2012. Plant–pollinator network along the gradient of agricultural intensification in Tripura. University of Calcutta, Kolkata. Supervisors: Dr. V.P. Uniyal and Dr. Basu Bhattacharya.

Salvador Lyngdoh, 2013. Spatial ecology and predation pattern of wolf in Spiti Valley, Himachal Pradesh, India. Saurashtra University, Rajkot. Supervisors: Dr. Bilal Habib and Dr. Y.V. Jhala.

Sharma, B.R., 2012. Evaluating the efficacy and conservation impact of *ex-situ* breeding on wildlife conservation in India. TERI University, New Delhi. Co-supervisor: Dr. V.B. Mathur.

Shivam Shrotriya, 2013. Status, distribution and foraging ecology of wolf in the north-western Himalayan landscape, India. Saurashtra University, Rajkot. Supervisors: Dr. Bilal Habib and Dr. Y.V. Jhala.

Sinha, Samir, 2012. An evaluation of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) implementation in South Asia with special reference to India. Saurashtra University, Rajkot. Supervisor: Dr. V.B. Mathur.

Virkar Preeti S., 2012. Plant–insect pollinator interaction across land use in Doon Valley, Uttarakhand. Saurashtra University, Rajkot. Supervisors: Dr. V.P. Uniyal and Dr. J.M.S. Rana.

Vinayak K. Patil, 2012. Diversity of spider assemblages in sacred groves of Ratnagiri, Maharashtra: Implications for conservation management in the landscape. Forest Research Institute University, Dehradun. Supervisors: Dr. V.P. Uniyal and Shri Mukul Trivedi.

TRAINING ACTIVITIES

XXXIII P.G. Diploma Course in Advanced Wildlife Management concluded, *September 1, 2011 to June 30, 2012.*

One of the important courses at the Institute, the 10-month P.G. Diploma Course in Advanced Wildlife Management commenced on 1 September 2011 with nine officer trainees. During the reporting period, the Management Term Paper Exercise was held at Kanha National Park in Madhya Pradesh. The Management Plan Exercise, with the objective of collecting first-hand information on tiger reserve resources, their problems and existing management practices was held at Dandeli–Anshi Tiger Reserve, in Karnataka.

All the officer trainees have successfully completed the course. Seven of them were awarded the Honours Diploma for securing 75% marks or more.

Institute's Gold Medal for the top trainee	Shri Arun R.S.
Silver Medal for the best all round wildlifer	Dr. Manish Kumar
A.K. Chatterjee Silver Medal for the best management term paper	Dr. Manish Kumar
Wildlife Preservation Society Silver Medal for the second in merit	Dr. Manish Kumar
N.R. Nair Memorial Silver Medal for the best management plan	Dr. Manish Kumar
Top Trainee in Wildlife Biology book prize	Dr. Raja Ram Singh

XXXIV Postgraduate Diploma in Advanced Wildlife Management, *September 1, 2012 to June 30, 2013.*

The 10-month P.G. Diploma Course in Advanced Wildlife Management commenced on 1 September 2012 at this institute with 20 officer trainees. The officer trainees represented 14 states (one each from Andhra Pradesh, Chhattisgarh, Mizoram, Nagaland, Punjab, Rajasthan, Sikkim, Tripura, Tamilnadu, Uttar Pradesh and West Bengal and two each from Himachal Pradesh, Kerala and Orissa). Among them, there are 3 IFS officers of the 2009–11 batch as Hari Singh Fellows, who completed their professional/forestry training of two years at Indira Gandhi National Forest Academy, Dehradun.

A number of visits and field tours were conducted for providing field exposure to the officer trainees. The Orientation Tour was held at Kotdi Range of Lansdowne Forest Division during 25–29 September 2012. The High Altitude Ecology Tour was held at Kedarnath Wildlife Sanctuary and Nanda Devi Biosphere Reserve in Uttarakhand during 22–27 October 2012. For the Techniques Tour, the officer trainees were taken to Rajaji National Park, in Uttarakhand, during 26 November—10 December 2012. They were oriented to the Shivaliks, the Bhabar tract and

vegetation of the park, connectivity issues of the park. For the Wetland Tour, the officer trainees were taken to Keoladeo National Park in Rajasthan and National Chambal Wildlife Sanctuary in Madhya Pradesh during 7–13 January 2013.

During the Management Tour (Indian component), the officer trainees visited several protected areas/wildlife sanctuaries/zoological parks in Gujarat during 10–23 February 2013. For the Management Tour (foreign component), they visited several protected areas in South Africa during 4–18 March 2013. 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 observe various conservation models in action. The officer trainees visited the Johannesburg Zoo, Pertoria Zoo, Kruger National Park, Southern African Wildlife College, Khamai Reptile Park, Moholoholo Wildlife Rehabilitation Centre, Cheetah Breeding Project, Marakele National Park and Mapungubwe National Park. The presentations on the Management Tour to South Africa by the officer trainees were made in a seminar on 22 March 2013.

XXVIII Certificate Course in Wildlife Management *November 2012 to January 2013.*

The Certificate Course is a regular training programme of the institute. The XXVIII Certificate Course in Wildlife Management commenced on 1 November 2012. In all, 10 candidates joined this course, of which eight were foreign nationals (two each from Malaysia and Bhutan and one each from Lao PDR, Vietnam, Nepal and Thailand) and two were Indian candidates from the Madhya Pradesh Forest Department. This year, the Global Tiger Forum supported five candidates for the course.

The officer trainees were taken for their Orientation-cum-Techniques Tour at Sariska Tiger Reserve and Keoladeo National Park, Rajasthan from 25 November to 7 December 2012. They visited various protected areas in West Bengal, such as Mahananda Sanctuary, Senchal Sanctuary, Gorumara National Park, Jaldapara Wildlife Sanctuary and Buxa Tiger Reserve, and *Darjeeling Zoo* for their management tour during 11–25 January 2013. In the latter half of the management tour, officer trainees were taken to various protected areas and the Ramsar sites at Bhitarkanika and Chilika. A visit to Nandankanan Zoological Park was made to learn about conservation breeding and zoo management.

In addition to lectures, there were practical sessions and short visits in the campus, and trainees were taken for a day's trip to Haridwar to see the cultural heritage, socio-economic status and biodiversity wealth of India through the 'Science Express—Biodiversity Special' (SEBS) train. They were also taken to Dhanaulti and Rajaji National Park.

The course concluded on 31 January 2013. All the officer trainees have successfully completed the course after three months' valuable training.

Wildlife Conservation Gold Medal	Ms Thinley Choden
Institute's Silver Medal for the best performance in 'Wildlife Management'	Shri Devesh Kharadi
Institute's Silver Medal for the `Best All Round Wildlifer'	Ms Thinley Choden

CAPACITY BUILDING

Workshops, Seminars & Conferences

Organized

Participated

Workshops, Seminars and Confeferences

ORGANIZED

Mainstreaming Biodiversity Conservation in Energy Projects: What Can Impact Assessment Offer?, Porto, Portugal, *27–28 May 2012*. This 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. The course was the ninth in the series of international courses jointly conducted and coordinated with Dr. V.B. Mathur. It was organized by IAIA. The two-day course was targeted for mid-career EA professionals, researchers, business groups, decision-makers, government officials, donor agencies, economists and other professionals committed to more responsible planning of energy projects through better integration of biodiversity in impact assessment.

The objectives of the course were to (i) review the future energy challenges, the biodiversity risks and the benefits of promoting biodiversity-inclusive impact assessments for successful conservation outcomes of different energy development projects; (ii) explore the kinds of win–wins that can be devised in power projects when accounting for impacts on biodiversity and ecosystem functions; (iii) explore innovative economic tools for adapting production to produce in more biodiversity-friendly ways, including avoidance, mitigation and offsets; (iv) share global experiences of successful biodiversity planning and mainstreaming in energy sector; and (v) facilitate sharing and peer-based learning among IA professionals.

World Environment Day celebrations, *Dehradun, 5 June 2012*. Like every year, World Environment Day was celebrated in the institute. The objective of the programme was to create awareness about the need to take positive environmental action. It was organized by Wildlife Institute of India jointly with the Indian Society of Remote Sensing, Dehradun Chapter (ISRS-DC) and Indian Meteorological Society, Dehradun Chapter (IMS-DC). A total of 120 persons participated in it.

The welcome address was delivered by Dr. George Philip, Chairman, ISRS-DC. Dr. Philip emphasized the importance of World Environment Day. The theme for this year was declared by United Nations Environment Programme (UNEP) as “Green Economy: Does It Include You?”

Shri P.R. Sinha, Director, Wildlife Institute of India also addressed the gathering and discussed the issue of environmental equity. Dr. Anand Sharma, Director, Meteorological Center, IMD, Dehradun

delivered a popular talk on 'Weather & Climate'. He gave an explanation about the weather and discussed the temperature, wind, humidity, pressure, precipitation, micro-climate, macro-climate, urban heart islands, climate variability and climate change.
A documentary, “Monsoon—India's God of Life”, was screened on this occasion. A poster exhibition was also organized, displaying significant case studies and applications of remote sensing technology in various fields of the natural sciences.

Consultation Workshop on National Biodiversity Information Outlook (NBIO), New Delhi, 20 *August 2012.* The workshop was organized to discuss the preparation of the National Biodiversity Information Outlook (NBIO) to be presented during the CBD-CoP at Hyderabad in October 2013. Twenty representatives from 11 organizations attended the workshop.

High-level meeting of Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) project on “Capacity Building in Biodiversity Informatics”, New Delhi, 21 *August 2012.* The workshop was organized to discuss the progress of the collaborative project “Capacity Building in Biodiversity Informatics”. A total of 11 representatives from five organizations attended the workshop.

Training workshop on “Mainstreaming Biodiversity in Impact Assessment”, Dehradun, 27–28 August 2012. This training workshop, conducted by the Wildlife Institute of India for Indian Forest Service officers, was sponsored by the Ministry of Environment & Forests, Government of India, New Delhi. The workshop had the following objectives: (i) improving the mechanisms for mainstreaming biodiversity in the impact assessment for sound decision making and long-term gains for conservation; (ii) improving appreciation of the issues and conflicts related to developments in ecologically sensitive areas; and (iii) reviewing options for professionalizing EIA for positive outcomes for biodiversity. A total of 26 Indian Forest Service officers participated in the workshop.

VIII Internal Annual Research Seminar (IARS), *14 September 2012.* The IARS was chaired by Shri Vinod Rishi, Former, ADG (WL), MoEF, Government of India, New Delhi. During the IARS, a total of 15 presentations were made in six technical sessions, *viz.,* Status Survey and Landscape Level Studies; Avifaunal Studies; Population Genetic and Phylogenetic Studies; Coastal and Marine Biodiversity Studies; Physiology, Reproductive Biology and Conservation Breeding Studies; and Biodiversity Data Publishing and Demonstration. The presentations were based on recently initiated and ongoing research studies and were made by research fellows of the institute. In addition, 11 poster presentations were made by the researchers. The oral presentations and posters

were evaluated by the panel of judges. The following were adjudged as the three best oral and poster presentations. The concerned research personnel were awarded book prizes:

Best Presentation Award

I Supriya Relationship between phylogenetic divergence and divergence in sperm morphology in Himalayan passerines

II Mousumi Ghosh Biodiversity data sharing: Digitizing and making camera trap data available to aid conservation

III Lakshminarasimha, R. Conservation of western tragopan (*Tragopan melanocephalus*) through captive propagation

Poster Presentation Award

I B. Navaneethan and Manas Manjrekar Ranging patterns and habitat use of re-introduced gaur *Bos gaurus* in Bandhavgarh Tiger Reserve, Madhya Pradesh

II Shivam Shrotriya Status and distribution of wolves in the Himalaya

III Manish Bhardwaj Butterfly (Lepidoptera: Rhopalocera) diversity, distribution and conservation in the Gangotri landscape, Uttarakhand

XXVI Annual Research Seminar (ARS) of WII, Dehradun, 17–18 September 2012.

Prof. R. Sukumar, Chairman, Training, Research and Academic Council (TRAC), chaired the seminar. A total of 18 presentations were made in five technical sessions, *viz*., Ecology of Large Carnivores; Patterns in Faunal Distribution and Diversity; Conservation and Development Interface; New Initiatives; and Monitoring and Management of Large Carnivores. The presentations were based on ongoing or completed research studies and were made by research fellows and faculty members of the institute.

About 225 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, conservationists, wildlife experts, faculty members, researchers, M.Sc. students and the P.G. Diploma Course officer trainees of WII.

A panel including eminent scientists and wildlife managers evaluated the relevance and quality of research by the presentations made. The presentations made by the following researchers were adjudged the best five presentations made during the XXVI Annual Research Seminar of the institute, and the researchers were awarded book prizes.

Best Presentation Awards

I Tapajit Bhattacharya Spatial database on carnivores and their prey in Khangchendzonga Biosphere Reserve, Sikkim

II Subhadeep Bhattacharjee Assessment of habitat utilization patterns of the re-introduced tigers *Panthera tigris* in Sariska Tiger Reserve, Rajasthan

III Manjari Roy Assessing the applicability of techniques for population estimation of tiger *Panthera tigris* in the Sunderbans, West Bengal

IV Bipin C.M. Re-introduction of cheetah *Acinonyx jubatus* in India

V Kausik Banerjee Identifying drivers of human–lion coexistence in Gir landscape, Gujarat

S. Harikrishnan Species richness, density and distribution of insular herpetofauna in Andaman Islands

In the concluding session, Dr. R. Sukumar, Chairman—TRAC complimented all the presenters of the ARS and congratulated WII for selecting a wide array of subjects including genetics and demonstration of new techniques and for the new initiative of poster presentations.

One-week course **on** "Human Wildlife Conflict: Issues and Mitigation"**,** Dehradun, *19–23 November 2012***.** This course was conducted at the Wildlife Institute of India, Dehradun as per the instructions from the Ministry of Environment & Forests, Government of India, New Delhi. The course was for the in-service IFS officers from various states of the country. A total of 25 IFS officers from various states participated in the course. The officers were sensitized about their role in human–wildlife conflict.

21st international conference on bear research and management, New Delhi, *26–30 November 2012.* The conference was hosted by the Ministry of Environment & Forests, Wildlife Institute of India, Wildlife Trust of India and Central Zoo Authority, with support from the

International Fund for Animal Welfare, World Society for Protection of Animals, *International Bear Association* (*IBA*) and the Bear Specialist Group. The conference has the unique distinction of being the first international conference on bears in South Asia and only the second in Asia, thereby signalling the growing recognition and influence of IBA outside America and Europe.

The release of the National Bear Conservation and Welfare Action Plan by the Union Minister for Environment & Forests was one of the most significant achievements of the conference. For preparation of this plan, a 'bottom to top approach' was adopted, and that included field surveys and consultations with field managers across 28 bear states of India for a period of over a year. The conference was attended by 373 delegates from 35 nations. To commemorate the occasion of the 21st IBA conference in India, the Department of Posts released a special cover. The formal sessions of the conference included nine technical sessions that were conducted over four days. The conference generated tremendous interest amongst the conservation community, media and general public and created the 'much-needed awareness' for strengthening bear conservation in South Asia. The proceedings of the conference are available at www.indianbears.com.

First meeting of the Regional Expert Committees for Management Effectiveness Evaluation (MEE) of Protected Areas in India, New Delhi, 29

November 2012. A meeting was organized to discuss matters relating to Management Effectiveness Evaluation (MEE) of Protected Areas in India. Forty national parks and wildlife sanctuaries have been identified for undertaking MEE across India in 2012–2013. Shri S.S. Garbyal, Additional Director General (Wildlife), MoEF reiterated the importance of conducting MEE of protected areas. The meeting was attended by five chairmen and 15 members of the regional MEE committees constituted by the MoEF.

Two days' compulsory workshop on 'Ecodevelopment for Biodiversity Conservation: Assessment and Way Forward', Dehradun, 3–4 December 2012.

The Wildlife Institute of India organized the workshop for Indian Forest Service (IFS) officers at Wildlife Institute of India, Dehradun. This course was sponsored by the Ministry of Environment and Forests. 21 Forest officers from the rank of DCF to PCCF participated in the course. This course was planned keeping in mind the fundamental principles and latest happenings in ecodevelopment with reference to the empowerment of local communities and protection of forests/PAs/natural ecosystems. It also served as a platform to develop linkages and further collaborations among the in-service forest officers of various ranks and the resource persons, who were drawn from the WII and the field and represented expertise on various dimensions of ecodevelopment planning and implementation.

YETI—Young Ecologists Talk and Interact, Dehradun, *5–7 December 2012.*

YETI—Young Ecologists Talk and Interact, an annual conference organized by and for students of ecology, was held at the Wildlife Institute of India. The conference, co-hosted by WII and Doon University, had over 250 student participants from across the country. The research talks and poster presentations by students spanned several fields of research in ecology, evolution and conservation and ranged from the diversity of marine invertebrates to trends in populations of wild carnivores. Alongside workshops on a variety of field skills, academic approaches and other allied subject topics such as wildlife photography and journalism, a number of eminent biologists and naturalists in this field shared findings and insights from their work on a range of subjects such as theoretical approaches to studying ecological processes, animal behaviour, studying evolutionary processes of natural and sexual selection, natural history, scientific thinking and conservation values and approaches.

YETI, which began as a small students' meet for researchers studying ecology–evolution–conservation in 2008 in Bangalore, fledged the very next year into a country-wide, low-cost, low-frills, student initiative to meet, exchange and review knowledge and advances in their research. In 2011, YETI was held in Guwahati, and this year, students brought it to Dehradun. The conference was very useful for students in meeting peers, exchanging ideas, getting research inputs, discovering new

perspectives and venues of research, making friends and updating their knowledge.

Training workshop on 'Health Management of Large Carnivores', Dehradun, *10–12 December 2012. The workshop was organized by the institute under the aegis of the* National Tiger Conservation Authority. It was organized with the objective of imparting training on handling of wild felids in distress, treatment and medication needs for large felids, immobilization and restraint techniques and understanding the basics of health management in wild carnivores. Emphasis was laid on ethical, humane and scientific management of large felids. The workshop was attended by 23 participants representing various state forest departments. It included managers and veterinarians from Jharkhand, Kerala, Madhya Pradesh, Odisha, Rajasthan, Tamilnadu, Uttarakhand, Uttar Pradesh and West Bengal. Apart from the faculty members of the institute, some external resource persons were also invited from the National Referral Centre for Wildlife Conservation, Management and Disease Surveillance and from the Indian Veterinary Research Institute, Izatnagar to provide their technical inputs. Professor Richard Kock, from the Royal Veterinary College, London and Dr. Tony Sainsbury, from the Zoological Society of London, provided valuable inputs at the workshop.
The participants were sensitized to the major issues, such as conservation biology of carnivores, feline medicine, feeding and nutrition, anaesthesia and surgery, and general field procedures. The workshop was instrumental in providing an insight into the ethical, scientific and professional management of wild felids.

Three-day training programme on 'Wildlife Conservation: Issues & Concerns', Nagarhole National Park, Karnataka, *12–14 December 2012.* The training programme was organized for representatives of the Indian Army in state boards for wildlife at Kabini River Lodge, Nagarhole National Park, Karnataka. A total of 14 senior army officers, mostly of the rank of Brigadier, who represent the army in various state boards for wildlife, participated in the programme. Col. Michael James, Director, Policy (Ecology), Land Works and Environment; Directorate, Integrated Headquarter of Ministry of Defence (Army) also participated from the Army Headquarters. Shri V.B. Sawarkar, Former Director, WII and Lt. Gen. (Retd.) Baljit Singh were invited as the resource persons. Shri B.G. Hoshmath, APCCF (Project Tiger), Karnataka inaugurated the programme. The training programme included indoor interactions as well as field tours, including a nature walk guided by the Head Naturalist, Jungle Lodges and Resorts.

Three-day course on EIA: Ecology & Biodiversity, CEPT University, Ahmedabad, *10–12 January 2013.* In response to the request received from the Centre for Environment Planning and Technology (CEPT) University, Ahmedabad, a three-day training course on ecology and biodiversity in EIA was organized by the Wildlife Institute of India. It was sponsored by the Centre for Environment Planning and Technology (CEPT) University, Ahmedabad.

The objective of the course was to build the capacity of EIA consultants in conducting biodiversity-inclusive impact assessments and to guide them to data sources for building ecological baselines of project areas. The course was well

received, as was evident from the course feedback and from the request by CEPT to conduct such courses on a regular basis. In all, 32 participants attended the course.

One-week compulsory training course on "Illegal trade in wildlife and its protection strategies: Intelligence gathering, anti-poaching strategies and the role of wildlife forensics in dealing with wildlife crimes", Dehradun, *14–18 January 2013.* The course was conducted at the institute for IFS officers nominated by the Ministry of Environment & Forests, Government of India. Nineteen participants from different states in the country participated in this course. The objective of the course was to understand the status and extent of the illegal trade in wildlife and the protection strategies adopted by the state governments. Case laws in wildlife and appreciating the role of wildlife forensics in dealing with wildlife crime were also covered in this course. There were several distinguished and eminent resource persons from the country with expertise in wildlife law, investigation of wildlife crime and identification of wildlife products, who gave inputs in this course. The course was very useful, and the participants appreciated the strategy developed for successful prosecution of offenders and felt that this should be emulated in their states. The inputs given by the resource person from the Wildlife Crime Control Bureau and Central Bureau of Investigation on wildlife case investigation and forensics was very much appreciated.

Attachment of probationers of Indian Revenue Service (Customs & Central Excise) Group A (63rd Batch) with Wildlife Institute of India, Dehradun, *21 January–1 February 2013 and 4–15 February 2013*. The present training modules essentially aimed at sensitizing the young probationers of the Indian Revenue Service towards the wildlife trade in the country and their role in checking it. The course was attended by a large group of 111 probationers in two groups. The various inputs included an introduction to the importance of biodiversity and its conservation, status of endangered species including flagship species such as the tiger and monitoring it and special inputs on the illegal trade in wildlife articles, including butterflies, *shahtoosh*, rhino horn, skins and tiger bones. Inputs were also given on the importance of plant taxonomy and the trade in medicinal plants. Inputs were given on the role of wildlife forensics in dealing with wildlife cases. Officers were also given basic information on the implementation of the Wildlife Protection Act, 1972, CITES and other international conventions.
The probationers were provided an opportunity to interact with the IFS probationers at Indira Gandhi National Forest Academy to improve inter-service coordination, which will definitely prove fruitful in their professional careers. Apart from being provided classroom inputs, the officers were taken to Rajaji National Park and Corbett Tiger Reserve for field exposure. Jungle safaris in the Dhikala and Bijrani areas of Corbett Tiger Reserve sensitized them towards flagship and keystone species. The young and enthusiastic probationers had the privilege of interacting with the top officials of the tiger reserve. The probationers of the Indian Revenue Service took a keen interest in understanding various aspects of wildlife conservation during both classroom and field activities.

WCS–WII International Workshop on Analysis and Management of Animal Populations, Wildlife Institute of India, Dehradun, *15–22 January 2013.* This workshop was organized jointly by the Wildlife Conservation Society—India and the Wildlife Institute of India with the objective of making Indian wildlife biologists conceptually understand statistical approaches to population parameter estimation and thus enabling them to apply these techniques in their own work and generate reliable understanding and assessments of wildlife populations across the country.

The workshop was attended by more than 35 participants and included faculty members, researchers and students from research institutions and organizations across India such as WCS—India, Centre for Wildlife Studies, Wildlife Institute of India, Ashoka Trust for Research in Ecology and Environment, World Wide Fund for Nature—India, Nature Conservation Foundation, Indian Institute of Science Education & Research—Kolkota, Foundation for Ecological Research, Advocacy & Learning and National Centre for Biological Sciences. Senior-level forest officers of the Rajasthan and Uttarakhand forest departments also participated in the workshop. The resource persons included renowned scientists and authors Dr. David R. Anderson, Dr. James D. Nichols and Dr. K. Ullas Karanth.

One-week training workshop on Biodiversity Conservation, Dehradun, *18–22 February 2013.* The Wildlife Institute of India organized this one-week training workshop at the Wildlife Institute of India, Dehradun for women scientists/technologists of the Department of Science and Technology (DST), Dehradun as part of the DST-sponsored scheme "National Training Programme for Scientists & Technologists Working in Government Sector". In all, 22 women scientists/technocrats from across the country participated in the workshop. The workshop served to sensitize women scientists from across different sectors to the various issues of wildlife management as well as to recent advances in wildlife science. It also served as a platform to develop linkages among the women scientists representing different institutions for further collaborations.

Training Programme on 'Wildlife Conservation: Issues and Concerns', Kaziranga National Park, Assam, *4-6 March 2013.* The three-day training program was conducted for representatives of Indian Army in the State Boards for Wildlife at Aranya Tourist Lodge, Kaziranga National Park, Assam. In all, 14 senior army officers, mostly of the rank of Brigradier, who represent the Army in various State Boards for Wildlife, participated in the program. Col. Michael James, Director Policy (Ecology) Land Works and Environment Directorate Integrated Headquarter of MoD (Army) also participated from the Army Headquarters. Shri V.B. Sawarkar, former Director, WII and Dr. A.J.T. Johnsingh, former Dean, WII were the resource persons. Shri N.K. Vasu, Field Director, Kaziranga inaugurated the program. The training program included indoor interactions as well as field tours including extensive field tours in Kaziranga Tiger Reserve.

Workshops, Seminars and Confeferences
PARTICIPATED

Workshop on "Open Source Geospatial Tools", Dehradun, *2–4 April 2012.* The workshop was organised at the Centre for Space Science and Technology Education in Asia and the Pacific (CSSTEAP), Indian Institute of Remote Sensing (IIRS), Dehradun. It was attended by Dr. Manoj Agarwal.

First national consultation on "Biodiversity Targets" organized by National Biodiversity Authority, New Delhi, 9 *April 2012*. Dr. V.B. Mathur, Dean attended this meeting and provided inputs in the development of national biodiversity targets as part of the National Biodiversity Strategy and Action Plan (NBSAP) revision process.

Country Consultation in India for the Development of Strategic Framework Meeting, New Delhi, *10 April 2012.* The overall objective of the consultation was to develop a strategic framework for future activities of the International Centre for Integrated Mountain Development (ICIMOD). ICIMOD is a regional inter-governmental learning and knowledge sharing centre serving the eight regional member countries of the Hindu Kush Himalaya (HKH). The HKH region has experienced great changes owing to rapid population growth, economic development, urbanization and high rates of out-migration and consequent feminization of rural activities. Globalization and climate change have an increasing influence on the stability of fragile mountain ecosystems and the livelihoods of mountain people. ICIMOD aims to assist mountain people to understand these changes, adapt to them and make the most of new opportunities while addressing upstream–downstream issues. To respond better to the changing needs, ICIMOD revisited its Strategic Framework in 2012. Hence, consultations in member countries were organized. This particular consultation in India was one of them and had participation from the MoEF, state forest departments of Himalayan states, experts from scientific organizations, NGOs, etc. From the WII, Shri P.R. Sinha, Director and Dr. P.K. Mathur attended this country-level consultation and actively contributed.

68th Annual Northeast Fish and Wildlife Conference, Charleston, West Virginia, USA, *15–17 April 2012.* Dr. Gopi G.V. made an oral presentation on "Occupancy Pattern and Food Niche Partitioning Among Sympatric Kingfishers in Bhitarkanika Mangroves, Odisha", which was co-authored by Joli Borah, Mousumi Gosh, Abishek Harihar, Bivash Pandav and Gopi G.V.

Census workshop for forest officers, Pinjore, Haryana, *25 April 2012.* Dr. Bilal Habib attended a census workshop for forest officers organized at Pinjore. A total of 50 forest officials from Haryana participated in the training workshop.

Round Table seminar on 'Monitoring tigers in the Sundarbans', Dhaka, Bangladesh, *27–30 April 2012.* Dr. Y.V. Jhala participated in this round table seminar and presented two talks on WII's work in on tigers India and the Indian Sundarbans.

Regional inception workshop on 'Kailash Sacred Landscape Conservation Initiative Implementation Phase', ICIMOD, Kathmandu, Nepal, *2–4 May 2012.* The broad objective of the workshop was to discuss the overall programme and country proposals and lay out a set of regionally common activities to efficiently achieve the goals of the Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI). More specifically, the workshop aimed to harmonize methodologies and approaches, delineate a set of milestones and agree upon the timeline for meeting these objectives. The workshop intended to extend an opportunity to partners to have a detailed discussion on implementation frameworks, national priorities and capacity building needs. The Kailash Sacred Landscape Conservation Initiative (KSLCI) is a trans-boundary collaborative effort of the governments of China, India and Nepal. During the past years, the KSLCI has made considerable progress in terms of preparing feasibility assessment reports, 'Conservation Strategy (CS)', 'Comprehensive Environmental Monitoring Plan (CEMP)', 'Regional Cooperation Framework (RCF)', and implementation plans.

The workshop had participants from each of the three partner countries, the Department for International Development (DFID), UK, the Department of International Cooperation (GIZ), Germany, International Centre for Integrated Mountain Development (ICIMOD) and the United Nations Environment Programme (UNEP). Representatives from the lead institutions from the three member countries participated in the workshop. About 35 participants from the three member countries, including ICIMOD participants, attended the workshop. Dr. P.K. Mathur and Dr. B.S. Adhikari represented the institute at this workshop. Dr. Mathur gave an update on behalf of the Indian team.

UNESCO Information Meeting on the 36th session of the World Heritage Committee, *15 May 2012* and Meeting of Open Ended Working Group of the World Heritage Committee, *16 May 2012.* India is currently a member of the UNESCO World Heritage Committee (WHC). Dr. V.B. Mathur, Dean attended the 36th session of the WHC and meeting of the Open Ended Working Group of the WHC as part of the Indian delegation.

Global Tiger Recovery Program stock taking conference, New Delhi, *16 May 2012.* Dr. Y.V. Jhala attended the conference, held at Vigyan Bhavan, New Delhi and delivered a talk on “Tiger Status Assessment in India”.

Annual Conference of the International Association for Impact Assessment (IAIA '12), Porto, Portugal*, 27 May–1 June 2012.* Dr. Asha Rajvanshi and Dr. Vinod B. Mathur attended the IAIA's international conference on 'Impact Assessment: Energy Future—The Role of Impact Assessment'. A poster paper was presented at the conference on 'Narmada Canal: Securing Economic and Biodiversity Gains' by Dr. Asha Rajvanshi, Ms. Roshni Arora and Dr. Vinod B. Mathur. Two oral papers were also presented on (i) Developing an EIA Biodiversity Data Publishing Framework: India Pilot Project, by Dr. Asha Rajvanshi; and (ii) CEA, Biodiversity and Hydropower Planning in India, by Ms. Roshni Arora, Dr. Asha Rajvanshi and Dr. Vinod B. Mathur.
Dr. Asha Rajvanshi also co-chaired a session on 'Publishing, Sharing and Accessing EIA Biodiversity Data' with Dr. V.B. Mathur and Dr. Vishwas Chawan of the Global Biodiversity Information Facility (GBIF) Copenhagen, Denmark.

Technical consultation organized by IUCN on 'Consolidation of the Criteria to

Identify Sites of Global Significance for Biodiversity Conservation', Cambridge, United Kingdom, 5–8 *June 2012.* The IUCN has constituted a joint SSC-WCPA task force to identify sites of global significance for biodiversity conservation. As a member of this joint task force, Dr. V.B. Mathur, Dean provided professional inputs at the technical consultation.

Kailash Sacred Landscape Conservation and Development Initiative, International Centre for Integrated Mountain Development (ICIMOD), Dehradun, *22 June 2012.* Dr. B.S. Adhikari participated in the meeting, which was organized by the Uttarakhand Forest Department, Dehradun. The meeting was organized to develop synergy among the participating institutes, such as G.B. Pant Institute of Himalayan Environment & Development, Almora, Wildlife Institute of India, Dehradun and Uttarakhand Forest Department.

UNESCO 36th session of the World Heritage Committee, Saint Petersburg, Russian Federation, 24 *June–7 July 2012.* Dr. V.B. Mathur, Dean was designated as a member of the official Indian delegation for the 36th Session of the World Heritage Committee in Saint Petersburg, Russian Federation. Dr. Mathur spearheaded India's initiative to strengthen world natural heritage conservation, which led to the inscription of 39 serial sites in the Western Ghats at the 36th Session of the WHC.

International workshop on 'Sharing biodiversity information and the Integrated Publishing Toolkit (IPT2)', Taiwan, 25–27 June 2012. The purpose of the IPT2 workshop was to promote publishing and sharing biodiversity data within Asia for regional biodiversity conservation. The training courses included using GBIF tools to publish biodiversity data, installing and managing IPT2 and submitting data papers. This workshop asked attendees to affirm their commitments to become seed trainers to help set up IPT2 as well as to promote publishing and sharing biodiversity data in their own countries. This training workshop helped develop a pool of trainers in the area of biodiversity data publishing, especially metadata authoring, and the use of GBIF Integrated Publishing Toolkit (IPT) so that they can become more involved in the development and deployment of the tool, acting as a distributed helpdesk network for the benefit of their stakeholders. A total of 50 participants from various countries and international organizations, such as Japan, South Korea, India, Indonesia, Pakistan, the Philippines, Taiwan, the Asian Centre for Biodiversity (ACB) and the International Centre for Integrated Mountain Development, participated in the workshop. Dr. G. Talukdar and Dr. Panna Lal represented the institute at the workshop.

Regional Nodes Meeting of the GBIF Participant Nodes in Asia, Taiwan, 28–30 June 2012. The main purpose of the Regional Meeting of the GBIF Participant Nodes was to agree on the realistic components of an Asia Regional Plan of Action, building on the results and recommendations from the two previous Asian meetings. The other objectives were to discuss the implementation of the GBIF Work Programme by

Nodes in 2012–2013 and formulating suggestions for prioritizations of the different work areas for the 19th meeting of the GBIF Governing Board. The meetings also provided a platform for the GBIF Asian Nodes to share their experiences, set priorities and state their requirements and needs in a streamlined manner. A total of 18 participants from various countries and international organizations participated in the workshop. Dr. G. Talukdar participated in the meeting.

Expert consultation on 'Trans-Boundary Biodiversity Management in Kanchenjunga Landscape, Gangtok, Sikkim, *16–18 August 2013.* The expert consultation was organized by the International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal. The broad objective of the consultation was to review the progress made so far in the Kanchenjunga Landscape (KL), discuss the key challenges and agree on the work plan for the next set of activities. The specific objectives of the workshop included (a) providing an update on the current status and overall progress; (b) discussing the next set of programme elements to develop feasibility assessment reports, comprehensive environmental monitoring, conservation strategies and elements of a regional cooperation framework; and (c) developing and agreeing upon a common approach and timeline.

The Hon'ble Forest Minister, Government of Sikkim addressed during the first session of the consultation. Dr. P.K. Mathur of the institute attended this expert consultation and provided valuable inputs during deliberations and group discussions. Experts from ICIMOD, Kathmandu facilitated the workshop.

Consultation workshop on 'National Biodiversity Information Outlook (NBIO)' New Delhi, *20–21 August 2012.* The objective of the consultation workshop was to review the requirements of the National Biodiversity Information Outlook (NBIO), a strategic vision document. Biodiversity information is crucial to a wide range of scientific ecological, economic and social endeavours. The large and increasing volume of biodiversity data available in varying quality, formats and physical distribution makes it difficult to access pertinent information. This calls for a comprehensive assessment of biodiversity information and factors influencing its easy accessibility. The National Biodiversity Information Outlook (NBIO) is an initiative for providing assessments of biodiversity information and a roadmap for achieving strategic goals and objectives in biodiversity informatics. India is hosting the CBD CoP-11 in October 2012, and the NBIO will be released in a side event. Dr. G. Talukdar participated in the consultation workshop.

Global Observation Research Initiative in Alpine Environments (GLORIA) under Kailash Sacred Landscape Project, Humla District, Nepal, *21 August—11 September 2012.* Dr. B.S. Adhikari participated in the meeting, which was organized by the International Centre for Integrated Mountain Development, Kathmandu, Nepal.

Regional training on 'Biodiversity Data Publishing in the Hindu Kush Himalayan Region: Platform, Progress and Prospect', ICIMOD, Kathmandu, Nepal, *23–24 August 2012.* Shri Lekh Nath Sharma attended this training. The objectives of this training were the following: (i) To understand the platform for publishing biodiversity data globally as facilitated through the GBIF's (Global Biodiversity Information Facility) informatics infrastructure and experience in publishing biodiversity data through HKH-BIF or the Hindu Kush Himalayan Region node of GBIF

established at ICIMOD as well as to be aware of ICIMOD's other regional platform for biodiversity data and information sharing. (ii) To realize the prospects for data publishing and their implications for research and policy making and for creating the opportunity for networking among the data providers across the Hindu Kush-Himalayan Regions. (iii) To contribute proactively to building upon the effort made in terms of making the biodiversity data from the HKH region accessible to a wider audience and achieve progress towards demand driven data publishing and data analysis for informed decision making in biodiversity management.

Study visit for policy makers to 'Mainstream Rangeland in National Development and Planning' Thimpu, Bhutan, *25 August—2 September 2012.* Dr. P.K. Mathur participated in this International Centre for Integrated Mountain Development, Kathmandu, Nepal-sponsored study visit, which was conducted at Thimpu and selected field sites at Bhutan.

Conference on 'DNA in Forensics 2012', Innsbruck, Austria, *6–8 September 2012.* The conference was organized by Medical University, Innsbruck, Austria. Shri S.K. Gupta presented a paper on “Is the Indian Wild Boar an Evolutionary Significant Unit: Molecular Insight into Phylogeny of the Wild Boars and Domestic Pig”. The paper was selected for presentation at this conference. The phylogenetic tree indicates that domestic pigs in India have not originated from Indian wild pigs. It was concluded that the 3% nucleotide difference between the Indian wild pigs and domestic pig is helpful in differentiating between them as well as differentiating them from other wild pig races.

IUCN World Conservation Congress (WCC) at Jeju, Republic of Korea, *6–11 September 2012.* Dr. V.B. Mathur, Dean

attended the IUCN World Conservation Congress (WCC) in the Republic of Korea, in which the institute had organized several collaborative events in partnership with Colorado State University and conservation NGOs: (i) Expanding Capacity Building Efforts to Enhance Protected Area Management Effectiveness in the Asian Context in partnership with Colorado State University, USA on 8 September 2012. (ii) Capacity Building to Enhance Protected Area Management Effectiveness and Wildlife Conservation in the Asian Context in partnership with Colorado State University, USA on 8 September 2012. (iii) Partners in Conservation Capacity Building in partnership with Colorado State University, USA on September 10, 2012. (iv) Shaping the Future of IUCN's Protected Area Capacity Development Programme in partnership with IUCN on 7 September 2012. (v) Identification of Sites of Global Biodiversity Conservation Significance: Defining Global Standards and Mobilizing Standardized Biodiversity Data—Real-World Applications in partnership with IUCN on 8 September 2012. (vi) Management Effectiveness Evaluations in partnership with IUCN on 8 September 2012. (vii) IUCN Green List of Well Managed Protected Areas in partnership with IUCN on 11 September 2012.

Workshop on 'Biodiversity inclusive impact assessment for responsible growth: Challenges and prospects', Inter American Development Bank,

Washington DC, USA, *21 September 2012.* Dr. Asha Rajvanshi was invited by the head of the natural resources cluster within the Environmental and Social Safeguards group of the Inter American Development Bank, Washington DC, USA to conduct a workshop for the staff of IADB and mutli-lateral financing institutions. The workshop led to the beginning of collaboration with IDB for long-term initiatives to partner events for promoting biodiversity in impact assessment.

International Conference on 'Pathways to success: Integrating human dimensions into fish and wildlife management', Breckenridge, Colorado, USA, *24–27 September 2012.* Dr. V.B. Mathur and Dr. Asha Rajvanshi were invited by the conference organizers to chair/co-chair a session on 'Ecological security and societal well-being: Are these competing or converging goals in development decisions?' Dr. Asha presented a paper on 'Review of development induced changes in human dimensions and biodiversity values: Where do we go from here?' and Dr. V.B. Mathur presented a paper on 'Maximizing ecosystem services benefits for wildlife and people: Experience of the Narmada Canal Project, India'.

Training workshop on 'Restraint of wild animals and their transport', Guwahati, *24–28 September 2012.* This training workshop was organized by the College of Veterinary Sciences, AAU, Khanapara and Assam State Zoo, Guwahati under the aegis of the Central Zoo Authority for zoo veterinarians from Indian zoos as well as SAARC countries. Dr. Parag Nigam participated in the workshop and delivered a talk on 'Capture and translocation of large felids' on 24 September 2012.

Seventh Meeting of State Board for Wildlife, Gujarat State, Gandhinagar, *3 October 2012.* The meeting had multiple agenda items. Essentially, the board deliberated on the status of wildlife in the state of Gujarat state, challenges/constraints, updates on eco-sensitive zones in the context of PAs, human–wildlife conflicts, upcoming projects, the requirement of diversion of forest lands and capacity building.

The meeting was convened by the PCCF (WL) and CWLW, Gujarat. The meeting was well attended, and most non-official and *ex-officio* members were present. Dr. P.K. Mathur represented WII at the meeting.

Workshop on National Mission for Sustaining the Himalayan Eco-system (NMSHE), Palampur, Himachal Pradesh, *5–8 October 2012.* The workshop was organized by the Institute of Himalayan Bio-resource Technology, Palampur, Himachal Pradesh. Dr. B.S. Adhikari participated in the workshop and presented a pre-proposal on the dynamics of timberline forests in relation to phenology and water stress. Dr. Bilal Habib also attended the workshop, and he presented a pre-proposal on 'Communities and Climate Change'.

CBD-CoP11 side event on 'From the sidelines to the mainstream: Engaging newer communities in biodiversity data publishing', Hyderabad, *8 October 2012.* This side event of the CoP11 was organized by the Global Biodiversity Information Facility (GBIF), Copenhagen, Denmark to engage newer communities in biodiversity data publishing on the basis of the experience of the India and South Africa pilot. Dr. Asha Rajvanshi was invited to make a presentation on access to biodiversity data from environmental impact assessment. This event also marked the launching of the EIA biodiversity data portal for India that was developed under a GBIF-sponsored project.

International conference on 'Third Urban Biodiversity and Climate Change (URBIO2012)', Mumbai, *8–12 October 2012.* Dr. Pranab Pal, Field Technical Officer participated in this international conference, which was organized by the Department of Humanities and Social Science, Indian Institute of Technology, Mumbai. The conference was sponsored by MOSPI, India; National Biodiversity Authority, India; United Nations Emergency Force; National Bank for Agriculture and Rural Development; South Asian Network for Development and Environmental Economics; Sanctuary; International Council for Local Environmental Initiatives; INSEE; and the Ministry of Environment & Forests. More than 200 delegates from 25 countries participated and shared their views. Dr. Pal delivered a plenary lecture on “Land Use Changes due to Improper Meddling with Nature's Resources and its Influence on Biodiversity Conservation”.

CBD Conference of Parties 11 (CBD COP-11), Hyderabad, *8–21 October 2012.* The Secretariat of the Convention on Biological Diversity (CBD) at Montreal, Canada and the Government of India, Ministry of Environment and Forests jointly organized CBD CoP 11 at Hyderabad 20 years after the adoption of CBD at Rio, Brazil. CoP-11 specifically aimed to review the progress made in the implementation of the CBD and to deliberate on the next priorities and appropriate strategies.

Various international conservation agencies and representatives of member countries that are signatory to the CBD have actively participated in this important forum. A large number of symposia and side events were organized concurrent to CoP-11 so as to highlight conservation efforts to accomplish the goals/objectives of CBD. A large number of faculty members from the institute, along with the Director and Dean, WII, attended various side events.

IIIrd Session of Uttarakhand History & Culture Association on Himalayan States of India—History & Culture, MPG College, Mussoorie, *15–16 October 2012.* Dr. Pranab Pal, Field Technical Officer participated in this conference, which was jointly sponsored by the Indian Council of Historical Research, New Delhi; Indian Council of Social Science Research, New Delhi; and Government of Uttarakhand. Dr. Pal presented a paper on 'Conservation Biodiversity in India: Ways and Challenges'. A total of 120 delegates attended the conference.

Meeting of the sub-group of the multilateral financial institutions' working group on 'Environment in biodiversity and ecosystem services: Forum on processes and tools for assessing and addressing impacts', Washington DC, *5 November 2012.* The aim of the sub-group meeting was to develop a plan for how experts and multilateral financial institutions can work more effectively to address biodiversity and ecosystem services issues that arise in development projects. This meeting included presentations on processes and tools for assessing and addressing biodiversity and ecosystem service impacts in development projects.
Dr. Asha Rajvanshi was invited by the Chief of the Environmental and Safeguards Unit of the Inter Amercian Development Bank (IDB) to deliver a lecture on Training Needs in EIA and Strategic Environment Assessment for Biodiversity Inclusive Impact Assessment at the meeting.

The closing event of the celebration of the 40th anniversary of the World Heritage Convention, Kyoto, Japan, *6–8 November 2012.* To commemorate the 40th anniversary of the 'Convention Concerning the

Protection of the World Cultural and Natural Heritage', the Government of Japan (the Ministry of Foreign Affairs, the Agency of Cultural Affairs, the Ministry of the Environment and the Forestry Agency) and UNESCO World Heritage Centre jointly organized the closing event in Kyoto, Japan, from 6 to 8 November 2012. Dr. V.B. Mathur, Dean participated in this event.

TROPMET—2012 national symposium on 'Frontiers of meteorology with special reference to the Himalaya', Indian Institute of Remote Sensing, Dehradun, *20–22 November 2012.*

Advancement of meteorological and allied sciences in all their aspects and dissemination of knowledge of such sciences among scientific workers and among the public were the main objectives of the symposium. It was organised by the Indian Meteorological Society (IMS).

The Indian Meteorological Society came up with the following recommendations during TROPMET—2012: (i) The Himalayan state governments should facilitate the setting up of observatories and encourage the involvement of the local administration and academic and research institutes in spreading information about weather observation and sensitizing the public about natural hazards, climate variability and climate change. (ii) Further, the Himalayan region being prone to frequent meteorological hazards, there is a need to mainstream the disaster management activities in the developmental planning process, including central/state government-sponsored schemes such as the Mahatma Gandhi National Rural Employment Guarantee Act and the Integrated Watershed Management Programme. Dr. G. Talukdar participated in the symposium.

Web Learning Sessions on e-Procurement, New Delhi, *26–30 November 2012.*

This programme was conducted by National Informatics Centre, New Delhi to facilitate seamless integration and adoption of the Central Public Procurement (CPP). Training sessions were conducted to impart training on e-publishing and e-procurement on the CPP Portal. Users from all Government of India ministries and departments, their attached/subordinate offices, central public sector enterprises (CPSEs) and autonomous or statutory bodies joined the training sessions. Dr. Manoj Agarwal and Shri Lekh Nath Sharma attended this training.

Global snow leopard strategy workshop, Bishkek, Kyrgyz Republic, *1–3 December 2012.*

As a member of the delegation of the Government of India, Dr. S. Sathyakumar participated in the workshop and presented the country plan for snow leopard conservation at this workshop and provided inputs at the various group discussions.

Training workshop on 'Health management of large carnivores', Dehradun, *10–12 December 2012.*

The workshop was organized by the institute under the aegis of the National Tiger Conservation Authority with the objective of imparting training to field veterinarians on handling of wild felids in distress, treatment and medication needs for large felids, immobilization and restraint techniques and understanding the basics of health management in

wild carnivores. Emphasis was given on ethical, humane and scientific management of large felids. The workshop was attended by 23 participants representing various state forest departments. They included managers and veterinarians from Jharkhand, Kerala, Madhya Pradesh, Odisha, Rajasthan, Tamilnadu, Uttarakhand, Uttar Pradesh and West Bengal. Apart from the faculty members of the institute, external resource persons were invited from the Indian Veterinary Research Institute, Izatnagar. Inputs were also provided by Professor Richard Kock from the Royal Veterinary College, London and Dr. Tony Sainsbury from the Zoological Society of London.

Round Table conference on 'Mining and biodiversity conservation', New Delhi, *22 December 2012.* IUCN organized the Delhi Round Table, a brainstorming/multi - stakeholder consultation on 'Mining and Biodiversity Conservation' at Magnolia, India Habitat Centre. The objectives of the round table were to (i) examine the current institutional framework for mining and the modifications enhancement contemplated in the forthcoming MMDR Bill; (ii) examining how best to enhance the integration of biodiversity conservation, livelihood concerns and the sustainable development framework into mining practices; and (iii) mainstreaming best mining practices into national policies.

Dr. Vinod B. Mathur and Dr. Asha were provided resource inputs in the discussions related to mainstreaming best mining practices into national policies.

First plenary meeting of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES-1), Bonn, Germany, *21–26 January 2013.* Over 500 participants attended the first session of the Plenary of the IPBES-1,

representing IPBES member and non-member governments, UN organizations and conventions, intergovernmental organizations, non-governmental organizations and various stakeholder groups. The Ministry of Environment and Forests (MoEF), Government of India deputed Dr. Sujata Arora, Director, MoEF, Government of India, New Delhi and Dr. V.B. Mathur, Dean, Wildlife Institute of India to the official Indian delegation for IPBES. Dr. Mathur was selected as a member of the UN-IPBES Multidisciplinary Expert Panel (MEP) for the Asia–Pacific Region.

Workshop on 'Strategies to deal with straying tigers in human dominated landscape', Tadoba Andhari Tiger Reserve, Chandrapur, Maharashtra, *5–6 February 2013.* The National Tiger Conservation Authority organized this workshop for officials from Karnataka, Kerala, Maharashtra and Andhra Pradesh. Inputs were provided in the form of lectures by Dr. Parag Nigam on 'Capturing Large Felids'. Dr. Bilal Habib also attended the workshop.

One-day consultation workshop, 'Prospects of conservation breeding of Great Indian Bustard', Pune, *8 February 2013.* Dr. Bilal Habib attended this workshop, which was organized by the Maharashtra Forest Department.

Workshop on 'Strategies to deal with straying tigers in human dominated landscape', Dudhwa Tiger Reserve, Uttar Pradesh, *10–11 February 2013.* This workshop was organized by the National Tiger Conservation Authority for officials from Rajasthan, Madhya Pradesh, Uttarakhand and Uttar Pradesh. Inputs on 'Capturing Large Felids', followed by a demonstration of immobilization equipment and accessories, were provided by Dr. Parag Nigam.

Indo-UK seminar on 'Mammalian diversity assessment and monitoring interdisciplinary and multi-scale approaches', Corbett National Park, *13–15 February 2013.* Dr. Y.V. Jhala attended this seminar, which was funded by the Department of Science & Technology and the Royal Society. He raised funds and coordinated the seminar, in which 28 scientists participated.

International expert workshop on 'Enhancing the IUCN World Heritage Programme', Isle of Vilm, Germany, *17–21 February 2013.* Dr. S. Sathyakumar participated in this workshop and provided inputs for the formation of the next five year action plan for the IUCN World Heritage Programme.

National User Workshop on development of 'Generic ENVIS Centre Database Application Development Mechanism Concept' for WII-ENVIS website, IIC, New Delhi, *18–19 February 2013.* This was organized for IT personnel of ENVIS centres. Interactions were held on the content management system (CMS)-based restructured websites of all the ENVIS centres. The workshop also focused on the development of a generic database for the 35 restructured ENVIS websites. Shri Dinesh Pundir and Shri Jyoti Nautiyal attended this workshop.

Training–cum-workshop on 'Restraining, capture and rehabilitation of wild animals', Kanha Tiger Reserve, Madhya Pradesh, *22–24 February 2013.* This training–cum-workshop was organized by the Madhya Pradesh Forest Department for officials of the Odisha Forest Department. Dr. Parag Nigam provided inputs in the form of lectures. The topics of deliberation were 'Immobilization and restraint of wild animals', 'Capturing elephants: Options and concerns' and 'Precautions, safety measures and first-aid during wild animal capture'.

Brain-storming meeting on 'Draft National Working Plan Code 2012 for Sustainable Management of Forests and Biodiversity in India', Dehradun, *23 February 2013.* Dr. B.S. Adhikari participated in the meeting and provided inputs. The meeting was organied by the Indira Gandhi National Forest Academy, Dehradun.

Asia Parks Congress Steering Committee Meeting, Sendai, Japan, *26 February—1 March 2013*. The Ministry of Environment, Japan and the IUCN will be organizing the Asia Parks Congress (APC) in November 2013 for the first time to take stock of the various protected area management issues, and the outcomes of the APC will feed into the IUCN World Parks Congress (WPC), which will be held in Sydney, Australia in November 2014. Dr. V.B. Mathur, Dean has been designated as the Regional Vice-Chair of the IUCN-World Commission on Protected Areas (WCPA) for South Asia. He was invited to attend the Asia Parks Congress Steering Committee at Sendai, Japan.

Regional workshop on 'Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI)', International Centre for Integrated Mountain Development, Kathmandu, Nepal, *27 February—1 March 2013.* The regional workshop was organized by the International Centre for Integrated Mountain Development (ICIMOD), Kathmandu. It aimed to review and draw up plans for implementation of KSLCDI during 2012–2016. The ICIMOD, Kathamdu, Nepal has in the recent past facilitated the development of an implementation plan (2012–2016) for the Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI), a trans-boundary landscape management strategy for the KSL, to be implemented by China, Nepal and India. The workshop specifically invited representatives from three member countries, lead/partner institutions and funding agencies. The workshop had an inaugural session addressed by the Director General, ICIMOD and Director Programme Operations, ICIMOD, apart from having remarks made by the three countries. There was an introduction of the workshop by the Programme Coordinator—KSLCDI and an address by the chief guest, the Secretary, Ministry of Forest and Soil Conservation, Government of Nepal.

Trans-boundary management experiences and learning were shared at the workshop. Later, there were deliberations on the KSL Mid-Term Action Plan (2013–2017). Subsequently, country-wise planning for each of the project components and team building exercises were undertaken. Dr. P.K. Mathur, Dr. S. Sathyakumar and Dr. B.S. Adhikari participated in the workshop and provided inputs on finalization of the LOA between WII and ICIMOD and discussed various aspects of the initiatives of the KSL programme.

International workshop on 'Visual integrity of World Heritage Sites', Agra, *6–9 March 2013.* Dr. V.B. Mathur, Dean participated in the international workshop, which was organized by the Ministry of Culture, Government of India in partnership with UNESCO. He presented a joint paper on 'IUCN observations on visual Integrity'.

User Interaction Meet, Dehradun, *11–12 March 2013.* User Interaction Meet was organized by the Indian Institute of Remote Sensing, Dehradun. More than 100 participants from across India attended it. Key presentations were made by several senior scientists from ISRO/NRSC/FSI/MPSAC/IIT-R/IIRS alumni on 'IRS missions and opportunities', 'Earth observation sensors: Present and future', 'Operational remote sensing applications', 'Environment and climate studies—Opportunities', 'Capacity building at IIRS—Needs & challenges' and 'Geo-informatics for wildlife conservation and management'. Dr. Panna Lal and Dr. Manoj Agarwal attended this meet.

Symposium on 'Improving genomics through collaboration and innovation', Vancouver, Canada, *13–14 March 2013.* Dr. Bilal Habib attended this next generation sequencing symposium, which was organized by Integrated DNA Technologies and D-MARK Biosciences at UBC—Michael Smith Building, Vancouver.

Workshop on 'Strategic environmental assessment—Increasing planning efficiency & reducing conflicts of interest: Relevance, scoping and needs assessment of SEA in India' New Delhi, *19 March 2013.* Under the ongoing Indo German Bilateral Development Cooperation, the Deutsche Gesellschaft für Internationale Zusammenarbeit

(GIZ) has initiated a scoping and needs assessment study on the topic 'Strategic Environmental Assessment' (SEA) to identify the relevance of the SEA instrument in India and the potential requirements for capacity development in this area. A workshop was organized under this project to identify the relevance of the SEA instrument in India and the potential requirements for capacity development in this area.
This workshop was attended by various stakeholders including the Wildlife Institute of India, Indian Institute of Public Administration, Institute of Town Planners India and School of Planning and Architecture (SPA). On behalf of the WII team, Dr. Asha Rajvanshi made a presentation on 'SEA: Potential, experience and future prospects'.

National conference on 'New frontiers for women in science and technology', Gwalior, *20–21 March 2013.* Dr. Asha was invited as a lead speaker at the national conference. She made a presentation on the relevance of including biodiversity in impact assessment.

Study Tours

Study visit for policy makers to mainstream rangeland in national development and planning, Thimpu and selected field sites in Bhutan, *26 August–1 September 2012.* The study visit was sponsored by the International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal. The study programme aimed at facilitating cross-learning between policy makers from Bhutan and other rangeland management countries (RMCs). Rangelands in the Hindu Kush Himalayas (HKH) region reflect a diverse geographical and cultural landscape, concurrently shaped by historical and current physical forces and human use. Sedentary, nomadic and semi-nomadic pastoral communities in the region have developed their own means over thousands of years to adapt to the erratic climatic and biotic conditions. The importance of the HKH rangelands is being gradually recognized by scientists and conservationists. It is widely acknowledged that major policy re-orientations are needed to address challenges faced by rangeland management and pastoral development in the world. There is a general lack of policies in the HKH countries regarding rangeland resources.

ICIMOD, Kathmandu, through its Regional Rangeland Programme (RRP), is working closely with its national partners, supported by several member countries in different forms in reviewing, revisiting and formulating policies on rangeland management. As a result, several RMCs have draft rangeland policies now. Efforts are ongoing to improve rangeland policies in the RMCs. As part of the effort, ICIMOD organized the visit to Bhutan for policy makers from RMCs. Dr. P.K. Mathur, from the institute, was invited to this study visit to Bhutan—Thimpu, Gogona, Phojikha, Bajo and Punakha—along with members from other RMCs. Participants had a visit to the Ministry of Agriculture, Forests, and Wildlife, Royal Government of Bhutan and interacted with senior officials on the rangeland management policies adopted by the Government of Bhutan. Participants of the study group later visited selected field sites and were able to appreciate the efforts taken up for conservation of rangelands, forest and wildlife resources and the involvement of local communities in such efforts.

Study abroad programme on 'Wildlife management and conservation', Dehradun, *16–28 December 2012.* The study abroad programme was organized by the Wildlife Institute of India for North Carolina State University students at Dehradun. Sixteen undergraduate (Animal Science majors) and DVM

students from North Carolina State University, Raleigh, NC attended the two-week programme. The programme was designed with the objectives of (i) educating and familiarizing students with wildlife management practices in India; (ii) exposing students to the current conservation challenges faced by wildlife managers and making them discuss strategies to address them; and (iii) acquainting students with aspects of Indian culture, traditions and history while integrating these with wildlife education to enhance their learning experience.

The course basically 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 three modules that focused on (i) Research and management of wildlife in a national park; (ii) wildlife techniques and monitoring; and (iii) theory lectures on various aspects of wildlife management and conservation, wildlife forensics, wildlife health and human–wildlife conflict issues. Besides theoretical inputs at WII, the participants were provided 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, Uttar Pradesh.

Faculty Capacity Building Programme, University of British Columbia, Vancouver, Canada, *16 February–2 April 2013.* This capacity building programme was organized by the University of British Columbia, Vancouver, Canada and sponsored by the Ministry of Environment & Forests, Government of India. Dr. K. Ramesh, Dr. Gopi G.V., Dr. Bilal Habib, Dr. Gautam Talukdar, Dr. J.A. Johnson, Shri Sandeep Kumar Gupta and Shri R. Suresh Kumar from the institute and a scientist from Ministry of Environment & Forests, Government of India participated in the programme.

PROFESSIONAL SUPPORT

Collaborations
Services
EIA
Wildlife Forensic
IT and RS & GIS
Library
Wildlife Extension
National Wildlife Database
Wildlife Health Services
Research Laboratory
ENVIS
Herbarium
Campus Development
Sports

PROFESSIONAL SUPPORT

International Collaboration

Professionalizing Protected Area Management for the 21st Century - A World Heritage Biodiversity Programme for India (WHBI)

The United Nations Educational, Scientific and Cultural Organization (UNESCO), in collaboration with the United Nations Foundation (UNF), had given a planning grant in 2001 to the Ministry of Environment and Forests (MoEF), Government of India to develop a 10-year World Heritage Biodiversity Programme (WHBP) for India. The goal of this WHB Programme is to strengthen biodiversity conservation in protected areas by building replicable models at World Heritage Sites that emphasize law enforcement, promote habitat integrity and connectivity and improve the professional, social and political profile of the protected area management community and its civil society partners. The MoEF entrusted the responsibility of developing a framework proposal for identifying priorities, actions and activities and their time frame and budget requirement under this project jointly to the Wildlife Institute of India and the Ashoka Trust for Research in Ecology and Environment (ATREE), Bangalore. The WHBP proposal was discussed and finalized in consultation with representatives from the UN Foundation, UNESCO, Ford Foundation and ATREE. The UN Foundation and its partners have agreed to provide funds amounting to US$1.83 million for the four-year implementation phase of the WHBPI.

During the reporting period, a range of activities were carried out under the project “Building Partnerships to support UNESCO's World Heritage Programme: India” at all four pilot sites, *viz.* Keoladeo National Park, Rajasthan; Nanda Devi National Park, Uttarakhand; Kaziranga National Park, Assam; and Manas Wildlife Sanctuary, Assam. The responsibilities for implementation of the project activities at Keoladeo and Nanda Devi National Park were assigned to the Wildlife Institute of India and ATREE, Bangalore for Kaziranga and Manas. Field equipment/gear was provided to the park staff, and livelihood enhancement activities were taken up at the project sites. Several thematic workshops were conducted to build the capacity of the frontline staff. The rickshaw pullers-cum-guides at Keoladeo National Park were given courses in the French and German languages. Fifty students each from local communities and staff members were selected at Keoladeo and Nanda Devi National Park on the basis of a competitive examination for the award of World Heritage Biodiversity scholarships. The selected 100 students are serving as ambassadors to carry forward the message of conservation awareness and natural heritage conservation.

The project activities were reviewed at Project Steering Committee meetings chaired by the Additional Director General (WL). The final evaluation of the project was carried out by the Society for Natural Resource Management and Community Development (SNRMCD), New Delhi, which concluded that the project had made significant contributions to conservation of biodiversity and raising awareness about natural

heritage conservation. The project is coordinated by Dr. V.B. Mathur. The site coordinator for Nanda Devi WHS and Keoladeo WHS are Dr. S. Sathyakumar and Dr. K. Sivakumar, respectively.

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. GBIF membership is open to any country or relevant international organizations. A memorandum of understanding (MoU) has to be entered into for membership. India's association with the GBIF is from July 2003 as an Associate Participant. The first MoU with the GBIF was from 2003 to 2006, the second MoU for the period 2007–2011 and the third MoU for the period 2012–2017. In 2009, the MoEF nominated the National Biodiversity Authority (NBA), Botanical Survey of India (BSI), Zoological Survey of India (ZSI), Foundation for Revitalisation of Local Health Traditions (FRLHT) and Wildlife Institute of India (WII) as GBIF nodes in India. WII was designated as the overall coordinating node. Several activities have been undertaken since then, including mentoring, capacity building and joint projects. In this period, WII was able to mobilize approximately 7,000 records, through the Integrated Publishing Toolkit (IPT) instance, hosted at the WII.

Collaboration with USDA Forest Service (USFS)

The formal collaboration with the USDA Forest Service ended in March, 2008. However, beyond the project period, informal collaborative efforts were continued with the US counterpart scientist—Dr. John F. Lehmkuhl—and other team members of the project. Efforts were made to publish work based on previous collaborative research jointly undertaken with the US collaborators.

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

As in previous years, the institute continued to cooperate/collaborate with ICIMOD while focusing on the conservation and development of Himalayan ecosystems and demonstration of the trans-boundary landscape approach besides activities of the Himalayan University Consortium (HUC). The Director, WII and Dr. P.K. Mathur participated in the country consultation organized by ICIMOD at New Delhi for development of a strategic framework. During the reporting period, the institute 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. The faculty members attended various meetings/workshops at ICIMOD, G.B. Pant Institute of Himalayan Environment and Development and Gangtok, Sikkim. Dr. P.K. Mathur was designated as the nodal officer for ICIMOD's activities at WII for coordination of various activities/ programmes jointly undertaken.

Services

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

The institute 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 the MoEF under the

chairmanship of Shri B.K. Chaturvedi, Member Planning Commission, which endorsed the findings of the study and recommended enhancement of e-flows 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.

Management Effectiveness Evaluation (MEE) of Tiger Reserves in India (2012—2013)

The Ministry of Environment & Forests (MoEF), Government of India assigned the responsibility of technical backstopping of independent management effectiveness evaluation (MEE) of protected areas in India. The MoEF constituted five independent MEE committees to evaluate all 40 protected areas. The institute 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 that provides 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 the 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).

Biodiversity Conservation and Rural Livelihood Improvement (BCRLI)

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

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. A landscape unit could contain a mosaic of land uses but typically will include one or more protected areas that are interspersed with reserved and production forests, agricultural and other productively used lands and village settlements. The project has the following objectives: (i) assisting implementing forest departments with demonstration of the processes and outcomes of the approach; (ii) building national and regional capacities in landscape-level management; and (iii) carrying out specific tasks including ecological mapping, identification of biological indicators and spearheading team trainings and consultation workshops with policy makers, implementing officers, stakeholders and key line departments.

Progress: WII is one of the implementing agencies in the project, which is coordinated by the Ministry of Environment & Forests (MoEF). In order to formalize the implementation arrangements, an MoU was signed between the WII and MoEF on 25 July 2011. It was subsequently revised to firm up financial arrangements within the WII, and the revised MoU was signed by the Director, WII on 19 December 2011. After the agreement was signed by the MoEF, it became effective, from January 2012.

During the financial year 2012—2013, the following tasks were accomplished: (i) *Appointment of contractual staff:* Six contract staff members were appointed for studying the Askot landscape, including six project assistants for studying insect, bird, mammal, fish and plant taxa and for socio-economic profiling. A Field Coordinator was also appointed for Askot. (ii) *Initiation of ecological mapping and biological indicator works:* Implementation teams from WII were constituted and deployed in the field for data collection. The first-cut maps are now ready, and they will be finalized during the current year with biological, ecological and socio-economic data. (iii) *Training of spearhead teams:* Spearhead team training under the Uttarakhand Forest Department and Gujarat Forest Department for Askot and the Little Rann of Kutch (LRK) landscape, respectively; have been completed after finalization of the curriculum. Three model micro-plans were prepared for LRK, and the staff was enabled to carry out the rest. Draft planning in Askot is delayed due to administrative reasons. (iv) *Field learning centres (FLCs):* Field visits, workshops and discussions were held at FLCs for developing resource material, consisting of training modules, case studies on best practices and curricula. The respective FLCs will produce final documents during the next financial year. (v) *Accounts:* The annual work plan and procurement plan for 2012–2013 were prepared, and activities were initiated. (vi) *World Bank meeting:* The Second and Third Support Implementation Missions of the World Bank visited WII during June 2012 and January 2013 and rated the implementation progress of WII as satisfactory. (vii) *International consultant:* An agreement was signed with an international consultant on developing WII's capacity in training regarding landscape management, and the consultant will visit India early in the next financial year. (viii) *Capacity building training of WII's young faculty at University of British Columbia:* Six young faculty members of WII and one from the MoEF were deputed to the University of British Columbia, Vancouver, Canada for upgradation of their knowledge and skills in landscape conservation.

Milestones: (i) Spearhead teams were trained, both at Askot and the LRK. While the micro-planning of the LRK has progressed substantially, based on the guidance given by the WII through development of three model micro-plans, the Askot plans could not be completed due to administrative reasons. (ii) All FLCs were intensively engaged in developing training modules and documenting best practices. (iii) Young scientists from WII and MoEF were deputed to an international training programme at the University of British Columbia, Vancouver, Canada. (iv) A field station was established at Askot, and technical staff members were recruited for field work on identification of biological indicators and ecological mapping of the Askot landscape. (v) Micro-watersheds were identified and mapped. The first layers of the Askot landscape maps were produced.

Workshops under the BCRLI Project: The following workshops and meeting were organized.

Two-day workshop on 'Second Implementation Support Mission of Ongoing BCRLIP, Hotel Taj Mansingh, New Delhi, *18–19 June 2012.* The World Bank Second Mission for the ongoing Biodiversity Conservation and Rural Livelihoods Project (BCRLIP) aimed to review the progress made by the ongoing project and decide the future course of action for the pilot project being implemented at two priority landscapes.

The Ministry of Environment and Forests (MoEF), Government of India and the World Bank jointly organized this two-day workshop as a part of the Second Implementation Support Mission for the ongoing BCRLIP. The main aim of the workshop was to review the progress made by two pilot field

sites (Askot Landscape and Little Rann of Kutch Wild Ass Landscape); three learning centres (Gir PA, Gujarat; Periyar TR, Kerala; and Kalakkad Mundunthurai TR, Tamilnadu); and the Wildlife Institute of India (WII) in implementation of project activities from the inception. Shri Hem Pande, the then Joint Secretary and Nodal Officer for BCRLIP in the MoEF; Shri Tashi Wangdi; and representatives of the World Bank and project sites and WII attended the workshop. The workshop was successful in deciding the future pathway for execution of the BCRLIP. The workshop was organized by the WII. A total of 37 participants attended the workshop.

Workshop on 'Planning Smart Green Infrastructure in Biodiversity-Rich Landscapes', New Delhi, *13–14 August 2012.* The workshop was aimed at creating an understanding among the key players about the need, importance and ways of integrating wildlife and human dimension issues into the planning and design of linear infrastructure projects for improved landscape-level management of biodiversity-rich areas using smart green infrastructure. Towards this end, the workshop objectives were to (i) review the challenges and prospects of adopting landscape-level approaches for biodiversity conservation; (ii) review the trends of linear infrastructure development in biodiversity-rich landscapes; (iii) identify key environment and social impacts of linear infrastructure projects; (iv) assess the effectiveness of past and current mitigation options proposed and implemented in linear infrastructure projects; (v) review the existing global and regional best practice guidance for promoting responsible development in the linear infrastructure sector at the landscape level; (vi) share experiences in planning and developing smart green infrastructure; and (vii) promote partnerships and networking for responsible planning and development of linear infrastructure in biodiversity-rich landscapes.

The workshop was attended by 37 representatives of the Ministry of Environment & Forests (MoEF); the World Bank; National Rural Roads Development Agency, Ministry of Road Development; National Tiger Conservation Authority (NTCA); Wildlife Savers Society; Wildlife Trust of India; forest departments of Gujarat and Uttarakhand; Indian Institute of Science (IISC), Bangalore; Australian Research Centre for Urban Ecology; Nature Conservation Foundation (NCF); Nodal Environment Officers, OSRP; Forest Department of Bhutan and Nepal; and the Wildlife Institute of India. A total of 14 presentations were made during the workshop.

Dr. Asha Rajvanshi made presentations on “Road Planning through Biodiversity Rich Landscapes: Case Studies from Central Indian Landscape” and “Best Practice Guidance for Planning Roads through Sensitive Habitats”. Dr. V.B. Mathur talked about the initiatives of the Wildlife Institute of India in developing 'Best Practice Guidance for Planning Linear Infrastructure in Biodiversity-Rich Landscapes'.

Review meeting of the Biodiversity Conservation and Rural Livelihood Improvement (BCRLI), Dehradun, *4–5 January 2013.* A two-day meeting to review the progress of the externally aided BCRLI project was held at the Wildlife Institute of India, Dehradun. Shri Hem Pande, Additional Secretary to the

Government of India and National Project Director chaired the review meeting. The review meeting focused on implementation of the activities according to the approved Annual Plan of Operations and to resolve any outstanding matters. Officials from the MoEF, the World Bank and all project implementing agencies participated in the meeting. A total of 35 participants attended the meeting. The chairman emphasized the need for showcasing the landscape approach for biodiversity conservation and management.

Cells

EIA Cell

The Environmental Impact Assessment 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.

Placement opportunities: The EIA Cell provided opportunities for placement of Master's student Shri Bidyut Bikash Borah of FRI University to undertake a dissertation study under the supervision of Dr. Asha Rajvanshi, Nodal Officer, EIA Cell of the institute. Under this study, Shri Bidhyut undertook assessment of the 'Impact of highway on habitat ecology of one horned rhinoceros in Kaziranga National Park'.

Collaboration with Global Biodiversity Information Facility (GBIF) for EIA Biodiversity mobilization

The pilot project for mobilization of EIA Biodiversity developed under the inter-organizational partnership between India and Global Biodiversity Information Facility (GBIF) on the lines of the South African National Biodiversity Institute (SANBI) was approved by the Ministry of Environment and Forests, Government of India. A memorandum of understanding was signed between the GBIF and WII for initiating the project. One of the important tasks under the project was data discovery from EIA reports and development of a data publishing framework for India, which is one of the pilot countries identified under the project. This has been successfully accomplished, and the EIA biodiversity portal for India has been developed. The outcomes of GBIF-commissioned pilot projects were showcased at several international events, including a side event organized during the CoP-11 meeting at Hyderabad. The various outcomes and outputs of the project have not only been well received but are now offering a promising opportunity for use in other countries.

Collaboration with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) for the Project 'Strategic Environmental Assessment (SEA): Increasing planning efficiency and reducing conflicts of interest—relevance, scoping and needs assessment of SEA in India'

Considering the potential usefulness of the SEA tool, the Federal Agency for Nature Conservation (BfN) of Germany has funded a project on 'Land-use planning and Strategic Environmental Assessment' within the frame of the CBD CoP-11 Presidency. The objective of this project is awareness raising and development of human capacities in India for better application use integrated planning instruments, in particular SEA, in the context of land-use/spatial and socio-economic development planning in order to contribute to more environment/nature-compatible planning, integrating aspects relevant to biodiversity.

Under the ongoing Indo-German Bilateral Development Cooperation, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) initiated a scoping and needs assessment study on the topic 'SEA' to identify the relevance of the SEA instrument in India and the potential

requirements for capacity development in this area. The Ministry of Environment & Forests, Government of India, granted its approval to this study, and the Wildlife Institute of India partnered this study.

The total project duration is from 25 October 2012 to 30 November 2014. The project will be carried out in two phases: (i) Phase I (25 October 2012–28 February 2013), 'Scoping Study' and 'Needs Assessment', providing the base for a detailed planning of Phase II. (ii) Phase II (1 March 2013–30 November 2014), 'Implementation of Capacity Development (CD) Measures'.

The tasks under the first phase have been completed. The results of the scoping study and need assessments were discussed in a workshop organized by GIZ on 19 March 2013 at Delhi. This workshop was attended by all project partners and key collaborators. Dr. Asha Rajvanshi made a presentation on '*SEA: Potential, Experience and Future Prospects* in the Context of India' at this workshop.

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 the capacity of a member of the committee since March 2012, Dr. Rajvanshi provided professional support to the Committee of Environment of Indian Road Congress.

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

As part of the ongoing initiative of MoEF for revision of environmental clearance process, the Quality Council of India 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 registration of EIA consultant organizations for NRBT registration. During the reporting year, Dr. Rajvanshi provided professional inputs in evaluation of applications received for seeking accreditation of QCI and continued to provide professional support to QCI in taking forward the scheme through contributions in several consultative meetings organized during the reporting year.

Professional support to IAIA

IAIA (International Association for Impact Assessment) is an interdisciplinary, non-profit professional society established in 1980. This professional body, with over 2,500 members representing EIA professional, 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. During this period, Dr. Rajvanshi also served as a link between IAIA and the Global Biodiversity Information Facility (GBIF) for promoting GBIF's initiatives to develop an EIA data publishing framework.

Professional support to Qatar National Research Fund (QNRF)

During the reporting year, Dr. Asha Rajvanshi was invited by the Director, Qatar National Research Fund (QNRF) Qatar Foundation to serve as a peer for evaluation of research proposals in the fifth

cycle of their flagship programme, the National Priorities Research Programme (NPRP).

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

Dr. Asha Rajvanshi was 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.

Wildlife Forensic Cell

The Wildlife Forensic Cell (WFC) has been continuously involved in the field of wildlife forensics. The thrust areas under the WFC include identification of species from wildlife articles, standardization of techniques for identification of species from wildlife parts and products, developing a repository of wildlife reference samples and making a genetic profile of different animals. Besides these, WFC sensitized various enforcement agencies in crime scene examination and collection of evidence through regular training and workshops.

During the year, we received wildlife parts and products involved in 342 wildlife offence cases, including one case from Nepal. Forest departments sent 76.3% of the cases, 13.15% of the cases were from the police and 7.3% from the courts. The WCCB, MoEF and Customs Department sent 3.5% of the cases for species identification. Various biological products were received for species identification, and 73% involved tissue samples requiring DNA-based techniques. WFC provided reports on species identification for 132 cases and appeared in 59 court appearances as expert scientific witnesses.

Apart from dealing with animals covered under the Wildlife (Protection) Act, 1972, cases were also referred to us where we needed to examine the implementation of CITES. Among such cases were suspected tail hair of elephants, seized at Kathmandu, Nepal and Tamilnadu. On microscopic analysis, we concluded that the tail hair were of the African elephant *Loxodonta africana*.

For further confirmation of species and specific geographical origin, genetic profiling was done by comparing Cyt b gene sequences of case samples with the available nucleotide database of the NCBI, USA. The phylogenetic relationship among the different haplotypes of the African elephant populations was examined, and it was concluded that the samples seized from Tamilnadu, India and Nepal were of the African Elephant *Loxodanta africana africana,* belonging to the north-central, central-east and central-west forest regions of Africa on the basis of region-specific haplotypes.

In another case referred by the Customs, one horn of a suspected mountain goat/sheep was received at the WFC. On the basis of morphometric measurements and by comparison with data in available references, it was concluded that it was of the argali *Ovis ammon* sp. since nine sub-species of argali are reported in CITES and only one is covered under WPA (1972). Therefore, it was decided to examine the material at the sub-species level. The sequence of the Cyt b gene of the horn in question shows a 99.75% similarity with two sub-species, *Ovis ammon ammon* and *Ovis ammon darwini.*

Field exercises and lectures were conducted on 'Crime scene management and evidence collection' for the diploma course and certificate course for officer trainees at Indira Gandhi National Forest Academy, Dehradun and other forest officers of Uttarakhand. Hands-on training was also imparted on identification of various parts and products encountered in the illegal wildlife trade for forest officers and customs probationers. Popular lectures

were delivered for various visitors/classes at the WFC.

WFC officials/researchers undertook short courses at the 'Hands-on workshop on molecular biotechnology and bioinformatics', which was organized by the International Institute of Information Technology, Pune, Maharashtra during 30 April–4 May 2012 and at a short course on 'Genomics and Phenomics' during 14–23 June 2012 at NBAGR, Karnal, Haryana. WFC researchers/officials presented their findings at the 100th Indian Science Congress, Kolkata, West Bengal during 3–7 January 2013.

During the year, the following papers/abstracts were published/presented:

Joshi, B.D., Mishra, S., Singh, S.K. and Goyal, S.P., 2013. An effective method for extraction and polymerase chain reaction (PCR) amplification of DNA from formalin preserved tissue samples of snow leopard. African Journal of Biotechnology. 12(22): 3399-3404. doi: 10.5897/AJB12.2759

Mukesh, Sharma, L.K., Kumar, V.P., Charoo, S.A., Mohan, N., Goyal, S.P. and Sathyakumar, S., 2013. Loss of genetic diversity and inbreeding in Kashmir red deer *Cervus elaphus hanglu* of Dachigam National Park, Jammu & Kashmir, India. BMC Research Notes. 6: 326. doi: 10.1186/1756-0500-6-326. PMCID: PMC3751512

Kumar, V.P., Pandey, P., Sharma, C.P., Kumar, D., and Goyal, S.P., 2013. Uses of DNA based technique in dealing wildlife offences: Illegal bear bile trade in India. Indian Science Congress, Kolkata.

Kumar, V.P., Pandey, P., Shukla, M, Rajpoot, A., Sharma, C.P. and Goyal, S.P., 2012. Molecular tracking in wildlife forensics: A case study of identification of tail hairs of African elephant origin seized in India and Nepal using Cytochrome b gene. National Biodiversity Conference, Kerala, India.

Information Technology, Remote Sensing & Geographic Information System

The Information Technology, Remote Sensing and Geographic Information System (IT, RS & GIS) facility is the hallmark of WII for providing cutting edge technology relevant to wildlife research, education and training. The facility is available round the clock to faculty members/ trainees/ researchers/ students and collaborators working with the institute. A large number of desktop computers configured with updated operating systems and specialized analytical software for data processing and research purposes are made available in the dedicated lab. The computer facility is provided by wide array of hardware connected to a local area network (LAN). There are Intel Pentium Xeon/Itanium servers for Internet and Intranet access, database management and library automation services. There are workstations, a storage area network (SAN) and more than 300 nodes. Wi-Fi connectivity is provided in the hostels, guest house, classrooms, auditorium, board room and Porta cabin. The Institute has 15 Mbps (1:1) Internet leased line connectivity. All the computers of the institute are provided with 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 programme of the institute and to the demand from field managers. The laboratory is equipped with the latest software such as ArcGIS, ERDAS Imagine and Idrisi and several open source software packages for modelling species distribution and niche requirement, landscape change detection, etc. 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., P.G. diploma and certificate courses at WII, and hands-on training is also provided to other graduate students and interns.

IT facility enhancement: The Computer Laboratory of the institute is used by students, researchers and officer trainees of WII training courses. It is also used for conducting training courses on application of software in wildlife research and management. This laboratory is operational on a 24×7 basis. In the reporting year, all the computer systems in this laboratory were replaced with new systems. The website of WII was re-engineered in compliance with the Guidelines for Indian Government Websites (GIGW). Thereafter, it was audited for security from an empanelled firm of CERT-In (Indian Computer Emergency Response Team). The re-engineered website of WII was successfully launched on the Internet.

Application of geo-informatics in research projects: Geo-informatics technology is being used in most of the research projects of the institute for wildlife research and conservation. Work is in progress on development of a spatial database on the boundaries of all the national parks, wildlife sanctuaries conservation reserves and community reserves in the country. Similarly, digitization of the division, range and beat boundaries of the 17 tiger range states in the country is in progress. Country-level data on climate, vegetation, topography and animal distribution are also being digitized.

Library & Documentation Centre

The Library and Documentation Centre (L & DC) plays a vital role in disseminating information to target scientists of research and training organizations. Therefore, the L & DC is considered to be the backbone of any research institution. Such is the case with the WII Library & Documentation Centre. It was established in line with WII's mission as a multidisciplinary information and learning resource centre on biodiversity conservation and management. The L & DC has the following objectives: (i) to serve as a repository of all wildlife related literature published in India; (ii) to acquire, organize and disseminate all relevant worldwide literature on biodiversity conservation and related fields; (iii) to serve the user readership through normal and special library and information services, such as circulation, reference, photocopy and documentation; (iv) 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; (v) to serve as a training centre for information personnel and users; (vi) to provide the above services to (a) WII; (b) protected areas all over the country; (c) institutions engaged in nature conservation research in the country and abroad; (d) universities and colleges; (e) individual scholars working in related areas, NGOs, etc.; and (vii) to bring out periodic publications on current content of periodicals; (b) research in progress; (c) list of unpublished research literature, covering dissertations, thesis, etc.; (d) compilation of bibliographies; and (e) compilations of abstracts.

The L & DC now holds approximately 28,000 books, 7,400 maps/toposheets, 25,500 newspaper clippings and more than 6,459 bound volumes of old and rare journals. The library also maintains a good collection of scientific papers numbering 10,850. It subscribes to more than 450 print and online journals.

The L & DC is fully computerized, using LIBSYS Library Management Software (WEBOPAC), UNESCO'S WINISIS Software, CD Server, Barcode and related technologies. For optimum resource use by researchers, students, officer trainees and other users, 12 computer terminals are available in the library premises, and the faculty desks have been inter-connected with a LAN. Being connected to the library facility, users have the privilege to

access all in-house databases such as books, reprints, Indian wildlife abstracts, the map/toposheet collection, press clippings, specialized bibliographic databases on Musk Deer, Application of Telemetry in Wildlife, Wildlife and Protected Area Management in Madhya Pradesh, Mountain Ungulates, Rainforests Conservation in India, Rajaji National Park, etc. Users also have access to the online database Ecology and Wildlife Studies Worldwide from 1935 to date. The L & DC provides a variety of library and information services to its users.

During 2012–2013, over 19,847 pages of photocopies were provided to the users. Approximately 45,000 documents were issued and consulted during 2012–2013. Value added services were provided to 3,500 clients, while the Ready Reference Service was provided to approximately 200 clients. Approximately 650 queries from outside users were attended to, and more than 8,500 bibliographic references were provided to users.

Wildlife Extension & Audio Visual

The 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, projection system, various audio-visual equipment, still cameras and video cameras with accessories and a photo library.

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

X WII-Friends of the Doon 'Wildlife & Environment Quiz 2012', Dehradun, 1 October 2012. The X WII-Friends of the Doon 'Wildlife & Environment Quiz 2012'—a collaborative activity of Wildlife Institute of India and Friends of Doon Society—was organized on 1 October *2012 at the Wildlife Institute of India* to mark Wildlife Week 2012. Fifteen schools participated in the preliminary round, and six of them qualified for the final round. The final quiz had six rounds, *viz* Uttarakhand, Guess Who, Audio Visual, Landscapes, Brain Strain and Current Events, as a rapid fire round. Ann Mary School won the WII-FoD Rolling Trophy, Book Prize and Sameer Ghosh Memorial Nature and Wildlife Rolling Trophy.

Interactive Fair on Biodiversity, Hyderabad, *1–19 October 2012.* The institute participated in an 'Interactive Fair on Biodiversity' during CoP-MoP6 and CoP-11. The institute showcased its achievements and ongoing activities and displayed its commitment to conservation of biological diversity. A total of 12 panels were prepared for the interactive exhibition and were displayed in two booths. The institute was also given the responsibility of showcasing the activities of member organizations of the Indian National Committee of International Union for Conservation of Nature (INC—IUCN). Four booths were arranged for INC - IUCN. A total of 28 panels were displayed for 16 INC—IUCN member organizations.

The institute received very good response from the visitors as well as the dignitaries who visited its booths. Prominent among them were Mr. Zhang Xinsheng, President of IUCN; Shri Hem Pande, Additional Secretary, Ministry of Environment & Forests, Government of India Ms. Meena Gupta, Ex-Secretary, Ministry of Environment & Forests, Government of India; Dr. Asad Rahmani, Director, Bombay Natural History Society; Shri L.M.S. Palni, Director, G.B. Pant Institute of Himalayan Environment and Development, Almora; Dr. R. Sukumar, Professor, Indian Institute of Science, Bangalore & Chairman, Training, Research & Academic Council, WII; and Dr. Erach Bharucha, Director, Bharati Vidyapeeth Institute of Environment Education and Research, Pune. The Hon'ble Chief Minister of Andhra Pradesh, Shri N.

Kiran Kumar Reddy also graced the occasion and visited the exhibition. A large number of school children visited the interactive fair and displayed keen interest in the institute's academic and research programmes. Dr. Bitapi Sinha coordinated this event.

Professional inputs in planning and organization of CBD CoP-11, Hyderabad, *8–19 October, 2012.*

The Ministry of Environment and Forests (MoEF), Government of India organized the XI Conference of Parties (CoP) to the Convention on Biological Diversity (CBD) during 8–19 October 2012 at the HICC-HITEX Complex in Hyderabad, India. The institute was assigned several responsibilities in planning and organizing this mega even by the MoEF. Dr V.B Mathur, Dean was included in the official Indian delegation to the CBD-CoP, and 26 faculty members and staff members provided inputs at the various activities during the meeting.

Go4BioDiv International Youth Forum at CoP 11

Go4BioDiv is an international youth forum where young individuals from different parts of the globe come together to share their experiences, discuss global environmental issues and engage in the UN conferences on biodiversity. It aims at raising awareness about the inter-dependence of biological and cultural diversity as well as intergenerational responsibilities for biodiversity conservation. The institute, in partnership with SCBD, GIZ, UNESCO, Department for Environment, Food and Rural Affairs (DEFRA), United Kingdom and UNDP-GEF-MoEF-APFD-EGREE Project organized the Go4BioDiv forum on the theme 'Conserving Coastal and Marine Biodiversity for Sustaining Life and Livelihoods'.Go4BioDiv brought together 38 young people from the most outstanding marine and coastal sites from 22 countries and nine coastal states and one union territory of India. They first interacted in a nature camp at the Sundarbans World Natural Heritage Site, West Bengal from 6 - 15 October 2012 and then joined the CoP-11 at Hyderabad from 16-19 October 2012 during the High - Level Segment to present their messages to decision-makers and the wider public via a powerful youth declaration, creative performances involving street theatres, colourful exhibitions and various side events. The events were accompanied by a strong virtual exchange via an online platform, e-coaching courses and creative tasks.

Ms. Jayanthi Natarajan, Hon'ble Minister of Environment & Forests, Government of India released the special Go4BioDiv brochure during the UNDP award ceremony. Dr. V.B. Mathur, Dr. K. Sivakumar and Dr. Shazia coordinated the activities of Go4BioDiv, with professional inputs from Dr. J.R. Bhatt, Dr. Sujata Arora and Dr. Neeraj Khera and an international team, comprising Dr. Thora Amend, Nina Treu and Ms. Verena Treber.

Commemorative stamps

On the occasion of the CBD CoP-11 at Hyderabad, the Ministry of Environment & Forests, Government of India decided to release commemorative stamps. For this purpose, the theme 'Endemic Species of Indian Biodiversity Hotspots' was chosen by the institute, and the task was executed in coordination with the Department of Posts, Government of India. Dr. Manmohan Singh, Hon'ble Prime Minister of India released the set of four commemorative stamps and the first day cover during the inaugural session of the CBD CoP-11 High Level Segment in Hyderabad on 16 October 2012. Dr. V.B. Mathur, Dean, Dr. Dhananjai Mohan and Ms. Mousumi Ghosh coordinated this task.

National Biodiversity Information Outlook

(NBIO) Presently, biodiversity data and information lie dispersed and distributed amongst various individuals and institutions. This opaqueness has resulted in a duplication of efforts on the one hand and is impairing India from emerging as a leader in the field of biodiversity informatics on the other. To address this situation, the MoEF and National Biodiversity Authority embarked on a process of

developing a National Biodiversity Information Outlook, whose prime responsibility was assigned to the Wildlife Institute of India. The WII team, led by Dr. V.B. Mathur, Dean and assisted by Dr. Gautam Talukdar, Dr. Karthik Vasudevan and Ms. Mousumi Ghosh and with valuable professional inputs from Dr. Vishwas Chavan and Dr. Jitendra Gaikward, developed the NBIO, the goal of which is to (1) identify barriers to the progress of developing biodiversity informatics in the country, (2) prioritize biodiversity data discovery and publication and (3) develop a road map for channelizing investments in this emerging area so that they become scientifically, ecologically, economically and socially relevant.

The NBIO is an overarching framework of collaboration with an aim to facilitating free and open access to biodiversity data. The NBIO was launched during the CBD CoP-11 at Hyderabad by Dr. K. Kasturirangan, Member, Planning Commission, Government of India. India is the first country in the world to develop a National Biodiversity Information Outlook.

Science Express-Biodiversity Special (SEBS)

'Science Express' is a unique, state-of-the-art exhibition train that has done four runs, bringing science awareness to the doorsteps of millions. Starting June 2012, this train became the Biodiversity Special, incorporating special exhibits on biodiversity. The Ministry of Environment & Forests and the Department of Science &

Technology partnered in this unique initiative. The Centre for Environment Education specially designed eight coaches for this purpose. Through visuals, models, audio—video and interactive exhibits, it portrayed India's unique biodiversity in national and eco-regional thematic approaches, as well as its relationship with mankind, its place in our diverse and ancient cultures, its importance, status, threats, conservation needs, action being taken and some success stories. The entire exhibition was targeted specially at students, teachers and families. The coaches were refurbished innovatively through appropriate exhibits, including interactive exhibits, backlit view boxes, panels, table-top models, touch-screen displays, audio—visuals, etc. The Wildlife Institute was assigned the responsibility of planning the exhibits of Coach I (Biodiversity) and Coach III (Gangetic Plains). The SEBS received over 24 lakh visitors. It was a phenomenal success, and the exhibition has broken all earlier records of visitors. Dr. V.B. Mathur, Shri R. Suresh Kumar, Dr. S.A. Hussain, Dr. B.S. Adhikari, Dr. Bivash Pandav, Shri K.K. Shrivastava, Ms. Mousumi Ghosh and Ms. Shazia Quasin provided inputs.

Side Events

The Institute's faculty provided inputs in the planning and conduct of the following side events during the CBD-CoP meeting in Hyderabad:
(i) From the Sidelines to the Mainstream: Engaging Newer Communities in Biodiversity Data Publishing in partnership with GBIFI on October 8, 2012.
(ii) Measuring and Monitoring Protected Area Management Effectiveness: Lessons from the Field in partnership with GEF on October 9, 2012.
(iii) Interpreting and Tracking Target 11 – 'What does success look like for Protected Area Systems - With Specific Examples' from Asia in partnership with IUCN-Asia on October 10, 2012.
(iv) Conserving Biodiversity Heritage Sites for Climate Change Adaptation: Role of Youth in Linking Cultural Practices and Future Strategies in partnership with GIZ-India on October 12, 2012.
(v) *Strategic Environmental Planning and Biodiversity Impact Assessment - Tools to Increase Planning Efficiency and to Reduce Conflicts of Interests* in partnership with GIZ-India on October 15, 2012. (vi) *Managing Biodiversity Conservation and Wildlife Protection at Landscape and Transboundary Scales in South Asia* in partnership with World Bank on October 18, 2012. (vii)

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 other data centres; and (iii) facilitate research and training activities in wildlife by providing bibliographic references on protected areas, habitat types and animal species.

During 2012–2013, the main thrust of the activities was on updating the Protected Areas, Species and Wildlife Bibliography databases with information collected from various sources. The Review of the Protected Area Network Report was also updated for newly notified protected areas during the reporting period. The state summaries of the PA Network report were revised by incorporating the latest information received from various states. The Protected Area Database of India was updated, and presently there are 683 protected areas, including 102 national parks, 520 wildlife sanctuaries, four

community reserves and 57 conservation reserves in the country, covering 1,64,981 km^2, which is 5.02% 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 the various issues of journals/periodicals received during the reporting period. The Trainees Database was updated further, and now there is information on 616 diploma and 488 certificate officers trained in various courses, including 176 foreign nationals. The website of the Database Cell has been modified and updated further by incorporating the latest information. Nearly 250 queries were received, and outputs were provided in the desired formats.

Wildlife Health Services

Assistance to J& K Wildlife Protection Department, March 16, 2013. As a part of the Hangul Monitoring Project of SKUAST-Kashmir, J&K Wildlife Protection Department and Wildlife Institute of India, Dehradun, the first successful capture and satellite collaring of an adult Kashmir red deer was carried out at Dachigam National Park. The animal was fitted with a satellite collar to ensure remote tracking. The field operation was carried out by a team led by Dr. Parag Nigam with support from the Wildlife Warden, Central Division and the frontline staff of Dachigam National Park. This happens to be the first capture and collaring of the hangul *Cervus elaphus hunglu* ever carried out.

Assistance to Rajasthan Forest Department, 22–23 January 2013. Based on a request from the PCCF & CWLW, Rajasthan, two tigresses (Bina1 and Bina2) were successfully immobilized and collared at Ranthambore Tiger Reserve and translocated to Sariska Tiger Reserve. The operation was carried out by a WII team comprising Dr. P.K. Malik, Dr. K. Sankar and Dr. Parag Nigam, with assistance from forest officials, in the presence of Madam Bina Kak, the Hon'ble Forest Minister, Government of Rajasthan.

Emergency services provided to Uttarakhand Forest Department

(i) Management of wounded elephant, 10 May 2012. Based on a the request from Director, Rajaji National Park, Dr. Parag Nigam proceeded to Kansrao, Rajaji National Park for providing assistance in the management of an injured lame tusker. The animal was successfully immobilized and treated.

(ii) *Management of injured wild elephant at Rajaji National Park,* 13–14 January 2013. Two wild elephants met with a train accident at Rajaji National Park close to Haridwar. One of the cow elephants died on the spot; the other cow elephant sustained multiple injuries. The animal was immobilized in the evening hours, and primary medication was provided on 13 January; however, owing to the wild herd being in the vicinity, further management could not be continued. The animal was provided with the necessary medication and fluid therapy. The animal was again approached

and immobilized next day, and treatment (antibiotics, anti-histaminic, NSAIDs, pain killer, tetanus shots and fluid therapy (50–60 liters)) were administered both parenterally and rectally. The animal recovered from sedation but succumbed to injuries. A post mortem examination revealed that the liver had ruptured. Field inputs were provided by Dr. Parag Nigam.

(iii) *Management of trapped leopard at Rani Pokhri, Dehradun Forest Division,* 17 October 2012. Based on a request from the DFO, Dehradun Forest Department, Dr. Parag Nigam proceeded to Rani Pokhri to provide technical assistance in managing a wounded trapped leopard. The leopard was trapped in a clutch wire snare and had sustained injuries on the limb. The animal was successfully immobilized, and first aid was provided. As the animal had sustained a fracture of the carpal joint, it was sent to the Wildlife Transit Rehabilitation Centre at Chidiyapur for intensive care.

Research Laboratory

The laboratory is equipped with advanced equipment such as an atomic absorption spectro-photometer, high performance liquid chromatograph, UV—visible spectrophotometer, microwave reaction system, automatic nitrogen and fibre analyser, Millipore water purification system, digital pH and conductivity meter, micro-controlled flame photometer and digital analytical balance, which are required for analysis of various physio-chemical parameters in ecological samples. Teaching classes followed by practicals were conducted for various ongoing courses of the institute and for students from other organizations/ universities. These included analysis of herbivore pellets and carnivore scats, collection and preservation of biological materials, collection of age and sex determination data of wild animals, osteology of mammals and analysis of ecological samples for various parameters. During the reporting period, a total of 1,583 ecological samples were analysed in the Teaching and Research Laboratory. Of these, 855 ecological samples were analysed for ADF, NDF, lignin, cellulose, nitrogen/crude protein, phosphate, Ca, Mg, Zn, Cu, Fe, Ni, Mn, Ni, Cr and Pb. In all, 623 scat samples of the tiger, leopard, jackal, wild dog and sloth bear and 110 pellet/dung samples of the chital, sambar and nilgai were analysed for food habits studies.

The laboratory staff provided technical inputs in various field training programmes, including demonstration of camera traps, mist netting of birds, radio telemetry and the use of GPS systems. The laboratory staff also collected meteorological data at the WII campus. During the reporting period, the maximum temperature recorded was 42°C (26 May 2012), and the minimum temperature was 4°C (8 January 2013). The total rainfall recorded during the year at the WII campus was 1,476.14 mm.

ENVIS

The Ministry of Environment and Forests, Government of India established the 23rd Centre on Environment Information System (ENVIS) in September 1997 at the Wildlife Institute of India. The thematic area of the WII ENVIS Centre is 'Wildlife and Protected Areas'. The mission of ENVIS is to support and facilitate a diverse clientele from policy makers to researchers and industries and to 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; and (iv) promote national and international co-operation through networking and exchange of wildlife-related information.

During the reporting period, the WII ENVIS Centre published a thematic bulletin on 'ENVIS Bulletin on Arthropods and Their Conservation in India (Insect and Spiders)'. The ENVIS bulletin on 'Telemetry in Wildlife Science' was released by Dr. K. Kasturirangan, Member, Planning Commission on 10 April 2012.

Herbarium

During the reporting period, the herbarium staff provided their inputs in various field activities and surveyed different protected areas. Approximately 400 plant species collected by research scholars, diploma and certificate trainees and faculty members from various parts of the country, *viz.* Corbett Tiger Reserve, Rajaji National Park, the WII campus, Sariska Tiger Reserve and Kedarnath Wildlife Sanctuary, and about 150 photographs from various PAs and from outside PAs were identified.

Digitization of approximately 6,500 plant specimens has been completed. The herbarium specimens have been entered in the Darwin Core Format (ca. 4,500) and uploaded and published through the integrated publishing tool kit of the GBIF and hosted at the WII website.

Campus Development

Preventive maintenance of the 800 KVA, 11 KV/415 V electric sub-station and changing the damaged/ burnt UG electric cable and feeder pillar of the residential area in Block III were completed during the reporting period. The Old ARS Hall was converted into an indoor badminton hall. Wooden partitioning work of the office rooms of faculty members was also carried out during the period.

Sports

During the reporting period, a WII contingent of 26 players participated in the 20th All India Forest Sports & Games Meet 2013 during 8–12 February 2013 at Panchkula, Haryana in various events such as cricket, carrom, rifle shooting, table tennis, lawn tennis, billiards, golf and chess. Dr. Manoj Agarwal of the Wildlife Institute of India bagged the silver medal in the .22 prone 50 m rifle shooting event.

A cricket tournament was organized during 28–31 March 2013 by the Indian Council of Forestry Research and Education (ICFRE), Dehradun, in which teams from the ICFRE, Central Academy for State Forest Service, Forest Survey of India, Indira Gandhi National Forest Academy and Wildlife Institute of India participated. The institute's cricket team won the tournament.

Right To Information (RTI)

Shri Aseem Shrivastava IFS, Scientist F has been designated as the CPIO of the Institute under the Right to Information Act 2005. The Director disposes the appeals received under RTI. During the reporting period, 30 requests and 3 first appeals were received. All requests and appeals were disposed off during the same period.

VISITORS

- Forester trainees from the Forest Training Centre Jainti, Almora on 13 April 2012.
- A three-member delegation led by Mr. Jeremy Gustafson, USAID on 13 April 2012.
- Officers undergoing the senior command management course from SSB, Srinagar on 16 April 2012.
- Forest guards from Corbett Wildlife Training Centre, Kalagarh, Uttarakhand on 24 April 2012.
- Senior foresters of the 1962–1964 batch from the Indira Gandhi National Forest Academy, Dehradun on 8 May 2012.
- Trainees of the second training programme on Archeological Science & Conservation from the Archeological Survey of India, Dehradun on 10 May 2012.
- Officers from Soil Conservation, Dehradun on 10 May 2012.
- Forest Guards from Uttarakhand Forest Training Academy, Haldwani on 10 May 2012.
- Students and professors from St. Michael College, USA on tour to Navdanya from Navdanya Trust, Dehradun on 23 May 2012.
- Dr. Suzie Lavallee from University of British Columbia (UBC), Canada in June 2012.
- Range Forest Officers from Andhra Pradesh, Maharashtra and Madhya Pradesh forest departments on 1 June 2012.
- M.Sc. (Zoology) students from Dolphin (P.G.) Institute of Biomedical Natural Sciences, Manduwala, near Suddhowala, Dehradun on 5 June 2012.
- SFS trainees from Central Academy for State Forest Service, Dehradun on 18 June 2012.
- Students and staff members from University of Victoria, Canada on education tour to Himalayan Action Research Centre (HAARC), Dehradun on 7 August 2012.
- Delegation from USDA Forest Service (Dr. Valdis E. Mezainis, Director, International Programmes, USFS, Washington DC; Dr. D. Bosworth, Former Chief of USDA Forest Service, Washington DC; Ms. Sasha Gottlieb Beth, Asia Pacific Program Specialist, USFS, Washington DC; Dr. Varghese Paul, Sr. Forestry Adviser, USAID, New Delhi) on 8 August 2012.
- Students of M.A. (Architecture) and faculty members from CEPT University, Ahmedabad on 9 August 2012.
- Researchers from an institute of Pune on 22 August 2012.
- RFO trainees from R.F.O., Assam on 7 September 2012.
- In-service SFS officers from Central Academy for State Forest Service, Dehradun on 6 September 2012.

- ACF trainees from Central Academy for State Forest Service, Dehradun on 18 September 2012.
- Students of B.Sc. (Forestry) from College of Forestry, Orissa University of Agriculture and Technology, Bhubaneswar, Odisha on 20 September 2012.
- Officers of Srinagar High Command Management Course from SSB Academy, Srinagar on 24 September 2012.
- Students of B.Sc. (Botany) from Zakir Hussain Delhi College, Delhi University on 3 October 2012.
- B.Sc. (Forestry) students from Kathmandu Forestry College (KAFCLO), Kathmandu, Nepal on 4 October 2012.
- B.Sc. (Forestry) students from Forest College Research Institute, Tamilnadu Agriculture University, Mettupalayam University, Mettupalayam on 4 October 2012.
- B.Sc. (Forestry) students from Tribhuvan University, Institute of Forestry, Pokhara Campus, Nepal on 6 October 2012.
- B.Sc. (Forestry) students from Department of Forestry, Wildlife Environment Science, Guru Ghasidas Vishwavidyalaya, Bilaspur, Chhattisgarh on 8 October 2012.
- B.Sc. (Forestry) students from Institute of Forestry, Hetauda Campus, Tribhuvan University, Nepal on 12 October 2012.
- Forest Guards from Corbett Wildlife Training Centre, Kalagarh on 12 October 2012.
- Trainees of Forester Training Course from Pinjore on 12 October 2012.
- Forest Guard Instructor from Soyam Forest Division, Almora on 18 October 2012.
- Forest Guard Instructor from Forestry Training Academy, Haldwani on 19 October 2012.
- SFS Officer Trainees of 2012–2014 batch from SFS Academy, Coimbatore on 23 October 2012.
- Shri Praveen Pardesi, Principal Secretary (Forests), Government of Maharashtra on 25 October 2012.
- Dr. Tej Pratap, Vice Chancellor, Sher-e-Kashmir University of Agricultural Science and Technology of Kashmir, Srinagar on 2 November 2012.
- Students and faculty members from Krantiguru Shyamji Krishna Verma Kachchh University, Bhuj on 2 November 2012.
- Range Forest Officer trainees from Forest Range College, Balaghat, Madhya Pradesh on 14 November 2012.
- B.Sc. (Biotech) students from Sai Institute of Paramedical & Allied Sciences, Dehradun on 26 November 2012.
- M.Sc. (Biotech) students from GLA University, Mathura on 30 November 2012.

- Assistant Commandant from SSB Academy, Srinagar Garhwal on 4 December 2012.
- M.Sc. (Zoology) students from Department of Zoology, Jai Narayan Vyas University, Jodhpur, Rajasthan on 5 December 2012.
- B.V.Sc. students and a teacher from Jabalpur Veterinary College, M.P.P.C.V.V., Jabalpur on 6 December 2012.
- Students and faculty members from *Mar Athanasios College for Advanced Studies*, School of Bio-sciences, Tiruwalla, Kerala on 7 December 2012.
- Officers, JCOs and other ranks from 127 Inf. Bn. (TA) Ecological GARH RIF, Kurukshetra Marg, Dehradun on 17 December 2012.
- B.Sc. (Forestry) students from College of Forestry, Sirsi, Karnataka on 17 December 2012.
- IFS probationers from Indira Gandhi National Forest Academy, Dehradun on 26 December 2012.
- Students of Class X, XI and XII and army personnel from 22 RR Srinagar, J&K on 28 December 2012.
- B.Sc. (Forestry) students from University of Agricultural Science, College of Forestry, Ponampet on 31 December 2012.
- Officers promoted to IFS with 20–25 years of service from Indira Gandhi National Forest Academy, Dehradun (Professional Skill Upgradation Course) on 15 January 2013.
- RFOs from Uttarakhand Forestry Training Academy, Haldwani on 23 January 2013.
- Students and masters from *Rashtriya Indian Military College*, Dehradun on 31 January 2013.
- B.Sc. (Forestry) from College of Forestry, Trichur on 15 February 2013.
- P.G. Diploma & M. Tech. trainees from IIRS, Dehradun on 20 February 2013.
- B.Sc. students from Bahauddin Science College, Junagarh, on 27 February 2013.
- B.Sc. students from *ASPEE College* of Horticulture and Forestry, Navsari on 5 March 2013.
- Students of Environmental Science from University of Jammu on 6 March 2013.
- Teacher and research scholars of Uttarakhand from FRI, Dehradun (Division of Genetics & Tree Plantation) on 22 March 2013.
- Students of B.Sc. (Forestry) from Allahabad University on 27 March 2013.a

GOVERNANCE

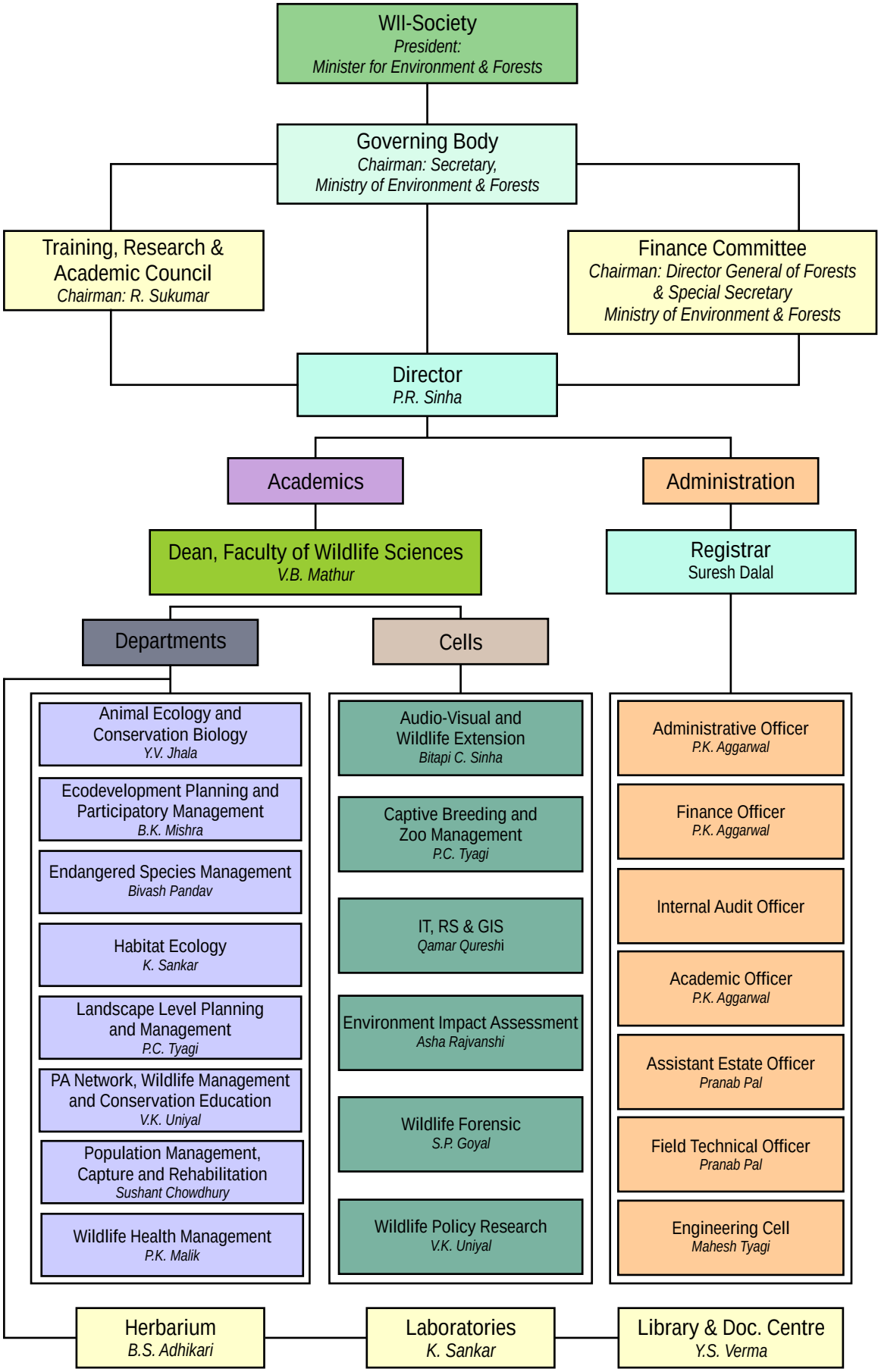
Society

Governing Body

TRAC

Finance

Organizational Structure of WII



GOVERNANCE

The Society of Wildlife Institute of India

1. President
   Union Minister of State (Independent Charge)
   Environment & Forests, Government of India
   Ministry of Environment & Forests
   Paryavaran Bhawan, 'B' Block,
   CGO Complex, Lodi Road
   New Delhi – 110 003

Members

2 to 4. Three Members of Parliament
   (To be nominated by Government of India)

5. Hon'ble Minister
   Forests & Environment
   Government of Assam
   'Secretariat'
   Dispur, Guwahati (Assam)

6. Hon'ble Minister
   Forests & Environment
   Government of Meghalaya
   'Secretariat'
   Shillong (Meghalaya)

7. Hon'ble Minister
   Forests & Environment
   Government of Sikkim
   'Secretariat'
   Gangtok (Sikkim)

8. Hon'ble Minister
   Forests & Environment
   Government of West Bengal
   'Secretariat'
   Kolkata (West Bengal)

9. Hon'ble Minister
   Forests & Environment
   Government of Andaman & Nicobar
   'Secretariat'
   Andaman (A&N)

10. Hon'ble Minister
    Forests & Environment
    Government of Goa
    'Secretariat'
    Hadoo (Goa)

11. Hon'ble Minister
    Forests & Environment
    Government of Maharashtra
    'Secretariat'
    Nagpur (Maharashtra)

12. Hon'ble Minister
    Forests & Environment
    Government of Kerala
    'Secretariat'
    Thiruvananthapuram (Kerala)

13. Hon'ble Minister
    Forests & Environment
    Government of Tamil Nadu
    'Secretariat'
    Chennai (Tamil Nadu)

14. Hon'ble Minister
    Forests & Environment
    Government of Haryana
    'Secretariat'
    Panchkula, Ambala (Haryana)

15. Hon'ble Minister
    Forests & Environment
    Government of Himachal Pradesh
    'Secretariat'
    Shimla (Himachal Pradesh)

16. Hon'ble Minister
    Forests & Environment
    Government of Madhya Pradesh
    'Secretariat'
    Bhopal (Madhya Pradesh)

17. Hon'ble Minister
    Forests & Environment
    Government of Uttarakhand
    'Secretariat'
    Dehradun-248 001 (Uttarakhand)

18. Shri Brijendra Singh,
28, Sunder Nagar,
New Delhi 110 003

19. Dr. Ullas Karanth,
Director, Centre for Wildlife Studies
403, Seebo Apartments,
26-2, Aga Abbas Ali Road,
Bangalore 560 042 (Karnataka)

20. Dr. Biswajit Mohanty
Shantijunj,
Link Road,
Cuttack (Orissa)

21. Dr. Erach Bharucha
Director,
Bharti Vidyapeeth Institute of Environment,
Education and Research,
(Bhartiya Vidyapeeth Deemed University)
Katraj-Dhankawadi,
Pune-411 043 (Maharashtra)

22. Dr. Reena Mathur,
D-279, Todarmal Marg
Banipark
Jaipur (Rajasthan)

23. Dr. H.S. Pabla
Former PCCF (Madhya Pradesh)
E-5, Surendra Garden,
Hoshangabad Road,
Bhopal-462 026

24. Shri A.S. Negi,
Former Chief Wildlife Warden (Uttarakhand)
300, Model Colony, Araghar,
(Near R.N. Singh Eye Clinic)
Dehradun -248 001

25. Dr. Ms. Priya Davidar
Head
Salim Ali school of Ecology and
Environmental Sciences
R Venkataraman Nagar, Kalapet,
Pondicherry

26. Dr. Mewa Singh
Ramanna Fellow and Professor of Psychology
University of Mysore
Mysore-570 006

27. Dr. A.J.T. Johnsingh
101, Magnolia, Esteem Gardenia
Sahkara Nagar
Bangaluru- 560 092

28. Director
Bombay Natural History Society (BNHS),
Hornbil House, Dr. Salim ali Chowk,
Shaheed Bhagar Singh Road,
Mumbai-400 023

29. Secretary General & CEO
World Wide Fund for Nature-India (WWF),
"Secretariat", 172-Lodhi Estate,
New Delhi-110 003

30. Wildlife Preservation Society of India,
7, Astley House,
Dehradun-248 001

31. Director,
Centre for Environment Education,
Nehru Foundation for Development,
Thaltej Tekra, Ahmadabad (Gujarat)

32. A Representative of Friends of Doon,
Jakhan, Dilaram bazaar
Dehradun

33. Secretary
Secretary to the Govt. of India,
Ministry of Environment & Forests,
Paryavaran Bhavan, 'B' Block,
CGO Complex, Lodi Road,
New Delhi - 110 003

34. The Secretary,
Government of India,
Ministry of Finance,
North Block,
New Delhi - 110 001

35. The Secretary
Government of India,
Department of Science and Technology,
Technology Bhavan,
New Mehrauli Road,
New Delhi - 110 01

36. The Secretary,
Government of India,
Department of Education,
Ministry of Human Resource Development,
Shastri Bhavan,
New Delhi - 110 001

37. The Deputy President
Planning Commission,
Yojana Bhavan,
Sansad Marg,
New Delhi

38. The Chairman,
University Grant Commission (UGC),
Bahadur Shah Zafar Marg,
New Delhi

39. Chief Secretary,
Govt. of Uttarakhand
"Sachivalaya"
Dehradun

40. Director General of Forests &
Special Secretary to the Government to
Special Secretary,
Ministry of Environment & Forests,
Paryavaran Bhavan, 'B' Block,
CGO Complex, Lodi Road,
New Delhi - 110 003

41. Addl. Director General of Forests (WL) &
(Ex-officio Director Wildlife Preservation)
Ministry of Environment & Forests,
Paryavaran Bhavan, 'B' Block,
New Delhi - 110 003

42. Additional Secretary (Finance Advisor),
Ministry of Environment & Forests,
Paryavaran Bhavan, 'B' Block,
CGO Complex, Lodi Road,
New Delhi - 110 003

43. Director General,
Indian Council of Forestry Research &
Education,
P.O. New Forest,
Dehra Dun - 248 006

44. Director
Zoological Survey of India,
M-Block, New Alipore
Calcutta - 700 053

45. Director
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.)

46. Dr. V.B. Mathur
Dean, FWS
Wildlife Institute of India,
Chandrabani,
Dehradun- 248 001

47. Dr. V.K. Uniyal
Scientist - F
Wildlife Institute of India
Chandrabani,
Dehradun - 248 001

Member Secretary

48. Director
Wildlife Institute of India
Chandrabani,
Dehradun - 248 001

Permanent Invitee

49. Inspector General of Forests (WL)
Ministry of Environment & Forests,
Paryavaran Bhavan, 'B' Block,
CGO Complex, Lodi Road,
New Delhi - 110 003

50. Member Secretary
National Tiger Conservation Authority
Annexe-5, Bikaner House
Shahjahan Road,
New Delhi- 110 011

51. Director (Project Elephant)
Ministry of Environment & Forests,
Paryavaran Bhavan, 'B' Block,
CGO Complex, Lodi Road,
New Delhi - 110 003

Governing Body

1. Chairman
   Secretary
   Ministry of Environment & Forests,
   Govt. of India, Paryavaran Bhavan, B-Block,
   CGO Complex, Lodi Road,
   New Delhi - 110 003

2. Vice Chairman
   Director General of Forests
   & Special Secretary,
   Ministry of Environment & Forests,
   Govt. of India,
   Paryavaran Bhavan, B-Block,
   CGO Complex, Lodi Road,
   New Delhi - 110 003

Member

3 Dr. A.J.T. Johnsingh
   101, Magnolia, Esteem Gardenia
   Sahkara Nagar
   Bangaluru- 560 092

4. Shri Brijendra Singh
   28, Sunder Nagar,
   New Delhi - 110 003

5. Dr. Ullas Karanth
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   403, Seebo Apartments,
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6. Dr. Biswajit Mohanty
   Shantijunj, Link Road,
   Cuttack (Orissa)

7. Dr. Erach Bharucha
   Director, Bharti Vidyapeeth Institute of
   Environment, Education and Research,
   (Bhartiya Vidyapeeth Deemed University)
   Katraj-Dhankawadi,
   Pune-411 043 (Maharashtra)

8. Dr. Reena Mathur,
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   Jaipur (Rajasthan)

9. Additional Secretary & Financial Advisor,
   Ministry of Environment & Forests,
   Paryavaran Bhavan, 'B' Block,
   CGO Complex, Lodi Road,
   New Delhi - 110 003

10. Chief Secretary
    Government of Uttarakhand,
    "Sachivalaya"
    Dehradun – 248 001

11. Chief Wildlife Warden
    Govt. of Uttarakhand
    Chandrabani
    Dehra Dun

12 Chief Wildlife Warden,
    Government of Mizoram
    Environment & Forest Department,
    Tuikhuahtlang,
    Aizwal (Mizoram)

13 Chief Wildlife Warden,
    Bikash Bhawan,
    3rd Floor, North Block, Salt Lake City,
    Kolkata – 700 091 (West Bengal)

14 Chief Wildlife Warden,
    Government of Jammu & Kashmir
    Raj Bagh Forest Complex, Silk Factory Road
    Srinagar -190001(J&K)

15 Chief Wildlife Warden,
    Government of Uttar Pradesh,
    17, Rana Pratap Marg,
    Lucknow-226001 (Uttar Pradesh)

16 Chief Wildlife Warden,
    'Vanalakshmi'
    Forest Headquarters, Vazhuthacaud,
    Thiruvananthapuram - 695 014 (Kerala)

17 Additional Director General of Forests (WL)
    & Director, Wildlife Preservation,
    Government of India
    Ministry of Environment & Forests,
    Paryavaran Bhavan, 'B' Block,
    CGO Complex, Lodi Road,
    New Delhi - 110 003

18 Director General,
    Indian Council of Forestry Research &
    Education,
    P.O. New Forests,
    Dehra Dun - 248 006

19 Dr. R. Sukumar
    Professor
    Centre for Ecological Sciences
    Indian Institute of Science
    Bengaluru — 560 012 (Karnataka)

20. Dr. V.B. Mathur
Dean, Faculty of Wildlife Sciences
Wildlife Institute of India
Post Box No. 18, Chandrabani,
Dehradun

Member Secretary

21. Director
Wildlife Institute of India
Post Box No. 18, Chandrabani,
Dehradun – 248 001

Permanent Invitees

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23. Member Secretary
National Tiger Conservation Authority
Annexe-5, Bikaner House
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24. Director (Project Elephant)
Ministry of Environment & Forests,
Paryavaran Bhavan, 'B' Block,
CGO Complex, Lodi Road,
New Delhi - 110 003

Training, Research & Academic Council (TRAC)

1. Dr. R. Sukumar, Professor
Chairman *(from 26 Sept. 2011)*
Centre for Ecological Sciences
Indian Institute of Science
Bengaluru – 560 012 (Karnataka)

Members

2. Dr. S. Shivaji
Scientist,
Centre for Cellular & Molecular Biology
Habsiguda, Uppal Road
Hyderabad – 500 007 (Andhra Pradesh)

3. Dr. Reena Mathur
Professor and Head
Department of Zoology, University of Rajasthan
Jawahar Lal Nehru Marg
Jaipur – 302 004 (Rajasthan)

4. Dr. P.S. Easa
'Anugraham', Apsara Gardens
Nellikunnu–Paravattani Road
East Fort P.O.
Thrissur – 680 005 (Kerala)

5&6 Two representatives from University who are members of WII-Society
(to be nominated by President, WII-Society)

Dr. V.C. Soni
Professor, Department of Bio-Sciences
Saurashtra University, University Campus
Rajkot – 360 005 (Gujarat)

Dr. Albert Rajendran
Department of Zoology
St. John's College, Palayamkottai
Tirunelveli – 627 002 (Tamil Nadu)

Members (Ex-officio)

7. The Director, Wildlife Preservation,
Ministry of Environment & Forests,
Government of India,
Paryavaran Bhavan, 'B' Block
C.G.O. Complex, Lodhi Road
New Delhi – 110 003

8–20 Chief Wildlife Wardens on a regional rotational basis.

Northern Region	-	Haryana, Himachal Pradesh
Eastern Region	-	Bihar, West Bengal
Central Region	-	Madhya Pradesh
Western Region	-	Gujarat, Maharashtra
Southern Region	-	Tamil Nadu, Kerala
North-Eastern Region	-	Tripura, Arunachal Pradesh & Mizoram
Permanent Invitee	-	Uttarakhand

21. The Director
Botanical Survey of India
Ministry of Environment & Forests
CGO Complex, 3 MSO Building
Block F, 5th & 6th Floors, DF Block
Sector-I, Salt Lake City
Kolkata – 700 064 (West Bengal)

22. The Director
Zoological Survey of India
Prani Vigyan Bhawan, M-Block, New Alipore
Kolkata – 700 053 (West Bengal)

23. The Member-Secretary
Central Zoo Authority (CZA)
Bikaner House, Annexe-VI, Shahjahan Road
New Delhi – 110 011

Members

24. A representative of the Indian Council of Forestry Research & Education (ICFRE),
P.O. New Forest
Dehradun – 248 006 (Uttrakhand)

25. The Dean, Faculty of Wildlife Sciences
Wildlife Institute of India
P.O. Box # 18, Chandrabani
Dehradun – 248 001 (Uttarakhand)

26& 27 Two senior most Head of Departments *(in terms of pay-scale)*
Wildlife Institute of India
P.O. Box # 18, Chandrabani
Dehradun – 248 001 (Uttarakhand)

28. The Research Coordinator
Wildlife Institute of India
P.O. Box # 18, Chandrabani
Dehradun – 248 001 (Uttarakhand)

Member-Secretary

29. The Director,

Wildlife Institute of India,
P.O. Box # 18, Chandrabani
Dehradun – 248 001 (Uttarakhand)

Finance Committee

1. Chairman
Director General of Forests & Special Secretary,
Ministry of Environment & Forests,
Paryavaran Bhawan, 'B' Block,
CGO Complex, Lodi Road,
New Delhi – 110 003.

Members

2. Additional Director General of Forests &
Director (Wildlife Preservation)
Government of India
Ministry of Environment and Forests
Paryavaran Bhawan, B-Block
CGO Complex, Lodi Road
New Delhi – 110 003

3. Additional Secretary & Financial Advisor,
Ministry of Environment & Forests,

Paryavaran Bhawan, 'B' Block,
CGO Complex, Lodi Road,
New Delhi – 110 003

4. Dr. R. Sukumar
Professor
Chairman, TRAC
Centre for Ecological Sciences
Indian Institute of Science
Bengaluru – 560 012(Karnataka)

5. Dr. Biswajit Mohanty
Shantikunj,
Link Road
Cuttack (Orissa)

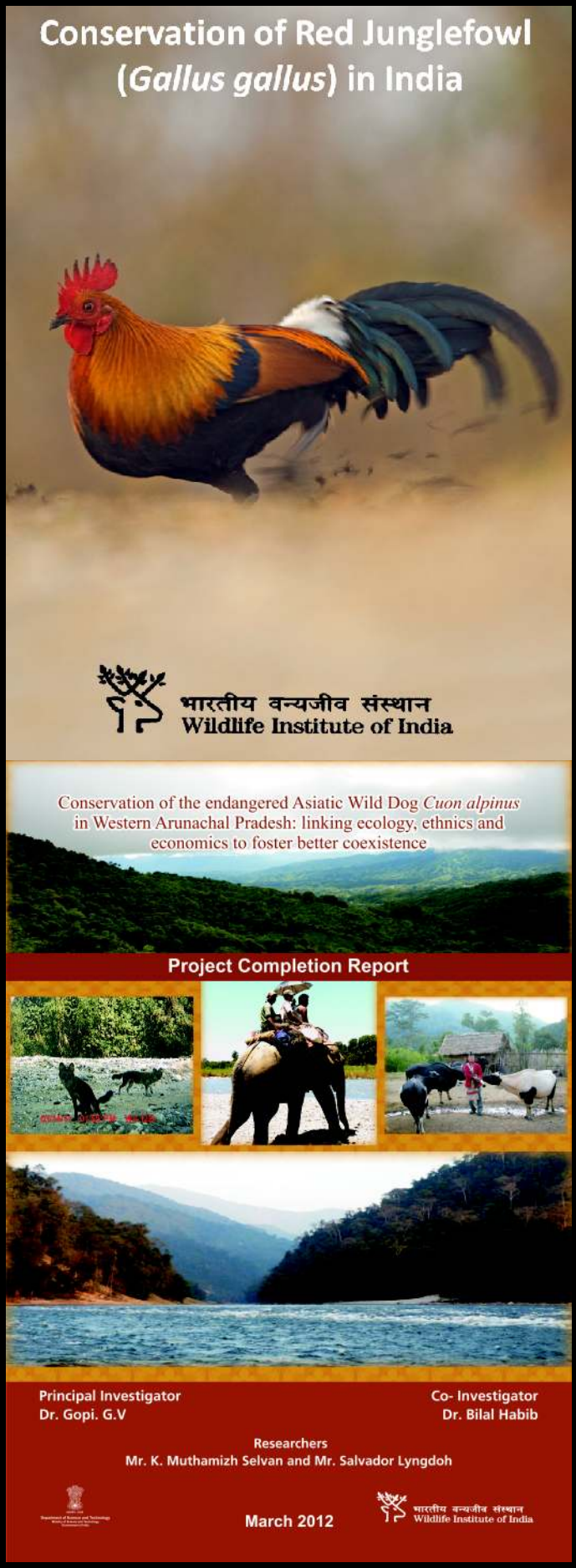
6. Dr. V. B. Mathur
Dean, FWS
Wildlife Institute of India
Dehra Dun

Member Secretary

7. Director
Wildlife Institute of India
Dehradun

PUBLICATIONS

- Peer Reviewed International Journals
- Peer Reviewed National Journals
- Technical Reports
- Manuals
- Status Survey Report
- Conference Proceeding
- International Seminars/Workshops (Abstracts)
- Books
- Book Chapters
- Papers Presented
- Poster Presented
- Popular Articles



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Himalaya: Implications for management of grazing practices. Proceedings of the Zoological Society 65(1): 11–21. doi:10.1007/s12595-012-0025-4.

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Mukesh Sharma, L.K., Charoo, S.A. and Sathyakumar, S., 2012. Improved and efficient molecular sexing of free ranging Asiatic black bears, *Ursus thibetanus*. Poster presented at the 21st International Conference on Bear Research and Management, New Delhi, India. 26–30 November 2012.

Pandey, P., Thakur, M., Singh, S.K., Nigam, P., Sankar, K., Navaneethan, B. and Goyal, S.P., 2013. Genetic diversity assessment of Indian wild gaur *Bos gaurus gaurus* using bovine micro-satellites. Paper presented at the First National Biodiversity Congress 2012, organized by Kerala State Biodiversity board, Kanakakkunnu Palace, Thiruvananthapuram, Kerala, India, 27–30 December 2012.

Pragatheesh, A. and Rajvanshi, A., 2012. Spatial patterns and factors influencing the mortality of avifauna on the National Highway-7 passing through Pench Tiger Reserve, Madhya Pradesh, India. Presented at pre-conference workshop on Road Ecology in Asia: State of Science and Future Directions to Achieve a Sustainable Transport System, Biodiversity Asia 2012, Bangalore, 7 August 2012.

Rajvanshi, A., 2012. Publishing, sharing and accessing EIA biodiversity data EIA and SEA national experiences II. Paper presented at the 32nd annual conference of the International Association of Impact Assessment (IAIA) on Energy Future: The Role of Impact Assessment, Porto, Portugal, 31 May 2012.

Rajvanshi, A., 2012. Best practice guidance for planning roads through sensitive habitats: The experience so far. Presented at pre-conference workshop on Road Ecology in Asia: State of Science and Future Directions to Achieve a Sustainable Transport System, Biodiversity Asia 2012, Bangalore, 7 August 2012.

Rajvanshi, A., 2012. Road planning through biodiversity rich landscapes: Case studies from central Indian landscape. BCRLIP-supported workshop on 'Planning Smart Green Infrastructure in Biodiversity-Rich Landscapes at India International Centre, New Delhi, 13–14 August 2012.

Rajvanshi, A., 2012. Best practice guidance for planning roads through sensitive habitats. BCRLIP supported workshop on 'Planning Smart Green Infrastructure in Biodiversity-rich Landscapes' at India International Centre, New Delhi, 13–14 August 2012.

Rajvanshi, A., 2012. Biodiversity inclusive impact assessment for responsible growth: Challenges and prospects. Presentation made at Workshop on Biodiversity Inclusive Impact Assessment for Responsible Growth: Challenges and Prospects, Inter American Development Bank, Washington DC, USA. 21 September 2002.

Rajvanshi, A., 2012. Review of development induced changes in human dimensions and biodiversity values: Where do we go from here? Presented at International Conference Pathways to

Success: Integrating Human Dimensions into Fish and Wildlife Management Conference, Breckenridge, Colorado, USA, 24–27 September 2012.

Rajvanshi, Asha, 2013. Presentation on SEA: Potential, experience and future prospects. Workshop on Strategic Environmental Assessment: Increasing Planning Efficiency & Reducing Conflicts of Interest—Relevance, Scoping and Needs Assessment of SEA in India, at New Delhi, 19 March 2013.

Rajvanshi, Asha, 2013. Relevance of including biodiversity in impact assessment. National conference on New Frontiers for Women in Science and Technology, School of Studies in Zoology, Jiwaji University, Gwalior, Madhya Pradesh, 21 March 2013.

Roshni, Arora, Rajvanshi, A. and Mathur, Vinod B., 2012. CEA, biodiversity and hydropower planning in India. In Technical Session 6.4 Planning for energy and biodiversity conservation I. Paper presented at the 32nd annual conference of the International Association of Impact Assessment (IAIA) on Energy Future: The Role of Impact Assessment, Porto, Portugal, 30 May 2012.

Sathyakumar, S., Kaul, R. and Ashraf, N.V.K., 2012. The National Bear Conservation Action Plan for India. Paper presented at the 21st International Conference on Bear Research and Management, New Delhi, India. 26–30 November 2012.

Sharma, L.K., Charoo, S.A. and Sathyakumar, S., 2012. Some aspects of spatial ecology of Asiatic black bear in Dachigam Landscape, Kashmir. Paper presented at the 21st International Conference on Bear Research and Management, New Delhi, India. 26–30 November 2012.

Sivakumar, K. 2012. Identification of research gaps in the coastal and marine biodiversity conservation in the Godavari Estuarine Ecosystem. National Consulation Workshop of EGREE, Kakinada, 8 May 2012.

Sivakumar, K, 2012. Dugong conservation action plan for Gulf of Mannar and Palk Bay. 10–11 November 2012, Tuticorin.

Yadav, B.P. and Sathyakumar, S., 2012. Asiatic black bear-human conflicts in Nepal (case studies of Langtang National Park and Dhorpatan Hunting Reserve). Paper presented at the 21st International Conference on Bear Research and Management, New Delhi, India. 26–30 November 2012.

Poster Presented

Rajvanshi, Asha, Arora, Roshni and Mathur, V.B., 2012. Impact assessment of Madhya Ganga Canal Project. Poster paper presented at the 32nd Annual Conference of the IAIA at Porto, Portugal during 27–28 May 2012.

Popular Articles

Chaudhary, A., Bhardwaj, G.S. and Sivakumar, K., 2013. The flight of the florican. Saevus 2(6): 12–19.

Manral, U., Raha, A., Solanki, R., Hussain, S.A., Babu, M.M., Mohan, D., Gopi, G.V., Sivakumar, K. and Talukdar, G., 2013. Plant species of Okhla Bird Sanctuary: A wetland of Upper Gangetic Plains, India. Check list 9(2): 263–274 (http://www.checklist.org.br/getpdf?SL044-12)

Sathyakumar, S. 2012. Tracking bashful black bears in paradise. Saevus 1(1): 28–36.

Tiwari, U.L., Adhikari, B.S. and Rawat, G.S. 2012. A checklist of Berberidaceae in Uttarakhand, Western Himalaya, India. Check List *8(4): 610–616.* (http://www.checklist.org.br)

RESOURCE LECTURES

RESOURCE LECTURES

WII Faculty as Resource Speakers

Dr. G. Talukdar (2 April 2012): Ecosystem analysis. External expert for M.Tech. in Forestry, Indian Institute of Remote Sensing, Dehradun.

Dr. Dhananjai Mohan (10 April 2012): Conservation of birds in India. Indira Gandhi National Forest Academy, Dehradun.

Dr. Asha Rajvanshi (2 May 2012): Space based environmental services and role of EIA in disaster and risk reduction. Course organized by the Centre for Space Science and Technology Education in Asia and Pacific in collaboration with Indian Institute of Remote Sensing (IIRS), UN-ESCAP, UN- SPIDER and ITC, the Netherlands.

Dr. Y.V. Jhala (6 May 2012): Career opportunities in natural resource management and conservation. Christian College, Rajkot for DST sponsored program Inspire.

Dr. Asha Rajvanshi (14, 15 & 18 June 2012): EIA module. Indira Gandhi National Forest Academy, Dehradun.

Dr. V.B. Mathur (20 June 2012): Environment, forest and wildlife conservation in India: An overview. Indira Gandhi National Forest Academy, Dehradun.

Dr. Y.V. Jhala (16 July 2012): Conservation biology. Indira Gandhi National Forest Academy, Dehradun.

Dr. R. Badola (17 July 2012): Ecosystem, biodiversity and climate regulation services from forests and their monetary estimates. Indira Gandhi National Forest Academy, Dehradun.

Dr. Y.V. Jhala (20 July 2012): Tiger conservation and status assessment in India. Indira Gandhi National Forest Academy, Dehradun.

Dr. Parag Nigam (23–28 July 2012 and 30 July–3 August 2012): Various aspects of wildlife health management. Twelve lectures at Indira Gandhi National Forest Academy, Dehradun.

Dr. Asha Rajvanshi (26 July 2012): Biodiversity conservation (with point of view of CPSUs). Engineering Staff College of India, Hyderabad.

Dr. G. Talukdar (23–24 August 2012): Biodiversity data publishing in the Hindu Kush Himalayan region: Platform, progress, and prospect. International Centre for Integrated Mountain Development, Kathmandu, Nepal.

Dr. B.K. Mishra (24 August 2012): Eco-development for biodiversity conservation. Indira Gandhi National Forest Academy, Dehradun.

Dr. Dhananjai Mohan (29 August 2012): Biological Diversity Act 2002. Central Academy of State Forest Officers, Dehradun.

Dr. R. Badola (30 August 2012): Ecodevelopment. Indira Gandhi National Forest Academy, Dehradun.

Dr. P.K. Mathur (3 September 2012). Management planning. Central Academy of State Forest Officers, Dehradun.

Dr. Dhananjai Mohan (4 September 2012): Development and conservation strategy. Central Academy of State Forest Officers, Dehradun.

Dr. Dhananjai Mohan (21 September 2012): Bird watching. Central Academy of State Forest Officers, Dehradun.

Dr. Dhananjai Mohan (26 September 2012): Bird conservation. Central Academy of State Forest Officers, Dehradun.

Dr. Y.V. Jhala (6 October 2012): Wildlife week talk. Dolphin Institute, Dehradun.

Dr. V.B. Mathur (30 November 2012): Inscription of the Western Ghats on the Natural World Heritage List: Challenges, opportunities and way ahead. Mahabaleshwar, Maharashtra.

Dr. Dhananjai Mohan (30 November–2 December 2012): Organising a bird-watching camp: Lectures and field sessions for 2 days. Ecotourism Wing, Uttarakhand Forest Department, Dehradun.

Dr. Asha Rajvanshi (5 December 2012): Economic valuation approaches for integrating biodiversity in impact assessment. Amity School of Natural Resources & Sustainable Development, Noida.

Dr. V.B. Mathur (9 December 2012): Inscription of the Western Ghats on the Natural World Heritage List: Challenges, opportunities and way ahead. Indian Institute of Science, Bangalore.

Dr. Y.V. Jhala (11 December 2012): Ecological perspective for wildlife health. National Tiger Conservation Authority-sponsored Indo-UK workshop.

Dr. V.B. Mathur (12 December 2012): Biogeography, conservation planning and protected area network in India. Indian Institute of Remotes Sensing, Dehradun.

Dr. Y.V. Jhala (17 December 2012): Importance of corridors in the Western Ghats. To the Kasturi Rangan Committee on Ecosensitive Zone of Western Ghats.

Dr. R. Badola (18 December 2012): Climate change and biodiversity: Challenges and opportunities. Indian Council of Forestry Research and Education, Dehradun.

Dr. Asha Rajvanshi (19 December 2012): Environment impact assessment. Indian Institute of Remote Sensing, Dehradun.

Dr. Asha Rajvanshi (2 January 2013): Environment impact assessment and monitoring. Indian Institute of Remote Sensing, Dehradun.

Dr. V.B. Mathur (16 January 2013): The management response to protected area crisis in India: Knee-jerk or measured response? Recent experiences with management effectiveness evaluation (MEE) of protected areas in India. Indira Gandhi National Forest Academy, Dehradun.

Dr. V.B. Mathur (28 January 2013): Mainstreaming environmental considerations in road transportation planning. 111th international training programme on 'Environmental Audit' at the International Training Centre of the Comptroller and Auditor General of India at Noida.

Dr. R. Badola (January 2013): Gender issues in conservation. Skill Upgradation (PSU) Course for IFS Officers, Indira Gandhi National Forest Academy, Dehradun.

Dr. P.K. Mathur (1 February 2013). Biodiversity conservation in India. Extension lecture at Regional Institute of Education (RIE), National Council of Educational Research and Training, Ajmer.

Dr. R. Badola (February 2013): Teaching inputs in M.Sc. (Forestry—IV Semester) Forest Management Course. Forest Research Institute University, Dehradun.

Dr. R. Badola (14–15 February 2013): Ecosystem services - Valuation challenges. Indira Gandhi National Forest Academy, Dehradun.

Dr. V.B. Mathur (21 February 2013): Biogeography, conservation planning and protected area network in India. Indian Institute of Remote Sensing, Dehradun.

Dr. V.B. Mathur (11 March 2013): Application of geoinformatics in wildlife conservation and management: The WII experience. Indian Institute of Remote Sensing, Dehradun.

Dr. Asha Rajvanshi (13 March 2013): Environmental impact assessment and monitoring. Indian Institute of Remote Sensing, Dehradun.

Dr. R. Badola (13 March 2013): Johari window. Indira Gandhi National Forest Academy, Dehradun.

Dr. R. Badola (15 March 2013): Ecosystem goods and services assessment and ecological economics. Indian Institute of Remote Sensing, Dehradun.

Speakers at WII

Dr. S.N. Prasad, former WII faculty member, delivered a guest lecture on 'Use of the open source tools in conservation' on 3 April 2012.

Dr. K. Ravikumar, Assistant Director, Foundation for Revitalisation of Local Health Traditions (FRLHT), Bangalore delivered a lecture on 'Diversity of medicinal plants in India with special focus on in situ conservation in southern India' on 22 April 2012.

Dr. Suzie Lavallee from University of British Columbia (UBC), Vancouver, Canada delivered lectures on: (i) Policy and emerging issues in dealing with species at risk in Canada on 8 June 2012. (ii) Novelty space and experimental learning on 13 June 2012. (iii) Alternate teaching and learning practices on 14 June 2012. (iv) Population viability analysis using Excel spreadsheet on 21 June 2012. (v) Invertebrate conservation in British Columbia and Canada on 22 June 2012.

Dr. Gopal K. Kadekodi, Honorary Professor, Centre for Multi Disciplinary Development Research (CMDR), Dharwad delivered a popular talk entitled 'Green Economy' on 2 July 2012.

Dr.Vishwas Chavan, Senior Program Officer for Content Mobilization, Global Biodiversity Information Facility, Denmark delivered a guest lecture on 'Changing paradigm in biodiversity data publishing' on 22 August 2012.

Shri Jagdish Kishwan, Former Additional Director General of Forests, Government of India delivered a lecture on 'REDD+ as an instrument for enhancing local livelihoods and sustainable biodiversity conservation' on 26 December 2012.

Dr. Camilla Sandström, Department of Political Science, Umeå University delivered a guest lecture on 'Large carnivores in Sweden: From conservation to conflict management' on 4 February 2013.

Dr. Leela Hazzah, Lion Guardians delivered a guest lecture on 'Lion Guardians: A participatory approach' on 4 February 2013.

Awards

Roshni Arora, Project personnel working in the EIA Cell was awarded the International Association for Impact Assessment (IAIA) President's Bursary. This bursary is awarded to the most deserving student from around the world to attend the international conference of the IAIA. This included a complimentary conference registration and $1000 stipend.

Right To Information (RTI)

Shri Aseem Shrivastava IFS, Scientist F has been designated as the CPIO of the Institute under the Right to Information Act 2005. The Director disposes the appeals received under RTI. During the reporting period, 30 requests and 3 first appeals were received. All requests and appeals were disposed off during the same period.

ACCOUNTS

Separate Audit Report on the Accounts of Wildlife Institute of India, Dehradun for the year 2012-13.

We have audited the attached Balance Sheet of Wildlife Institute of India, as on 31 March 2012, the Income & Expenditure Account and the Receipt & Payment Account for the year ended on that date under Section 20(1) of the Comptroller & Auditor General's (Duties, Powers & Conditions of Service) Act, 1971 read with Section 38G of the Wildlife (Protection) Act, 1972. The audit has been entrusted upto 2015-16. These financial statement are the responsibility of the WII's management. Our responsibility is to express an opinion on these financial statements based on our audit.

1. 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.

2. 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 statement. We believe that our audit provides a reasonable basis for our opinion.

3. 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 Receipt & Payment 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 38G 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:

1. Capital Fund

Income & Expenditure Account show the excess of expenditure over income to the tune of Rs. 174.72 lakh whereas the amount deducted from Schedule-1 Capital Fund was shown as Rs. 181.59 lakh. The figures need reconciliation.

2. Understatement of Current Assets:

- Schedule 11-B: Current Assets- Loans, Advances and other assets - Interest accrued on pension fund was shown as Rs. 56.90 lakh whereas in I&E Account of Pension Fund, it was shown as Rs. 59.90 lakh. the figures need reconcilation.

Schedule-11 (B)- Loans, Advances and Other Assets show TDS on Pension Fund, GPF and Corpus Fund to the tune of Rs. 9.23 lakh to be refunded by ITO. This amount did not include refundable amount for the last year resulting in understatement of Current Assets and liabilities to the same extent.

Lack of Response: The management did not furnish the reply to the draft SAR within the prescribed timeframe.

B: Grants-in-Aid:
The Institute received Rs. 1870.00 lakh as Grant-in-Aid during the year 2011-12 which was utilized in full.

C: Management Letter
Deficiencies which have not been included in the Audit Report have been brought to the notice of WII, Dehradun through a Management Letter issued separately for remedial/corrective action.

(v) Subject to our observations in the preceding paragraphs, we report that the Balance Sheet and 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 statement read together with the Accounting Policies and Notes on Accounts and subject to the significant matters stated above and other matters mentioned in Annexure I to this Separate Audit Report give a true and fair view in conformity with accounting principles generally accepted in India.

a. 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 2012 and
b. In so far as it relates to Income & Expenditure Account of the deficit for the year ended on that date.

For and on behalf of C&AG of India.

Place: New Delhi
Date: 21.11.2013

Pr. Director of Audit (SD)

Annexure

1. Adequacy of Internal Audit System: The internal audit of WII, Dehradun has been conducted for the first time since inception during 2010-11 by the PAO, MoEF. The internal audit system was not adequate.

2. System of Physical verification of assets:
   Physical verification of Assets has been conducted for the period 2011-12 and for the year 2012-13 was in progress. The system was adequate.

3. Adequacy of Internal control system:
   The internal control system was adequate for areas seen in audit.

4. Regularity in payment of statutory dues:
   WII is generally regular in payment of undisputed statutory dues.

के मा/2012

Director (EA)

Dated: 21.11.2013

Annexure-A

1. Static Balance: WII, Dehradun has been showing Rs. 8.38 lakh as static balances under Schedule-11-B-Loans, Advances and Other Assets for more than last 5 years. These balances are recoverable from four agencies including Rs. 6.60 lakh recoverable from MoEF, New Delhi. WII must pursue these cases vigorously lest these recoveries should become irrecoverable.

2. 87 Cheques amounting to Rs. 99.25 lakh were not debited in Bank Accounts and these payments were outstanding as at March 2013. This position include 3 cheques pertaining to the period April 2012 to September 2012 involving 0.11 lakh and, thus, had become time barred. Appropriate action under the rule should be taken.

3. WII has the outstanding balances of Rs. 10.53 lakh on account of FA/TA/LTC and MTC etc. which needed to be adjusted as per rules.

4. Physical verification of Assets has been conducted for the period 2011-12 and for the year 20-12-13 was in progress.

5. Inventory of plantation costing Rs. 34.38 lakh and trees Rs. 24.33 lakh have not been maintained.

6. WII purchased one Motor Cycle costing Rs. 0.48 lakh for which the payment was made on 28 March 2013. The vehicle was not received till 31 March 2013, but it was added to the fixed assets resulting in overstatement of fixed assets to the tune of Rs. 0.48 lakh and understatement of Current Assets – Advances to the extent.

के मा/2012

Director (EA)

Dated: 21.11.2013

WILDLIFE INSTITUTE OF INDIA
Receipts & Payments Accounts for the financial year 2012-13

(A) GRANT-IN-AID

Particulars		Non Plan	Total	Previous Year	Particular		Non Plan	Total	Previous Year
To Opening Balance					Salaries & Allowances	95118567	10000000	105118567	91220527
Cash in Bank	12,891,553.90	0	12,891,554	4,568,676	Medical	6765916		6765916	6228080
Cash In Hand	41,542.00	0	41,542	110,035	LTC	941645		941645	1934813
			0		OTA	419715		419715	467054
To Grant in Aid (Revenue)	182,700,000	11,520,000	194,220,000	187,000,000	Honorarium	74400		74400	25900
To Grant in Aid (Capital)	100,000		100,000	0	Wages	11656311	1520000	13176311	11058044
To Grant (other Projects)			0	0	Bonus	436523		436523	386983
MSc Course Fee	803,839		803,839	957,005	Travel Exp. (Grant in Aid)	3129660		3129660	3165194
To Bus Charges	71,199		71,199	96,733	Travel Exp. (Res. Proj)	990828		990828	642899
To Rent	652,170		652,170	658,226	Fellowship & Wages (Research Project)	4236203		4236203	6662926
To WII Products	24,815		24,815	74,721	Base Camp Expenses (Research Project)	118693		118693	272400
To Misc Receipts	465,124		465,124	326,037	Research Fellowship- Payable	65754		65754	172075
To Elect & Water	354,483		354,483	336,524	Leave Salary Pension Con	4248143		4248143	2059453
To Telephone	6,838		6,838	17,253	POL, Hiring of Veh. (Res. Proj.)	1273700		1273700	1849169
To Interest on Saving A/c	1,634,791		1,634,791	970,510	Contingencies (Res. Proj)	2504056		2504056	2077865
To Loan & Advance	151,494		151,494	136,950	M.Sc. Courses Expenses	1705158		1705158	2615132
To Hostel Caution Money	49,000		49,000	42,700	Travel Advance (M.Sc.)	75761		75761	0
Income Tax refund	793,010		793,010	0	Forests Advance (M.Sc.)	426244		426244	0
Travel Advance recovered	14,485		14,485	72,664	Telephone	697490		697490	799321
FA Recovered	238,155		238,155	416,048	Postage	187485		187485	208590
To T A (Research Project)	118,640		118,640	26,432	Electricity & Water Exp	7685500		7685500	7257632
To FA (Research Project)	341,251		341,251	0	Guest House Maint.	109373		109373	78887
Journals & Periodicals	189,899		189,899	56,101	Hospitality & Enter.	105348		105348	263043
To TDS	1		1	0	Repair of Equipment/ Furniture	150702		150702	142032
To CGEGIS	100		100	0	POL for WII Vehicle	2144546		2144546	2076289
LTC Adv	0		0	11,132	Repair & Maint of Veh	1016738		1016738	1065462
Internal Loan	0		0	1,481,033	Training Cost Exp	23000		23000	13500

TA/FA M.Sc			0	505326	Sty & Cmptr Consum.	432497		432497	799555
CCU New Delhi	0		0	206,809	Sports	394154		394154	274550
Medical Adv	0		0	164831	Legal Expenses	94775		94775	138925
					Operational Expenses	1031560		1031560	1122797
					Printing & Binding	935168		935168	13996
					Maint. of WII Campus	756422		756422	933975
					Estate Security	9619826		9619826	9129035
					Lab Expenses (Health Lab)	13000		13000	0
					Lab Expenses (Gen Lab)	201357		201357	492477
					Lab Expenses (Res Lab)	944074		944074	243318
					Lab Expenses (For Lab)	1266281		1266281	1798442
					Publication	190159		190159	431017
					AMC of Computers	1438777		1438777	1855049
					Transferred to Trg A/c for Expenditure	9000000		9000000	9450000
					LTC Adv	409958		409958	0
					Medical Adv	63885		63885	0
					Sharing of cost of Kendriya Vidyalaya	2000000		2000000	5000000
					Annual Research Seminar	673987		673987	937752
					World Environment Day	43939		43939	267298
					CGEGIS	0		0	94250
					TDS	0		0	45148
					By GPF	0		0	4673
					EMD Release	130000		130000	58045
					Project Costs	0		0	1403000
					Computer & Accessories	2981612		2981612	977584
					By Furniture & Fixture	86844		86844	0
					By Journals & Periodicals	2587040		2587040	3929553
					By Lab Eqpt (Res. Lab)	344549		344549	321945
					By Lab Eqpt (For Lab)	176728		176728	870271
					By Office Equipment	170804		170804	20015
					Civil Maintenance Work	1701792		1701792	208607
					Adv Paid to CPWD	284206		284206	1400000
					Vehicle Purchase	47774		47774	0
					By Office Eqpt (Res. Proj)	303017		303017	95057
					By Camp Eqpt (Res. Proj.)	1156566		1156566	243047
					Closing Balance				
					In Bank	15688280		15688280	12891553
					In Hand	165899		165899	41542
Total	201,642,390	11,520,000	213,162,390	198,235,746		201,642,390	11,520,000	213,162,390	198,235,746

GPF

Particulars		Non Plan	Total	Previous Year	Particular		Non Plan	Total	Previous Year
To Opening Bal (Bank)	5763253.00		*5763253.00*	2243068.00	By Final Payment	4,698,916.00		4,698,916.00	1,420,567.00
To GP Fund Contribution	16187586.00		*16187586.00*	13809737.00	By Invtmt in FDR (GPF)	10,000,000.00		10,000,000.00	0.00
To Int. on saving a/c	409081.00		*409081.00*	48748.00	By Advance/withdrawl	7,299,685.00		7,299,685.00	8,917,733.00
To Int. on FDRs	107711.00		*107711.00*	148297.00	TDS on Interest on FDRs	107,711.00		107,711.00	148,297.00
					By Closing Balance (Bank)	361,319.00		361,319.00	5,763,253.00
Total	22,467,631.00	0.00	22,467,631.00	16,249,850.00		22,467,631.00	0.00	22,467,631.00	16,249,850.00

PENSIONS

Particulars		Non Plan	Total	Previous Year	Particular		Non Plan	Total	Previous Year
To Opening Balance									
Cash in Bank	*1124097.00*		1124097.00	*480628.00*	By Investment in FDR	40,500,000.00		40,500,000.00	0.00
To encashment of FDR	43445052.00		43445052.00	0.00	By Commuted Value of Pension	3,326,273.00		3,326,273.00	246,017.00
To Interest (Pension A/c)	55858.00		55858.00	20147.00	By Pension/ Family Pension	3,904,213.00		3,904,213.00	2,851,845.00
To WII Contribution	3439992.00		3439992.00	3499078.00	By Closing Balance				
To Interest on FDRs	0.00		0.00	670228.00	To Interest on FDRs	865,509.00		865,509.00	670,228.00
To Pension Contribution	84544.00		84544.00	222106.00	Cash in Bank	419,057.00		419,057.00	1,124,097.00
To Interest on FDR (TDS)	865509.00		865509.00						
Total	49,015,052.00	0.00	49,015,052.00	4,892,187.00		49,015,052.00	0.00	49,015,052.00	4,892,187.00

CORPUS FUND

Particulars		Non Plan	Total	Previous Year	Particular		Non Plan	Total	Previous Year
To Opening Balance	792405.00	0.00	792405.00	580063.00					
Misc Receipts	15610579.42	0.00	*15,610,579.42*	823810.00	By Investment	0.00	0.00	0.00	10,770,684.00
Interests on Saving A/c	29755.00	0.00	*29,755.00*	240042.00	TDS on Interest on FDRs	82532.00	0.00	0.00	104644.00
To Encashment of FDR	0.00	0.00	*0.00*	9919174.00					
To Interet on FDRs	82532.00	0.00	*82,532.00*	104644.00					
Intersts Received on FDRs on Pre extension of period	0.00	0.00	*0.00*	8975.00	On FDRs on pre extension of period	0.00	0	0.00	8,975.00
					Closing Balance	16,432,739.42		16,432,739.42	792,405.00
Total	16,515,271.42	0.00	16,515,271.42	11,676,708.00		16,515,271.42	0.00	16,432,739.42	11,676,708.00

TRAINING ACCOUNT

Particulars		Non Plan	Total	Previous Year	Particular		Non Plan	Total	Previous Year
To Opening in Bank	*198,838.00*		*198,838.33*	*134,365.00*	By Equipment	244632.00		244,632.00	76108.00
Grant Received	10,972,829.00		*10,972,829.00*	9,450,000.00	By Office Equipment	152608.00		152,608.00	19000.00
Interest Received	61,837.00		*61,837.00*	39,314.00	By Furniture & Fixture	0.00		0.00	0.00
Other Receipts	3,861,822.90		*3,861,822.90*	3,218.00	By Hostel Items	43123.00		43,123.00	167779.00
					By Cont/Misc	436109.62		436,109.62	775824.00
					By Camping Gear	149974.00		149,974.00	19170.00
					By Travelling Expenses	5682546.00		5,682,546.00	2771348.00
					TA/DA & Honorarium (Guest Faculty)	237947.00		237,947.00	391123.00
					By Training Allowance	288265.00		288,265.00	
					POL & Maint of Vehicle	207191.00		207,191.00	788951.00
					Boarding & Lodging	4861122.00		4,861,122.00	2187779.00
					Books	188420.00		188,420.00	951563.00
					Forests Advance	0.00		0.00	0.00
					Salary & Wages	43806.00		43,806.00	198712.00
					Advance to Firm	0.00		0.00	1070538.00
					Sports Item	0.00		0.00	10164.00
					Other advances	100000.00		100,000.00	0.00
					By Closing in Bank	2459583.61		2,459,583.61	198838.00
Total	15,095,326.90	0.00	15,095,327.23	9,626,897.00		15,095,327.23	0.00	15,095,327.23	9,626,897.00

CONSULTANCY PROJECTS

Particulars		Non Plan	Total	Previous Year	Particular		Non Plan	Total	Previous Year
To Opening Balance:	0.00	0	0						
at Bank	33,164,435.85		*33,164,435.85*	*22,046,811.00*	By Camp Equipment	0.00		0.00	65,206.00
Grant Received	22,156,242.00		*22,156,242.00*	28,171,478.00	By Office Equipment	330,782.00		330,782.00	771,499.00
Interest Saving A/c	813,872.00		*813,872.00*	675,974.00	By Contingenciges/Misc	5,344,478.83		5,344,478.83	4,312,716.00
Other Receipt	22,045.00		*22,045.00*	1,184,720.00	By Fellowship & Wages	1,237,004.00		1,237,004.00	967,625.00
Loan from A/c No. 50650	0.00		*0.00*	350,000.00	By Travel Expenses	7,359,154.38		7,359,154.38	2,191,870.00
					By POL & Maint. of veh.	211,728.00		211,728.00	104,222.00
					Stationery items	268,873.00		268,873.00	0.00
					By Forests Advance (FA)	257,500.00		257,500.00	25,625.00
					Other Advance	336,179.00		336,179.00	0.00
					By Boarding & Lodging	10,847,881.54		10,847,881.54	10,338,770.00
					By TA /DA & Honorarium	360,534.00		360,534.00	102,778.00
					Books	271,337.00		271,337.00	136,066.00
					Omisc Expenses A/c No 8	30,215.00		30,215.00	0.00
					Transf. To Corpus Fund	15,254,909.42		15,254,909.42	190,700.00
					Publication & Printing	186,213.00		186,213.00	57,470.00
					Misc Rweceipt-Payment	760,000.00		760,000.00	0.00
					Loan A/c 51411 &	205,000.00		205,000.00	0.00
					By Bank Balance	12,894,805.68		12,894,805.68	33,164,436.00
Total	56,156,594.85	0.00	56,156,594.85	52,428,983.00		56,156,594.85	0.00	56,156,594.85	52,428,983.00

(P.K. Aggarwal)
Finance Officer

(P.R. Sinha)
Director

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANIZATION)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
Balance Sheet as on 31 March, 2013

(Amt. Rs.)

CORPUS /CAPITAL FUND AND LIABILITIES	Schedule	Current Year	Previous Year
CORPUS /CAPITAL FUND	1	259933265.36	248805212.60
RESERVE AND SURPLUS	2	0.00	0.00
EARMARKED FUND	3	12894806.00	33164436.00
SECURED LOAN AND BORROWINGS	4	0.00	0.00
UNSECURED LOAN AND BORROWINGS	5	325428.00	325428.00
DEFERRED CREDIT LIABILITIES	6	0.00	0.00
CURRENT LIABILITIES AND PROVISION	7	195794099.00	170454011.00
TOTAL (A)		468947598.36	452749087.60
ASSETS			
FIXED ASSETS	8	153361642.36	163545543.60
INVESTMENTS- FROM EARMARKED / ENDOWMENT FUNDS	9	0.00	0.00
INVESTMENTS- OTHERS	10	229207506.00	199400492.00
CURENT ASSETS, LOANS, ADVANCES ETC.	11	86378450.00	89803052.00
MISCELLANEOUS EXPENDITURE (to the extent not written off or adjusted)			
TOTAL (B)		468947598.36	452749087.60

(P.K. Aggarwal)
Finance Officer

(P.R. Sinha)
Director

Financial Statement (Non-Profit Organization)

Wildlife Institute of India, Dehraun

SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2013

SCHEDULE 1: CORPUS/ CAPITAL FUND			(Amt. Rs.)	
			Current Year	Previous Year
Balance as at the begninig of the year			198807068.60	210011576.00
Add: Contribution towards Corpus/ Capital fund			10238172.45	7571893.00
Less : Pre receipted Bill of consultancy Project				-617000.00
Add/(Deduct) : Balance of net income (expenditure) transferred from			-16636351.69	-18159400.40
		TOTAL A	192408889.36	198807068.60
Corpus Fund				
	Opening Balance		49998144.00	47928380.00
	Received during the year		15610579.00	816062.00
	Add Accrued Interest		1803366.00	917991.00
	Add Interest Earned		112287.00	335711.00
		TOTAL B	67524376.00	49998144.00
Total A+B			259933265.36	248805212.60
SCHEDULE3 : EARMARKED FUNDS				
a)	Opeining Balance of the Funds		33164436.00	22046811.00
b)	Addition to the Funds			
	i	Grants Received	22156242.00	28171478.00
	ii	Interest Received	813872.00	675974.00
	iii	Other Receipts	22045.00	1184720.00
	iv	Pre receipted Bill issued	0.00	617000.00
	v	Refund of Loan from A/c No. 50650	0.00	350000.00
		Total	22992159.00	30999172.00
		TOTAL (A+B)	56156595.00	53045983.00
	Utilisation/Expendition towards objectives of funds			
c)	i	Capital Expenditures		
		Fixed Assets		
		Camp Equipment	0.00	65206.00
		Office Equipment	330782.00	771499.00
		Books	271337.00	136066.00
	ii	Revenue Expenditure		
		Camp Expenses	0.00	103035.00
		Contigencies/Misc.	6190314.00	4369929.00
		Fellowship & Wages	1237004.00	967625.00
		Travel Expenses	7359154.00	2191870.00
		POL & Maint. Of Vehicle	211728.00	104222.00
		Advance for Expenses (FA)	257500.00	0.00
		Boarding & Lodging	10847882.00	25625.00
		Transferred to Corpus Fund	15254909.00	10338770.00
		Misc receipt - Payment	760000.00	190700.00
		Loan D/WII A/c No. 51411	205000.00	0.00
		Other advances - Firm	336179.00	0.00
	iii	Pre receipted Bill yet to be received	0.00	617000.00
		TOTAL-C	43261789.00	19881547.00
NET BALANCE AS AT THE YEAR-END (A+B-C)			12894806.00	33164436.00

SCHEDULE 5 : UNSECURED LOANS AND BORROWINGS		
(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		
(8) Others (Specify)		
Security Deposit	314318.00	314318.00
Internal Loan	11110.00	11110.00
TOTAL	325428.00	325428.00
SCHEDULE 7 : CURRENT LIABILITIES AND PROVISION		
(A) CURRENT LIABILITIES		
(1) Acceptances		
(2) Sundry Creditors		
(1) For Goods		
(2) For Others		
Other Payments outstanding (Grant in Aid) (11-12)	0.00	2534531.00
Other payments outstanding (Res Project) (11-12)	0.00	1089764.00
Other Payments outstanding (Grant in Aid) (12-13)	1113794.00	0.00
Other payments outstanding (Res Project) (12-13)	1133933.00	0.00
(3) Advances Received		
Hostel Caution Money	250660.00	201660.00
(4) Interest accrued but not due on		
(1) Secured Loans/Borrowings		
(2) Unsecured Loans/Borrowings		
(5) Statuary Liabilities		
(1) Overdue		
(2) Others (Specify)		
Pension Fund	129614899.00	115599626.00
GP Fund	62348749.00	50359477.00
(6) Others (Specify)		
EMD Received	351308.00	481308.00
TOTAL (A)	194813343.00	170266366.00
(B) Provisions		
(1) For Taxation		
TDS	2156.00	2155.00
(2) Gratuity		
(3) Superannuation/ Pension		
(4) Accumulated Leave Encashment		
(5) Trade Warranties/ Claims		
(6) Others (Specify)		
TDS refund paid to GPF, Pension & Corpus	793010.00	0.00
CGEGIS	535.00	435.00
Payment made to Sh Rajkishore Mohanto (Res Project)	119301.00	119301.00
Fellowship (Arrear)	65754.00	65754.00
TOTAL (B)	980756.00	187645.00
TOTAL (A+ B)	195794099.00	170454011.00

SCHEDULE 8 : FIXED ASSETS

Pariculars	Gross Block					DEPRECIATION				NET BLOCK	
	Cost as at the beginning of the year	Addition during the year		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
		Upto 30-Sep	After 30-Sep								
LAND											
BLOCK: 0%											
Avenue Plantations	3438280.00	0.00	0.00	0.00	3438280.00	0.00	0.00	0.00	0.00	3438280.00	3438280.00
Land	6607214.58	0.00	0.00	0.00	6607214.58	0.00	0.00	0.00	0.00	6607214.58	6607214.58
Trees	2432709.00	0.00	0.00	0.00	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	3125196.71	0.00	0.00	0.00	3125196.71	347244.08	312519.67	0.00	312519.67	2812677.04	3125196.71
Auditorium	4679888.15	0.00	0.00	0.00	4679888.15	519987.57	467988.82	0.00	467988.82	4211899.34	4679888.15
Boundary Fencing	285196.47	0.00	0.00	0.00	285196.47	31688.50	28519.65	0.00	28519.65	256676.82	285196.47
Boundary Wall	504258.98	0.00	0.00	0.00	504258.98	56028.78	50425.90	0.00	50425.90	453833.08	504258.98
Building Complex	67483413.48	0.00	0.00	0.00	67483413.48	7498157.05	6748341.35	0.00	6748341.35	60735072.13	67483413.48
Campus Development	22868312.99	879121.00	1106877.00	0.00	24854310.99	2529334.39	2430087.25	0.00	2430087.25	22424223.74	22868312.99
Tennis Court	185096.73	0.00	0.00	0.00	185096.73	20566.30		0.00	0.00	185096.73	185096.73
Sports Complex	117285.96	0.00	0.00	0.00	117285.96	13031.77	11728.60	0.00	11728.60	105557.36	117285.96
BLOCK: 20%	0.00										
Road & Culvert	245556.06	0.00	0.00	0.00	245556.06	61389.02	49111.21	0.00	49111.21	196444.85	245556.06
Staff Quarters	3327259.74	0.00	0.00	0.00	3327259.74	831814.93	665451.95	0.00	665451.95	2661807.79	3327259.74
Corr. during year for Staff Qtrs	241730.31	0.00	0.00	0.00	241730.31	60432.58	48346.06		48346.06	193384.25	241730.31
TOTAL	103063195.58	879121.00	1106877.00	0.00	105049193.58	11969674.97	10812520.45	0.00	10812520.45	94236673.13	103063195.58
PLANT MACHINERY & EQPT											
BLOCK: 20%											
Vehicle	1664882.46	0.00	47774.45	0.00	1712656.91	416220.62	332976.49		332976.49	1379680.42	1664882.46
Development of Foerensic Lab	5673112.99	103221.00	73507.00	0.00	5849840.99	1332349.25	1162617.50		1162617.50	4687223.49	5673112.99
Training Equipment	624188.01	0.00	0.00	0.00	624188.01	156047.00	124837.60		124837.60	499350.41	624188.01
BLOCK: 25%											
AC Plant	492283.60	0.00	0.00	0.00	492283.60	164094.53	123070.90		123070.90	369212.70	492283.60
Camp Equipment (project)	133832.65	0.00	0.00	0.00	133832.65	44610.88	33458.16	0.00	33458.16	100374.49	133832.65
DG Set	974192.82	0.00	0.00	0.00	974192.82	324730.94	243548.21	0.00	243548.21	730644.62	974192.82
EPABX	94485.74	0.00	0.00	0.00	94485.74	31495.25	23621.44	0.00	23621.44	70864.31	94485.74

Lab Equipment	2995204.43	115067.00	229482.00	0.00	3339753.43	984894.31	806253.11	0.00	806253.11	2533500.32	2995204.43
Office Equipment	1150519.57	170804.00	0.00	0.00	1321323.57	582293.52	330330.89	0.00	330330.89	990992.68	1150519.57
Training Equipment (Trng A/c)	2756570.98	19503.00	225129.00	0.00	3001202.98	908290.33	722159.62	0.00	722159.62	2279043.36	2756570.98
Office Equipment (Project)	6535.37	0.00	0.00	0.00	6535.37	2178.46	1633.84	0.00	1633.84	4901.53	6535.37
Office Equipment (Res. Project)	1766891.52	200412.00	102605.00	0.00	2069908.52	588963.84	504651.51	0.00	504651.51	1565257.02	1766891.52
Camp Equipment (Res. Project)	4470650.82	524870.00	631696.00	0.00	5627216.82	1489579.11	1327842.21	0.00	1327842.21	4299374.62	4470650.82
TOTAL	22803350.96	1133877.00	1310193.45	0.00	25247421.41	7025748.03	6148081.17	0.00	5737001.47	19510419.94	22803350.96
FURNITURE, FIXTURES BLOCK : 15%											
Furinitures & Fixtures	5495514.75	46834.00	40010.00	0.00	5582358.75	969796.72	834353.06	0.00	834353.06	4748005.69	5495514.75
Furniture & Fixture (Training)	400951.49	0.00	0.00	0.00	400951.49	70756.14	60142.72	0.00	60142.72	340808.77	400951.49
TOTAL	5896466.24	46834.00	40010.00	0.00	5983310.24	1040552.87	894495.79	0.00	894495.79	5088814.45	5896466.24
OFFICE EQUIPMENT BLOCK : 20%											
Office Equipment (Training A/c)	136858.46	0.00	152608.00	0.00	289466.46	34214.62	42632.49	0.00	42632.49	246833.97	136858.46
TOTAL	136858.46	0.00	152608.00	0.00	289466.46	34214.62	42632.49	0.00	42632.49	246833.97	136858.46
COMPUTER/PERIPHERALS BLOCK : 20%											
Comp. and Periphrals	1434816.38	1260637.00	1720975.00	0.00	4416428.38	332903.35	711188.18	0.00	711188.18	3705240.20	1434816.38
BLOCK : 60%											
Comp. & Accessories	396394.26	0.00	0.00	0.00	396394.26	594591.38	237836.56	0.00	237836.56	158557.70	396394.26
E Governance	152975.23	0.00	0.00		152975.23	229462.85	91785.14	0.00	91785.14	61190.09	152975.23
TOTAL	1984185.87	1260637.00	1720975.00	0.00	4965797.87	1156957.58	2463186.22	0.00	1040809.87	3924988.00	1984185.87
BOOKS BLOCK : 10%											
Journals & Periodicals	15449367.09	938667.00	1648373.00	0.00	18036407.09	1594530.57	1721222.06	0.00	1721222.06	16315185.03	15449367.09
Library Books	1733915.73	0.00	0.00	0.00	1733915.73	192657.30	173391.57	0.00	173391.57	1560524.16	1733915.73
TOTAL	17183282.82	938667.00	1648373.00	0.00	19770322.82	1787187.87	1894613.63	0.00	1894613.63	17875709.19	17183282.82
GRAND TOTAL	163545543.51	4259136.00	5979036.45	0.00	173783715.96	23014335.93	22255529.75	0.00	20422073.69	153361642.27	163545543.51

SCHEDULE :10 INVESTMENT - OTHERS	Current Year	(Amt. Rs.) Previous Year
(1) In the Govt. Securities		
(2) Other approved Securities		
(3) Shares		
(4) Debentures and Bonds		
Investment in RBI Bond (GPF)	20000000.00	27416000.00
Investment in RBI Bond (Pension)	16500000.00	35808000.00
Investment in RBI Bond (Corpus Fund)	29800000.00	29800000.00
(5) Subsidaries and Joint Ventures		
(6) Others (Specify)		
Investment in FDR (GPF)	39431927.00	15685915.00
Investment in FDR (Pension Fund)	104171812.00	72307473.00
FDR Corpus Fund	19303767.00	18383104.00
TOTAL	229207506.00	199400492.00
SCHEDULE :11 CURRENT ASSETS, LOANS, ADVANCES ETC.		
(A) CURRENT ASSETS		
(1) Inventories		
Closing Stock of Steel & Cement	0.00	0.00
Advance paid for Journals (Grant in Aid)	0.00	143735.00
Closing Balance of WII Publication	780234.00	820453.00
(2) Sundry Debtors		
(1) Debts Outstanding for a period exceeding six months	99213.00	123991.00
(2) Others (Specify)		
(3) Cash balances in hand (including cheques/drafts and imprest)		
Grant-in-Aid A/c	165899.00	41542.00
Training A/c	0.00	0.00
Pension Fund A/c	0.00	0.00
GPF A/c	0.00	0.00
Corpus Fund	0.00	0.00
(4) Bank Balances		
(1) With Scheduled Banks		
Grant-in-Aid A/c	15688280.00	12891553.00
Training A/c	2459584.00	198838.00
Pension Fund A/c	419057.00	1124097.00
GPF A/c	361319.00	5763253.00
Corpus fund No 4032	16432739.00	792405.00
Endowment Funds	12894806.00	33164436.00
TOTAL (A)	49301131.00	55064303.00

(B) LOANS, ADVANCES AND OTHER ASSETS		
(1) Loans	Current Year	Previous Year
(1) Staff		
Loan & Advances to Staff	510400.00	661894.00
Advance for expenses (Staff) (456244+75761+900[illegible]19150)	1052766.00	329556.00
Advance for Expenses to Staff (Training A/c)	0.00	0.00
Advance for expenses (Research Projects)	119566.00	460156.00
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)		
Adv for civil work to CPWD	284206.00	2427184.00
Loan for World Environment Day (MoEF)	280984.00	267298.00
Loan for WCF workshop	30253.00	0.00
Internal Loan	*0.00*	*0.00*
(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)	100000.00	1070538.00
TDS to be refunded by the ITO (Pension Fund)	1638104.00	670228.00
TDS to be refunded by the ITO (GPF)	288557.00	148297.00
TDS to be refunded by the ITO (Corpus fund)	187176.00	104644.00
(3) Income Accrued		
(1) On Investments from Earmarked / Endowment Funds		
(2) On Invesments -Others		
Interest Accrued in FDR (GPF)	2415243.00	1346012.00
Interest Accrued in FDR (Pension Fund)	7556154.00	5689828.00
Interest Accrued in FDR (Corpus Fund)	1803366.00	917991.00
(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	1173539.00	0.00
(4) Expenses payable towards capital/fixed Assets		
(1) Grant in Aid (2011-12)	0.00	815467.00
(2) Research Project (2011-12)	0.00	578998.00
(3) Research Project (2012-13)	386349.00	0.00
TOTAL (B)	37077319.00	34738749.00
TOTAL (A+B)	86378450.00	89803052.00

(P.K. Aggarwal)
Finance Officer

(P.R. Sinha)
Director

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANIZATION)

Wildlife Institute of India, Dehradun

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR 2012-13

(Amt. Rs.)

INCOME	Schedule	Current Year	Previous Year
Income from Sales/Services	12	0.00	0.00
Grants/Subsidies	13	184081828.00	180115233.00
Fees/Subscriptions	14	16812030.00	10410223.00
Income from Investments (from earmarked/endowment Funds Transferred to funds)	15	0.00	0.00
Income from Royalty, Publication etc	16	1574629.00	1509494.00
Interest Earned	17	1734608.00	1059057.00
Other Income	18	0.00	0.00
Increase/decrease) in stock of Finished goods and works-in-progress	19	0.00	0.00
TOTAL (A)		204203095.00	193094007.00
EXPENDITRUE			
Establishment Expenses (Plan & Non Plan)	20	134501222.00	119844052.00
Other Administrative Expenses (Plan & Non Plan)	21	65916151.00	67707894.00
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 Schedule 8)		20422073.69	23014335.93
Total (B)		220839446.69	210566281.93
Balance being excess of Income over Expenditure (A-B)		-16636351.69	-17472274.93
Balance being surplus (Deficit) carried to Corpus/Capital Fund		-16636351.69	-17472274.93

(P.K. Aggarwal)
Finance Officer

(P.R. Sinha)
Director

Financial Statement (Non-Profit Organization)

Wildlife Institute of India, Dehraun

SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2013

	(Amt. Rs.)	
	Current Year	Previous Year
SCHEDULE :13 GRANTS/SUBSIDIES		
(1) Central Government		
Grant -in- Aid from MoEF	194320000.00	187000000.00
Amt capitalized	10238172.00	6884767.00
Total	184081828.00	180115233.00
(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
TOTAL	184081828.00	180115233.00
SCHEDULE :14 FEES/ SUBSCRIPTIONS		
(1) Entrance Fees		
M.Sc.Course Fee	803839.00	957005.00
(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	0.00
(5) Others (Specify)		
Other Receipt (Training)	5834652.00	3218.00
Receipt for Training courses	9000000.00	9450000.00
Pre-receipted bill issued but not received	1173539.00	0.00
Misc. Receipts (Training A/c)	0.00	0.00
Receipt for Training Cost		
TOTAL	16812030.00	10410223.00
SCHEDULE :16 INCOME FROM ROYALTY, PUBLICATION ETC.		
(1) Income from Royalty		
(2) Income from Publications		
(3) Others (Specify)		
Misc. Receipts	465124.00	326037.00
WII Products	24815.00	74721.00
House Licence Fee	652170.00	658226.00
Bus Charges	71199.00	96733.00
Electricity & Water Charges	354483.00	336524.00
Telephone	6838.00	17253.00
TOTAL	1574629.00	1509494.00

SCHEDULE :17 INTEREST EARNED		
(1) On Term Deposits		
(1) With Scheduled Banks		
Int. on Bank Deposit	0.00	0.00
Interest on FDR	0.00	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)	0.00	0.00
(2) On Savings Account		
(1) With Scheduled Banks		
Int. on Savings Account	1634791.00	970501.00
Interest on Saving A/c (Training A/c)	61837.00	39314.00
(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	49242.00
(2) Others	0.00	0.00
(4) Interest on Debtors and Other Receivables		
TOTAL	1734608.00	1059057.00

SCHEDULE :20 ESTABLISHMENT EXPENSES (Amt. Rs.)

	Current Year		Previous Year	
	Plan	Non Plan	Plan	Non Plan
(1) Salaries and Wages				
Research Fellowship (Arrear) payable			0.00	
Honorarium	74400.00		25900.00	
Medical	6765916.00		6228080.00	
Salaries & Allowances	87466994.00	10000000.00	77017752.00	9200000.00
Stipend	406677.00		305148.00	
Wages	11249634.00	1520000.00	8258044.00	2800000.00
Fellowship & Wages (Research Project)	4301957.00		6662926.00	
(2) Allowances and Bonus				
Bonus	436523.00		386983.00	
OTA	419715.00		467054.00	
LTC	941645.00		1934813.00	
Corps Fund (Training)	0.00		0.00	
Transferred to Corpus Fund	0.00		0.00	
Honorarium (Training A/c)	237947.00		391123.00	
(3) Others (Specify)				
(4) Contribution to Other Fund (Specify)				
Leave Salary and Pension Contr.	7771374.00		5558531.00	
(5) Staff Welfare Expenses				
Uniforms	0.00		0.00	
(6) Expenses on Employees Retirement and Terminal Benefits				
Final Payment				
Leave Encashment & Gratuity	2789747.00		335298.00	
(7) Others (Specify)				
Camp Expenses (Research Project)	118693.00		272400.00	
TOTAL	122981222.00	11520000.00	107844052.00	12000000.00

SCHEDULE :21 OTHER ADMINISTRATIVE EXPENSES				
AMC of Computers	1438777.00	0.00	1855049.00	
Annual Research Seminar	673987.00	0.00	937752.00	
Contingencies/Misc. (Research Project)	2504056.00	0.00	1754005.00	
Cont./Misc.(Training Account)	5722555.00	0.00	4291821.00	
Electricity and Water Charges	7685500.00	0.00	7257632.00	
Estate Maintenance	756422.00	0.00	933975.00	
Estate Security	9619826.00	0.00	9129035.00	
Govt. Contribution to Pension Fund	0.00	0.00	0.00	
Lab Expenses (Research lab)	944074.00	0.00	243318.00	
Lab Expenses (Forensic Lab)	1266281.00	0.00	1798442.00	
Lab Expenses (Genetic Lab)	201357.00	0.00	492477.00	
Lab Expenses (Health Lab)	13000.00	0.00	0.00	
Legal Expenses	94775.00	0.00	138925.00	
M.Sc. Course Expenditure	1705158.00	0.00	1820039.00	
Operational Expenses	1246281.00	0.00	1464727.00	
Pension Contribution (1031560+105348+109373)	1338595.00	0.00	1168399.00	
POL & Maintenance of Vehicle (Research Project)	1273700.00	0.00	1849169.00	
POL & Maintenance of Vehicle (Training A/c)	207191.00	0.00	788951.00	
POL for Vehicles	2144546.00	0.00	2076289.00	
Postage & Telegrams	187485.00	0.00	208590.00	
Printing & Binding	935168.00	0.00	13996.00	
Printing of Books for Project	0.00	0.00	0.00	
Publication	190159.00	0.00	431017.00	
Repair & Maintenance of Vehicles	1016738.00	0.00	1065462.00	
Repair & Maintenance furniture & Fixture	150702.00	0.00	142032.00	
Sharing of cost of Kendriya Vidyalaya	2000000.00	0.00	5000000.00	
Sports Goods	394154.00	0.00	274550.00	
Stationery	432497.00	0.00	799555.00	
Training Allowance	288265.00	0.00	19170.00	
Telephone & TC	697490.00	0.00	799321.00	
Training & Skill Upgradation of Staff	23000.00	0.00	13500.00	
Training Cost Expenditure	9000000.00	0.00	9450000.00	
Travel Exp. (Grant in Aid)	3129660.00	0.00	3165194.00	
Travel Exp. (Research Project)	990828.00	0.00	642899.00	
Travelling Expenses (Training A/c)	5682546.00	0.00	2771348.00	
Refunded to Other Project towards project cost	0.00	0.00	1403000.00	
Write off the Material & Supplies as suggested by Audit	0.00	0.00	1501794.00	
Write Off Office Equip. during 2009-10 as pointed out by the Audit Team	0.00	0.00	839505.00	
Less : Payment made in 2006-07 towards repairing of DG Setas pointed by CAG	0.00	0.00	-289000.00	
Less : Depreciation charged on Campus Devlpmnt since 04-05 to 10-11 as adv was booked directly in Assets instead of Current Assets as pointed by CAG	0.00	0.00	-673874.00	
Add : Expenditure wrongly less shown in 2011-12 (As pointed out by Audit)	100000.00	0.00	0.00	
Payment Outstanding of Grant in Aid(2012-13)	0.00	0.00	2129830.00	
Payment Outstanding of Grant in Aid(2012-13)	1113794.00	0.00	0.00	
Payment Outstanding of Research Project (2012-13)	747584.00	0.00	0.00	
TOTAL	65916151.00	0.00	67707894.00	0.00

(P.K. Aggarwal)
Finance Officer

(P.R. Sinha)
Director

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANIZATION)

Wildlife Institute of India, Dehradun

FIXED ASSETS PURCHASED FROM FUNDS REFLECTED IN SCHEDULE -3

Particulars	Gross Block				
	Cost as the beginning of the year	Addition during the year	Deduction during the year	Costs as at the end of the year	Cost as at the previous year end
Equipment					
Camp equipment	10131290.29	0.00	0.00	10131290.29	10131290.29
Office Equipment	1616908.38	330782.00	0.00	1947690.38	1616908.38
Books	368549.00	271337.00	0.00	639886.00	368549.00
Total	12116747.67	602119.00	0.00	12718866.67	12116747.67

(P.K. Aggarwal)
Finance Officer

(P.R. Sinha)
Director

FORM OF FINANCIAL STATEMENTS (NON PROFIT ORGANIZATIONS)
NAME OF EQUITY: WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
Schedules Forming part of the Accounts for the period ended on 31st March 2013

SCHEDULE – 25 SIGNIFICANT ACCOUNTING POLICES (Notes on Accounts)

1. Accounts of the institute have been prepared on accrual basis and accrued interest has been accounted for the Accounts.

2. 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.

3. The funds received for expenditure on consultancy projects (Externally Funded) have now been shown under Liabilities as per direction of Audit (C&AG). The balance available and expenditure incurred on these projects in reflected in Schedule-3 of Balance Sheet. The Fixed Assets created from these funds are mentioned Annexure-I

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

(P.R. Sinha)
Director

GENERAL PROVIDENT FUND ACCOUNT NO. 518502010001297

Wildlife Institute of India, Dehraun

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2012-13

Income		Expenditure	
Particulars	Amount	Particulars	Amount
Opening Balance	5763253.00	Final payment of GPF	4698916.00
Interest Received on Saving Account	409081.00	Investment	10000000.00
Interest Earned on FDR	288557.00	Advance/Withdrawal paid	7299685.00
GPF Contribution	16187586.00	Interest Accrued and invested	107711.00
Interest Accrued on FDR	107711.00	TDS on Interest if FDR	288557.00
		Bank Balance	361319.00
Total	22756188.00	Total	22756188.00

PENSION FUND ACCOUNT NO. 518502010000018

Wildlife Institute of India, Dehraun

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2012-13

Income		Expenditure	
Particulars	Amount	Particulars	Amount
Opening Balance	1124097.00	Investment in FDR	40500000.00
Interest Received on Saving Account	55858.00	Commuted Value of Pension	3326273.00
Interest Earned on FDR	865509.00	Family Pension/ Pension	3904213.00
WII Contribution	3439992.00	Interest Accrued and invested	7556154.00
Encashment of FDR	43445052.00	TDS on Interest on FDR	865509.00
Pension Contribution	84544.00	Bank Balance	419057.00
Interest Accrued	7556154.00		
Total	56571206.00	Total	56571206.00

WILDLIFE INSTITUTE OF INDIA
Receipts & Payments Accounts

WII Management Effectiveness Evaluation (MEE) of Protected Areas			
Receipt	Amount	Payment	Amount
Opening Balance	243220.00	Wages to Ms Sanyogita	77702.00
Interest received 2012-13	29763.00	Travel expenses	522477.00
Grant received for MEE Tiger Reserve Project	385000.00	Sitting Fee	81000.00
Grant received for MEE of NPs & WLS Project	3500000.00	Per Diem to evaluation team	19132.00
		Report Writing Cost	33000.00
		Project Initiation & completion	445138.00
		Project management cost	108848.00
		Miscellaneous & unforseen	39569.00
		Advances paid	30000.00
		MEE Tiger Reserve	270377.00
		Bank Balance A/C No - 62	2530740.00
G. Total	4157983.00	G. Total	4157983.00

WII Survey & Mapping of Medicinal Plants in Uttrakhand			
Receipt	Amount	Payment	Amount
Opening Balance	1069910.00	Fellowships	126000.00
Interest received 2012-13	38038.00	Consumeable	37273.00
		Contingencies	981.00
		Expenditure Assessment of Banj Oak Forests in Uttrakhand	0.00
		Expenditure Assessment of Sand Mining in Uttrakhand	51390.00
		Bank Balance A/C No - 50188	892304.00
G. Total	1107948.00	G. Total	1107948.00

Project Tiger Co-predator, Prey & Habitat Phase IV			
Receipt	Amount	Payment	Amount
Opening Balance	956459.00	Fellowships	288000.00
Grant Received from Director Project Tiger Ramnagar	500000.00	Consumeable	134967.00
Interest received 2012-13	24259.00	Travel	345499.00
Refund of advances	70000.00	Contingencies	106256.00
		Wages to Field Assistants	65610.00
		Bank Balance A/C No - 50673	610386.00
G. Total	1550718.00	G. Total	1550718.00

Housing & Enclosure Enrichment of Some Species in selected Indian Zoos			
Receipt	Amount	Payment	Amount
Opening Balance	637065.00	Fellowships	648052.00
Gerant Received from Central Zoo Authority, New Delhi	900000.00	Stationery	36039.00
Interest received upto Mar 2013	21181.00	Travel	271452.00
		Miscellaneous & Contingencies	18214.00
		Equipment	13605.00
		Development of Enrichment	10153.00
		Bank Balance A/C No - 50912	560731.00
G. Total	1558246.00	G. Total	1558246.00

Macroecology of the Terrestrial Herpetofauna in Andaman & Nicobar Archipelago			
Receipt	Amount	Payment	Amount
Opening Balance	239475.00	Fellowships	340320.00
Interest received 2012-13	15991.00	Consumeable	50720.00
Grant received	700000.00	Travel	139835.00
		Contingencies	53138.00
		Equipment (Overhead)	36884.00
		Wages to Field Assistants	111050.00
		Advances paid	6000.00
		Bank Balance A/C No - 51031	217519.00
G. Total	955466.00	G. Total	955466.00

Ecology of Leopard Panthera Pardus in Relation to Prey Abundance & Land Use Pattern in Kashmir Valley			
Receipt	Amount	Payment	Amount
Opening balance	945295.00	Fellowships	288000.00
Interest received 2011-12	31853.00	Consumeable	188573.00
Grant received	300000.00	Travel	79882.00
		Contingencies	97059.00
		Equipment	215847.53
		Wages to Field Assistants	73400.00
		Overhead expenses	125951.00
		Advances paid	3200.00
		Bank Balance A/C No - 51480	205235.47
G. Total	1277148.00	G. Total	1277148.00

Ecological Assessment of Banj Oak Forests in Kedarnath Wildlife Sanctuary, Western Himalaya with reference to invasion by Pine			
Receipt	Amount	Payment	Amount
Opening balance	388516.00	Fellowships	420000.00
Interest received 2012-13	15173.00	Consumeable	7489.00
Grant received	350000.00	Travel	32698.00
		Contingencies	15000.00
		Equipment	1554.00
		Bank Balance A/C No - 51671	276948.00
G. Total	753689.00	G. Total	753689.00

Diversity of Moths Assemblage and their Potential Role as conservation tool in different Protected Areas of Uttrakhand			
Receipt	Amount	Payment	Amount
Science & Engineering Research Board (SERB))	550000.00	Fellowships	60000.00
Interest received 2012-13	9957.00	Consumeable	32605.00
		Travel	18411.00
		Contingencies	29242.00
		Overhead incl maint of Equipment	8430.00
		Bank Balance A/C No - 53258	411269.00
G. Total	559957.00	G. Total	559957.00

Preparing and updating Stud Books of 34 endangered Species (14 Old and 20 New) for five year period.			
Receipt	Amount	Payment	Amount
Central Zoo Authority, New Delhi	1139000.00	Salaries	65280.00
Interest received 2012-13	17936.00	Travel (Data colletion from Zoos)	33431.00
		Stationery	4055.00
		Equipment	100000.00
		Miscellaneous & contingencies	14060.00
		Bank Balance A/C No - 53274	940110.00
G. Total	1156936.00	G. Total	1156936.00

WII-UNESCO PROJECT			
Receipt	Amount	Payment	Amount
Opening Balance	3905517.25	Travel Expenditure	532050.00
Intt.Received	136278.00	Contigencies	13455.00
Loan: Director WII A/c No. 32	200000.00	Expenditure Total	545505.00
		Bank Balance A/c No. 44	3696290.25
G. Total	4241795.25	G. Total	4241795.25

All India Tiger Estmation/MSTrIPS/Eva Phy Strees & Reproductive Potential in Reintroduced Tiger Project			
Receipt	Amount	Payment	Amount
Brought forwarded	19798340.00	Equipment (Camera Trap, Compass, Range Finder, Binoculars, GPS, Computers, Software etc.)	310948.00
Grant received	385000.00	Contractual tech for data collection	1361766.00
Grant received (Sariska)	1300000.00	Vehicle hiring for data collection	370579.00
Interest	747213.00	Wages for field assistant	95228.00
Grant received (Sakhuntala)	179750.00	Travel exp(including International for Conferences)	401358.00
Grant Received (Bilal Proj)	1572160.00	Training Workshop (Six)	210561.00
Refund of Cheque/Trans ch	1338.00	GIS Staff (Contructual for Data	27347.00
		Contingencies	316479.00
		Pub & Trg material	71815.00
		Grant for Sariska	1300000.00
		Grant for Bivash Pandav	179750.00
		Grant for K Ramesh	600000.00
		Grant for Long Term TATR	1572160.00
		Grant for Sunderban	385000.00
		Total expenses	7202991.00
		Loan	0.00
		Forest Advance	0.00
		Tour Advance	21308.00
		Grant Total	7224299.00
		Bank UBI-50968	16759502.00
G. Total	23983801.00	G. Total	23983801.00
Note: A sum of Rs 15 lakh has been tfr to a/c No 50545 as per sanction order of NTCA dt 29 Jun 2011 and approval of Dean, WII, Dehradun on 15 Jul 2011			

WII - Long Term Monitoring of Tiger at TATR			
Receipt	Amount	Payment	Amount
Grant Received	1572160.00	Salaries & Wages	1000.00
		Consumables	0.00
		Travel	35008.00
		contingences	0.00
		Equipment	0.00
		Total expenses	36008.00
		Loan	0.00
		Forest Advance	0.00
		Tour Advance	0.00
		Grand Total	36008.00
		Bank UBI-50968	1536152.00
G. Total	1572160.00	G. Total	1572160.00

WII - Re-introduction of Cheetah Project			
Receipt	Amount	Payment	Amount
Grant Received	1072170.19	Biologists / sociologist	350144.00
Intrest	31728.00	Wages	27784.00
Refund of Cheque	312.00	Office staff	0.00
		Casual Labour	0.00
		POL & Veh Main	70076.00
		Travel Exp	5324.00
		International TA	0.00
		contingences	78149.00
		Total expenses	531477.00
		Forest Advance	0.00
		Tour Advance	0.00
		Grand Total	531477.00
		Bank UBI-50968	572733.19
G. Total	1104210.19	G. Total	1104210.19

Impact of Global changes on species composition in western Himalayas: HP [A/c 51164]			
Receipt	Amount	Payment	Amount
Opening Balance	203159.00	Fellowship	109161.00
Interest credited by Bank	3249.00	Travel	5855.00
Interest credited by Bank	1071.00	Wages	15200.00
		Equipment	35490.00
		Contingencies	7002.00
		Cash at Bank	34771.00
G. Total	207479.00	G. Total	207479.00

Study to Assess Cumulative Environmental Impact of Various Hydro Electric Projects (HEP) & Bellary Study			
Receipt	Amount	Payment	Amount
Opening Balance	1217587.00	Fellowships/Manpower	36000.00
Interest received 2012-13	33536.00	Vehicle Hiring	111591.00
		Travel	45646.00
		Miscellaneous & Contingencies	115202.00
		Field Equipment	190408.00
		Spital Data	69735.00
		Expenditure Bellary Study	0.00
		Professional Fees Bellary Study	0.00
		Miscellaneous & Contingencies Bellary Study	131836.00
		Bank Balance A/C No - 52127	550705.00
G. Total	1251123.00	G. Total	1251123.00

WII-Building Partnership to Support UNESCO World Heritage Programme			
Receipt	Amount	Payment	Amount
Opening Bal.	2735488.20	Fellowship and Wages	1213147.00
Grant Received	4407513.40	Travelling Expenses	1215700.52
Intt. Received	88682.00	Scholarship	477750.00
		Training & Workshop	108307.00
		Office Equipment	365687.00
		Equipment	111517.00
		Base Camp Expenditure	101490.00
		Advance for Expenses	8000.00
		Misc. & Contigencies	529293.60
		Meeting & Confrence	54654.00
		Printing Expenses	60690.00
		Professional Fees	380449.00
		Expenditure Total	4626685.12
		Bank Balance A/c No. 50246	2604998.48
G. Total	7231683.60	G. Total	7231683.60

WII-ENVIS PROJECT			
Receipt	Amount	Payment	Amount
Opening Balance	42216.75	Fellowship and Wages	331768.00
Intt. Received	3116.00	Travelling Expenditure	17726.00
Grant Received	2012179.00	Contigency	32960.00
Loan:-50650	15000.00	Report Writing	118778.00
		Loan Refund:-A/c No 44	200000.00
		Expenditure Total	701232.00
		Bank Balance A/c No. 32	1371279.75
G. Total	2072511.75	G. Total	2072511.75

WII-DGH Seaturtle Telemetry Project			
Receipt	Amount	Payment	Amount
Opening Balance	8950385.01	Fellowship and Wages	108429.00
Intt. Received	344258.00	Logistic Expenses	533008.93
		Base Camp Expenditure	9200.00
		Travelling Expenses	101294.00
		Contingency	36263.00
		Office Equipment	11474.00
		Expenditure Total	799668.93
		Bank Balance A/c No. 59	8494974.08
G. Total	9294643.01	G. Total	9294643.01

Avian Malaria Project			
Receipt	Amount	Payment	Amount
Opening Balance	22506.00	Loan: A/c No. 32	15000.00
Intt. Received	536.00		0.00
		Expenditure Total	15000.00
		Bank Balance A/c No. 50650	8042.00
G. Total	23042.00	G. Total	23042.00

Tiger Response to Pray Human Disturbance			
Receipt	Amount	Payment	Amount
Opening Balance	1276518.30		
Interest Received	51711.00		
		Expenditure Total	0.00
		Bank Balance A/c No. 60	1328229.30
G. Total	1328229.30	G. Total	1328229.30

ISRO-GBP Project on LULC Dynamics			
Receipt	Amount	Payment	Amount
Opening Balance	529573.00	Fellowship & Wages	48869.00
Intt. Received	17298.00	Office Equipment	52483.00
		Travel Expenditure	521.00
		Contigencies	4503.00
		Camp Equipment	56714.00
		Advance for Expenses	1819.00
		Expenditure Total	164909.00
		Bank Balance A/c No. 51241	381962.00
G. Total	546871.00	G. Total	546871.00

Interrated Development of Wildlife Habitats			
Receipt	Amount	Payment	Amount
Opening Balance	417736.00	Fellowship & Wages	104875.00
Intt. Received	14072.00	Travel Expenditure	59684.00
		Contigency	6529.00
		Expenditure Total	171088.00
		Bank Balance A/c No. 51240	260720.00
G. Total	431808.00	G. Total	431808.00

WII-Monitoring Land-Use by Wildlife. Livestock and Human in Khangchendzonga Biospheres Reserve			
Receipt	Amount	Payment	Amount
Opening Balance	158759.00	Fellowship & Wages	298485.00
Intt. Received	2427.00	Lab. Expenditure	41086.00
Loan: A/c No. 52529	35000.00	Contigencies	11152.00
Loan: A/c No. 8	200000.00	Lab. Equipment	14432.00
		Travel Expenses	29005.00
		Expenditure Total	394160.00
		Bank Balance A/c No. 51411	2026.00
G. Total	396186.00	G. Total	396186.00

I U C N Cell			
Receipt	Amount	Payment	Amount
Opening Balance	1156752.50	Travel Expenditure	860293.00
Intt. Received	37420.00	Misc. Expenses	14904.00
Member Ship Fees	246000.00	Office Equipment	54955.00
Society of Hill Resource Management	25995.00	IUCN Booth Exhibition Fees, Jeju	88768.26
		Office Stationery	11470.00
		Expenditure Total	1030390.26
		Bank Balance A/c No. 41	435777.24
G. Total	1466167.50	G. Total	1466167.50

Western Tragopan Project			
Receipt	Amount	Payment	Amount
Opening Balance	2134374.00	Fellowship & Wages	416596.00
Intt. Received	72130.00	Travel Expenses	223272.00
		Base Camp Expenditure	22000.00
		Office Equipment	39021.00
		Camp Equipment	1600.00
		Contigencies	9912.00
		Advance for Expenses	23000.00
		Expenditure Total	735401.00
		Bank Balance A/c No. 52465	1471103.00
G. Total	2206504.00	G. Total	2206504.00

Structural and Functional Attrubutes of Plant Communities in Cold Arid Region of Nanda Devi Biospheres Reserve, Uttarakhand			
Receipt	Amount	Payment	Amount
Opening Balance	334197.00	Fellowship & Wages	231028.00
Intt. Received	7148.00	Travel Expenses	32560.00
		Base Camp Expenditure	29876.00
		Contigencies	11477.00
		Loan: A/c No. 51411	35000.00
		Expenditure Total	339941.00
		Bank Balance A/c No. 52529	1404.00
G. Total	341345.00	G. Total	341345.00

Assessment of Dugong Distribution, Habitat and Risks due to Fisheries and other anthropogenic related activities in India			
Receipt	Amount	Payment	Amount
Grant	760000.00	Fellowship & Wages	161515.00
Intt. Received	10826.00	Travel Expenses	233899.00
		Report Writing	3625.00
		Contigencies	15331.00
		Expenditure Total	414370.00
		Bank Balance A/c No. 52529	356456.00
G. Total	770826.00	G. Total	770826.00

Assessment of Ecological Setting and Biodiversity Values of Papikonda National Park and Indira Sagar (Polavaram) Mult. Project			
Receipt	Amount	Payment	Amount
Grant	1700000.00	Fellowship & Wages	102800.00
Intt. Received	33966.00	Travel Expenses	76945.00
		Office Equipment	39795.00
		Base Camp Expenditure	5000.00
		Contigencies	21326.00
		Advance for Expenses	180000.00
		Expenditure Total	425866.00
		Bank Balance A/c No. 52529	1308100.00
G. Total	1733966.00	G. Total	1733966.00

National Biodiversity Authority			
Receipt	Amount	Payment	Amount
Grant	1980000.00	Fellowship & Wages	200000.00
Intt. Received	7762.00	Travel Expenses	71640.00
		Office Equipment	5400.00
		Report Writing	98175.00
		Contigencies	53016.00
		Training & Workshop	268852.00
		Expenditure Total	697083.00
		Bank Balance A/c No. 52529	1290679.00
G. Total	1987762.00	G. Total	1987762.00

Foreign Contribution Account			
Receipt	Amount	Payment	Amount
Balance as on April,1 2012		Fellowship & Wages	696993.00
		Travel Expenditure	877614.20
UBI A/c No 518502010000010	11865238.26	POL & Vehicle of Maint.	86353.00
Interest Received	482512.00	Contigencies	593879.34
Fund Received		Fund Transferred	1081207.00
		Office Equipment	322134.00
GBIF-Indian Pilot Project		Field Equipemt	0.00
Global Biodiversity Information Facility Secretariat, Universitetsparken 15 DK-2100 Copenhagen, Denmark	342550.00	Base Camp Expenses	8908.00
Global Biodiversity Information Facility Secretariat, Universitetsparken 15 DK-2100 Copenhagen, Denmark	343999.00	Boarding & Lodging	1479285.00
GBIF-Mentoring Project		Report Writing	600472.00
Global Biodiversity Information Facility Secretariat, Universitetsparken 15 DK-2100 Copenhagen, Denmark	209070.00	Advance for Payment	133070.00
Conserving Great Indian Bustard Occupied Landscapes through Scientific Understanding and Participatory Planning			
The Mohamad Bin Zayed Species Conservation Fund	325875.00	Total Expenditure	5879915.54
Workshop of WII-NINA-GBIF Project "Capacity Building in Biodiversity Informatics"			
Narwegian Institute for Nature Research (NINA), Norway	177675.00		
Participation Fee (Go4BioDiv parallel to CBD-COP11)			
University of Tasmania, Australia	68270.00	Balance as on 31st, March 2013.	
Deutsche Gesellschaft fur Internatinale Zusammenarbeit (GIZ) C/o ASEAN Centre for Biodiversity, Philippines	276764.00	*UBI A/c No 518502010000010*	12907832.72
Australia Great Barrier Reef, Australia	65842.00		
Administracion Peninsula Valdes, Argentina	67550.00		
Dr. Michael (Deuteche Gesellschaft fur Internationale Zusammenarbeit (GIZ)	67510.00		
German Development Cooperation, Bangladesh	135500.00		
Erik Versluijs, Johan De Wittlaan 266-3, 6828ws arnhem, Netherlands	69540.00		
WWF Deutschland, Germany	138840.00		
UNDP-EGREE Project for Development, Hyderabad	1200000.00		
GIZ India Office, Deustscje Gesellschaft for Internationale Zusammenarbeit(GIZ) , New Delhi	68391.00		
Dr. Berthold Seibert (Project Dir.) Biodiversity and Climate Change Project (BCCP) Deutsche Gesellschaft fur internatinale Zusammenarbeit (GIZ), Philippines	133415.00		
Ms. Sabdra Spies "Concepts for sustainable waste management" GIZ Deutsche Gesellschaft Fur Internationale Zusammenarbeit, Eschborn	268832.00		
Sandee Collobative Project			
International Centre for Integated Mountain Development, Kathmandu, Nepal	480375.00		
GOI-UNDP-GEE Godavari Project			
Govt. of Andhra Pradesh Forest Department	2000000.00		
G. Total	18787748.26	G. Total	18787748.26

Monitoring of source population of tigers in Ranthambore Tiger Reserve			
Receipt	Amount	Payment	Amount
Opening Balance	4126176.40	Equipment	180472.59
Interest received	157638.00	Contingency	125222.00
		Fellowship & Wages	299440.00
		Travel	17777.00
		Vehicle Hiring	229072.00
		Procurement of Radio Collars & Accessories	118278.00
		Grant Total	970261.59
		Bank UBI-64	3313552.81
G. Total	4283814.40	G. Total	4283814.40

Radio collaring of Tigers in Sunderbans Tiger Reserve			
Receipt	Amount	Payment	Amount
Opening Balance	2477191.00	FA	162500.00
Interest received	60783.00	TA	11000.00
		Fellowship & Wages	433394.00
		Veh & Boat hiring	583541.00
		Equipment	268786.87
		Travel	29747.00
		Contingencies	133861.00
		Grant Total	1622829.87
		Bank UBI - 50546	915144.13
G. Total	2537974.00	G. Total	2537974.00

Monitoring Re-introduced Gaur in Bandhavgarh Tiger Reserve (MP)			
Receipt	Amount	Payment	Amount
Opening Balance	295487.29	FA	80000
Grants received	1350000.00	Purchase of radio telemetry items (4 GPS,11 VHF radio collars, 2 receivers, 2 antenas)	150487.9
Interest received	32746.00	Purchase of immoblization Equipment,accessories and drugs	262182.24
		Fellowship & wages	534767.00
		TA/DA for the researcher/Investigators	39595.00
		Vehicle POL and maintenance	257363.00
		Misc/Contingency	93484.00
		Grant Total	1417879.14
		Bank UBI - 50629	260354.15
G. Total	1678233.29	G. Total	1678233.29

Radio Telemetry Monitoring Souce Population of Tigers in Kanha Tiger Reseve			
Receipt	Amount	Payment	Amount
Opening Balance	2813423.61	TA	9000
Interest received	102784	Travel	53542
		GPS/Sat Collars	55647.43
		Drugs & eqpt	85073
		POL	237473
		Fellowship/Wages	379540
		Contingency	167261
		Grant Total	987536.43
		Bank UBI-50685	1928671.18
G. Total	2916207.61	G. Total	2916207.61

Ecological Monitoring of Tiger Population in Panna Landscape (MP)			
Receipt	Amount	Payment	Amount
Opening Balance	2496310.55	FA	50000.00
Grants received	5860000	Fellowship	435716.00
Interest received	62615	Wages	204633.00
		V/Hiring	605879.00
		Contingency	261993.00
		GPS Collars	60049.83
		Equipment	1304203.14
		Grant Total	2922473.97
		Bank UBI-50908	5496451.58
G. Total	8418925.55	G. Total	8418925.55

Monitoring of Re-introduced Tigers in Sariska Tiger Reserve			
Receipt	Amount	Payment	Amount
Opening Balance	486781.00	Fellowship	146323.00
Grants received	1375000.00	Field Asstt	399910.00
Interest received	24799.00	Vehicle Hiring	513492.00
		Purchase of Radio Collars	317413.39
		Satellite Data acquiring Charge	69659.73
		Misc/Contingency	159495.00
		Grant Total	1606293.12
		Bank UBI - 50545	280286.88
G. Total	1886580.00	G. Total	1886580.00

Development of Appropriate Techniques for minimizing Man Animal Conflict			
Receipt	Amount	Payment	Amount
Opening Balance	29484.00	Cost of Equipment procured/computer usage	34227.00
Grants received	328200.00	Contingency	829.00
Interest received	6319.00	Serice Tax @ 10.30%	36103.00
		Grant Total	71159.00
		Bank UBI - 50710	292844.00
G. Total	364003.00	G. Total	364003.00

Okhala Bird Sanctuary Management Plan			
Receipt	Amount	Payment	Amount
Opening Balance	490287.00	Stationary	13513.00
Interest received	12672.00	Institutional Charges @ 15% of total	226350.00
		Grant Total	239863.00
		Bank - UBI - 50885	263096.00
G. Total	502959.00	G. Total	502959.00

Procurement of Satellite and VHF collars for study of tiger behaviour			
Receipt	Amount	Payment	Amount
Opening Balance	552191.00	Bank UBI - 50709	574562.00
Interest received	22371.00		
G. Total	574562.00	G. Total	574562.00

Impact of Global changes on species composition in Western Himalayas:HP [A/c 51164]			
Receipt	Amount	Payment	Amount
Opening Balance	203159.00	Fellowship	109161.00
Interest credited by Bank	3249.00	Travel	5855.00
Interest credited by Bank	1071.00	Wages	15200.00
		Equipment	35490.00
		Contingencies	7002.00
		Cash at Bank	34771.00
G. Total	207479.00	G. Total	207479.00

WII - Effect of Climate Change on Riverine Forests & Indicator species along river Gange in Uttarakhand			
Receipt	Amount	Payment	Amount
Grant Received	1092000.00	Equipment (GPS, Binoculars, Digital	164218.00
Interest Received	15079.00	Cameras, Notebook etc)	
		Fellowship & HRA	2710.00
		Honorarium	2000.00
		Total Expenditure	168928.00
		Forest Advance	20000.00
		Grand Total	188928.00
		Bank UBI - 10053319	918151.00
G. Total	1107079.00	G. Total	1107079.00

WII - BCRLI Project			
Receipt	Amount	Payment	Amount
Opening Balance	3855586.00	Training of Spearhead Teams	673150.00
Grant Received	9451000.00	Biological indicators for assessing conservation objectives	654157.00
Advances for FA/TA	115000.00	Ecological mapping	659199.00
		WII inputs/support	146305.00
		Lessons learnt visits	98316.00
		National Level Workshop	1016732.00
		Study tours	4253843.00
		COP, 11	1230653.00
		Online Scientific Journals	2489284.00
		Equipment	1053450.00
		Contractual Staff	677794.00
		Vehicle Hiring etc.	170719.00
		Consumables	140017.00
		Audit	132089.00
		Total expenditure	13395708.00
		Bank Balance	25878.00
G. Total	13421586.00	G. Total	13421586.00

(P.K. Aggarwal)
Finance Officer

(P.R. Sinha)
Director

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