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भारतीय वन्यजीव संस्थान
Wildlife Institute of India

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Director's Note

I am pleased to present the Annual Report for the period 2005-06 in a revised format approved by the Institute's Governing Body.

As a technical arm of the MoEF, the Institute continued to provide professional inputs in building capacity of wildlife managers and frontline staff through its wide array of regular and customized training courses. As part of the All India Tiger, Large Carnivores, Ungulates and Habitat Status Evaluation and Monitoring exercise, the Institute organized a national workshop for the Principal Chief Conservator of Forests and Chief Wildlife Wardens of States, Field Directors of Tiger Reserves in collaboration with the Project Tiger Directorate in New Delhi on 29th August, 2005 to apprise the participants of the new population estimation methodology for the country level estimation of tigers, co-predators and their major prey species. This was followed by four regional level training of trainers workshops in which over 300 forest and wildlife managers and frontline staff from 23 States participated. From February, 2006 onwards Phase-I of this exercise was initiated in 17 tiger range States. The Institute is gearing up to receive the Phase-I data and information from the States and to initiate the process of spatial analysis at a landscape level.

The Institute's faculty and researchers interacted with the members of the Tiger Task Force and the State Empowered Committee on Forest and Wildlife Management constituted by the Government of India and Government of Rajasthan respectively and also provided valuable inputs in planning and implementation of population estimation exercise for carnivores and herbivores in Ranthambhore and Sariska Tiger Reserves in Rajasthan.

The Institute made significant progress in furthering its wildlife research agenda by initiating several new projects in various regions and States of the country. The XIX Annual Research Seminar brought together over 300 researchers, scientists and field managers to interact and review the research projects.

The Institute continued to receive valuable guidance from the WII-Society, Governing Body and the Training, Research and Academic Council. On behalf of the Institute, I would like to convey our gratitude

to the members. The Institute also received vital support from the State Forest Departments, sister organizations, scientific institutions and civil society organizations for carrying out its activities in a collaborative manner. The Institute faculty, technical and administrative staff have worked hand-in-hand in successfully accomplishing the mandated activities and making the Institute a better place of learning. I take this opportunity to thank them all.

The previous year has been very satisfying and the coming year is going to be full of activities too. I am confident that the Institute will not only be able to maintain its present momentum but will also strive to exceed the same and would continue to accomplish the mandated responsibilities.



(P.R. Sinha)
Director

Role & Mandate



Vivek Sehajpal

Introduction

Our Mission

Aims & Objectives

Role & Mandate

Introduction

Wildlife Institute of India (WII) at Dehradun was established in 1982 and has emerged as a premier training and research institution in the field of wildlife and protected area management in the South Asian Region. The IUCN has recognized WII as one of the six regional institutions for capacity building in protected area management. From its inception, WII has had the benefit of collaboration with international organizations such as UNDP, FAO, USFWS, IUCN, UNESCO, etc. These have allowed 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.

Our Mission

The WII's mission is to nurture the development of wildlife sciences, and promote its application in the field in a manner that accord with our economic and socio-cultural milieu.

Aims and Objectives

- To build capacity and develop human resources in wildlife science,
- To develop as a centre of excellence in wildlife science,
- To provide consultancy and advisory services in wildlife conservation,
- To advocate issues relevant to wildlife science and conservation,
- To develop as a regional centre for South Asia and South-East Asia for training and research in wildlife conservation,
- To develop as a Deemed University in wildlife science.

Research Reports



Jeevan S. Jhal

Completed

Ongoing

Initiated

Ecology of otters in Corbett Tiger Reserve: Impact of Kalagarh reservoir on the habitat use pattern

Funding Source: Grant-in-Aid
Investigator: Dr. S.A. Hussain
Researcher: Shri Asghar Nawab
Date of initiation: November, 2000
Date of completion: November, 2005

Objectives: (i) To determine the status and distribution of otters in the Corbett Tiger Reserve (CTR) and the adjacent aquatic ecosystems; (ii) to identify the factors governing their distribution; (iii) to examine the habitat use patterns along the Ramganga main stream and the reservoir; (iv) to compare the feeding habits of otters between Ramganga main-stream and the reservoir, and (v) to examine associated threats to otter populations such as parasitic load, cases of poaching and destruction of stream habitats in the region.

Progress: Otters are obligately tied to aquatic environments and are recognized as one of the top predators in freshwater systems, and thus play an important role in the functioning of these systems.

The study was envisaged to appraise the impacts of making of dams on the ecology of otters in Corbett Tiger Reserve, as the habitat of otters has been fragmented due to the creation of a dam on the Ramganga River under the Kalagarh Multipurpose Hydroelectric Project. In India, it has never been quantified to what extent this affects the habitat use by resident otter populations and hence the findings of this study can be used to formulate a model for similar studies elsewhere in the country. In the Corbett Tiger Reserve both smooth-coated and Eurasian otters have been reported. The preliminary survey revealed that at the low lying areas such as the Ramganga, Mandal and Palain rivers, smooth-coated otter occurs. This study deals with smooth-coated otter in the above mentioned areas only.

The study reveals the occurrence of otters in three river stretches viz, Ramganga, Mandal and Palain. Of the total 380 plots sampled 15.5% ($n = 31$) proved positive, with maximum being recorded from River Ramganga (17.5%, $n = 14$) followed by Mandal (15%, $n = 6$) and (13.75%, $n = 11$) for Palain. Although intensive search were made, no signs of otter activity were recorded from Rivers Sonanadi and Kosi and the lake area. Relative abundance of otters was estimated as 0.35 per km for River Ramganga, 0.30 per km for River Mandal and 0.28 per km for River Palain. The surveys led to a detection of four otter groups identified in the study area. The range of 4 to 16 individuals recorded in 4 different groups can be considered wide enough to cover all possible variation. Inter-change of otter populations between Ramganga on the east of the reservoir and Palain and Sonanadi on the western side can be validated from radio tagging studies in these areas. This is specially so in light of absence of evidence of otter use of the reservoir areas.

Otter habitat appears to be extremely capricious but actually the living space is much more confined, linear following banks and shores. Otters in CTR were confined to middle stretches of the rivers, indicating relative preference for undisturbed areas. Their occurrence along Rivers Ramganga, Mandal and Palain is attributed to availability of shallow water, slow water current, clear water quality and prey availability. Otters tend to avoid reservoir area since it lacks the preferred habitat features. Although stream systems offer dispersal corridors over large distances, otters are highly selective in their habitat use and, as the study suggests they show considerable site specificity. This may be related to their limited diving ability and the availability of sites with suitable water depths to permit foraging amongst the substratum.

Catch per unit effort (CPUE) was calculated to determine the fish availability. River Mandal recorded (457.13 gm/hr/trap), River Palain recorded (502.23 gm/hr/trap) while River Ramganga recorded (1965 gm/hr/trap). Size class (cm) of fish species caught ranged between 3.9 ± 0.9 (*Puntius* spp) and 53 ± 2.08 (*L. dyocheilus*). Feeding habits of otters were studied by analyzing 499 scats. Collections were made from the entrance of dens, communal sprainting sites and feeding areas. Prey remains in scats were identified by the comparison of body parts with a reference collection of appropriate prey species. Diet of otter is represented by six prey categories (fish, crab, frog, insect, bird and mammal) in which fish (72.6%) was the most frequently occurring item and also formed the bulk (95.9%) of the diet. Five fish species were identified from 120 randomly selected scats, which belonged to two families. Members of the family Cyprinidae were taken more frequently, however, the bulk was formed by *Glyptothorax* spp. which belongs to family Sisoridae. Proportions of different fishes in the diet are assumed to depend on their swimming speed as well as abundance and slower moving species being apparently favoured. Seasonal variation in diet is thought to be affected by prey activity as well as abundance. Freshwater systems are very sensitive to land-use changes, and the otter seems to reflect that in its diet. Any comparison of diet among rivers and habitats is based on the assumption that spraints reflect food consumed in the general area, where the spraints were deposited. On this basis, the variation in otter diet among the different study (river) sites reflects fish availability.

Disturbance to otters was studied based on six variables viz, poaching, fishing, pollution, removal of sand and boulder, extraction of bank side vegetation and Livestock grazing. Among the used sites River Mandal recorded a maximum of 0.06 (60%) DI (disturbance index), followed by River Palain 0.02 (20%) and 0.01 (10%) for River Ramganga. Of the absence sites River Kosi recorded the maximum of 0.09 (90%) DI. Human presence along the riverbank was evident in areas that lay close to the vicinity of the reserve boundary, like village *Jamond* (along River Ramganga), village *Bhakuan* (along River Mandal) and village *Ramesera* (along River Palain). Fishing appeared to be the major form of disturbance and locals usually practice destructive methods such as, dynamiting 'ghan' or hammering and Ichthyotoxic plants. This leads to indiscriminate killing of large number of fish (juvenile as well as brood fish) that adversely affects the population of fish and as well as water quality of the rivers. There is heavy browsing and grazing along the banks and the mere presence of the cattle itself may dissuade otters from landing. The local people also resort to burning of undergrowth in order to enhance the growth of

fresh crops of fodder. The net result is that the banks are denuded of vegetation cover for the otters, making it too open for them to come to land escaping the predators. Sand mining is one of the major commercial activities associated with River Kosi, however, within the protected area sand and boulder extraction were recorded along River Mandal (village *Bhakuan*), which is for personal use by locals. The depletion of sand from banks decreases the number of sites, where otters can groom and bask. The study indicates that human activity affects otter activity negatively but that this influence can be modified by other habitat variables. Therefore, it seems that otters can use rivers and streams with reasonable disturbance activities, albeit it provides secure refuge/prey.

Outputs and Outcomes: The findings of this study emphasize this relationship and indicate that activities, which detrimentally affect the otter's habitat and that of its prey should be discouraged. CTR can be considered as a safe heaven for otters, particularly in the Ramganga River and the middle course of the Palain River. The value of the reserve as otter heaven relates to the availability of key habitat features and a broad prey base. The detailed approach adopted in the present work is clearly necessary to begin to understand the precise relationships between otter distribution and ecology and habitat attributes – information that is essential for conservation measures and the implementation of management practices to encourage and maintain healthy otter populations. In the light of the results of the present study following management recommendations are suggested, highlighting need for habitat management, public education and long-term monitoring programme:

- (i) Control burning along the riverine stretches, though a well adopted practice by the forest department deteriorates the habitat and growth of riparian vegetation, which otherwise serves as escape cover to small mammals such as otters. Hence, it is recommended that a buffer of about 25 m of riparian vegetation should be left unburnt or controlled while carrying out routine practices such as control burning.
- (ii) It is suggested that soil erosion in the catchment areas be prevented and this is possible only by preserving the catchment forests.
- (iii) Interviews with locals revealed their ignorance of otters and their importance to wetlands hence, it is crucial to take people into confidence by creating awareness to generate sympathetic attitude towards otters.

It is stressed that long-term monitoring programmes be initiated by forest department to maintain otter records. Surveys may include searches for habituated and non-habituated (deserted) den sites, presence of otter signs per km stretch (for computing relative abundance) and recording of presence of sufficient riparian cover. The methods used need not be rigorous but should be simple, less time consuming and cost effective. Otter sighting logbooks can be maintained at respective rest houses and visitors encouraged recording their sightings as, date, place and numbers seen. Such information collated can eventually be used for comparisons either seasonally or annually and later can be verified through rigorous fieldwork and other statistical procedures.

Diversity and rarity in floral and faunal assemblages in the western Himalaya: A study of patterns and mechanisms to devise viable conservation strategies



Funding Source: Grant-in-Aid
Investigators: Dr. V.B. Mathur and Dr. Kevin.J.Gaston
Researcher: Shri Rashid. H. Raza
Date of initiation: June 2001
Date of completion: June 2005

Objectives: The objectives of this project are: (i) to determine the patterns and relationships of plant and bird diversity and rarity along a complete altitudinal gradient (from foothills to 5000m), (ii) to identify and investigate the relative role of different mechanisms in generating the observed patterns of diversity and rarity, (iii) to identify altitudinal zones and habitats of high diversity and rarity and hence of conservation importance, and (iv) to develop guidelines for meeting biodiversity conservation goals based on understanding of the processes generating diversity and rarity patterns.

Progress: The fieldwork of this project was carried out from July, 2001 to June 2004. The data was analysed and interpreted and the final project report was submitted in July, 2005.

Outputs and Outcomes: The study adopted a macro-ecological approach in arriving at statistical generalizations emerging from the analyses of distribution and abundance patterns of woody plants and birds along the altitudinal gradient. The study identified key patterns of composition, species abundances and species diversity along a large altitudinal gradient and attempted to understand some of the mechanisms associated with these patterns. An advantage of comparing taxa with very different life strategies is that it leads to better understanding of the complexity of the underlying mechanisms.

Composition of both plants and birds seem to be strongly governed by altitude. The compositional changes along the gradient are congruent and seem to be generated by a common mechanism. Himalayas are known to be a meeting point of three biogeographic realms. The floral and faunal diversity of these very different realms arrange themselves altitudinally along climatic zones most favourable to each group. This is amply demonstrated from the distinct biogeographic affinities of avifauna of different altitude zones. There is a distinct tendency for higher elevation communities to have affinities with source pools at higher latitudes. This suggests a latent physiological basis for community zonation as well. The range limit analysis for woody plants show an abrupt increase in lower altitude species meeting their upper range limits at around 2200 m. This suggests cold intolerance (and frost) to be an important limiting factor for plant species of subtropical origins. The distribution and abundance relationship is remarkably congruent in both woody plants and birds. Strong positive correlations are present between different measures of frequency of occurrence and abundance. Altitude range, a measure of environmental amplitude of species also relates positively with frequency

and abundance although after a level abundances become invariant to increase in altitudinal range. This suggests that greater environmental amplitude may have a role to play in giving an advantage to species but it may not be the only factor. Greater availability of habitat or resources can also help species achieve higher frequency and abundance. Body size is likely to have a strong influence on the density, a species can achieve. Thus, together with species intrinsic life history attributes such as bodysize and feature of the environment such as how abundant the resource of the species is, determines the frequency, abundance and hence the total population size of that species. For woody plants those species, which achieved greater site occupancy also had consistently high maximal abundance *i.e.* they occurred at high abundance at a given site as well, however, at low frequencies both very high and low densities occurred. This suggests properties related to growth rates as well as greater availability of resources of these plants.

Diversity of both the groups shows contrasting patterns yet some similarities. Plant diversity by and large declines with altitude, whereas bird diversity seems to have a plateau and then declining relationship with altitude. Though in both groups highest diversity does occur at low elevations. The interpolated richness shows multimodal patterns in both cases and in both cases the peaks are coincident with ecotonal effects or zonal feedbacks. Site diversity shows a complex pattern and high and low diversity occurred at all parts of the gradient except for the highest elevations. Thus, there does seem to be a strong component of greater compositional dissimilarity across sites in a zone, contributing to the overall zonal or gamma diversity. Adequate coverage of the variability in each zone would be important in conserving the diversity resident along compositionally distinct zones.

Plant diversity seems to be more governed by climatic factors. Mean annual temperature declines linearly with altitude and it seems to be major correlate of plant diversity. It shows poor relationship with area in each elevation belt, whereas birds seem to relate well with area. Since birds are mobile and most of them migrate altitudinally in winter, they escape the climatic severity. Plants being sessile are strongly affected by cold, which seems to govern their diversity patterns. The Gori valley presents an exceptionally diverse assemblage of flora and fauna in a very short geographical span. A central reason for this wonderful display of biological diversity in the Gori basin is its large altitude gradient represented in a short geographical spread. The adequate conservation of its diversity would require protecting representative sites in each of its elevation zones. It has some excellent forest patches such as the Ghana Dhura area (and other areas falling in Askot WLS), which are currently protected. But importantly its degrading forests such as on the exceptionally diverse Chiplakot slopes also will have to be revitalised and the biotic pressure will have to be gradually reduced in order to ensure long-term conservation of its unique avifaunal diversity. In the past, hydroelectric dams have been proposed in the basin, which would impact the low elevation areas. It is important to recognise the uniqueness of the contiguity of the entire spectrum of life, from subtropical to alpine observed in this basin. Much of the high altitude bird diversity for instance may depend on availability of forests in the lower elevation, as a large number of birds are altitudinal migrants. These habitats would be necessary both as stepping-stones for winter migration in other areas as well as for critical winter habitats. Therefore, it is of vital importance that the integrity of the entire landscape be conserved and managed for biodiversity and not just high altitude habitats for a single species such as musk deer or snow leopard. Indeed, the importance of this landscape is much greater.



B. Bhaskar Acharya

Ecology of the dhole (*Cuon alpinus*) in Central India



Funding Source: Grant-in-Aid
Investigators: Dr. A.J.T. Johnsingh and Dr. K. Sankar
Researcher: Shri B. Bhaskar Acharya
Date of initiation: January, 2001
Date of completion: July, 2005

Objectives: The project aims to study: (i) Dhole habitat use and ranging patterns, (ii) food habits of dholes, (iii) dhole behaviour and social organization, and (iv) abundance of dhole prey species.

Progress: Field data, regarding home range and movements of three radio-collared dhole packs, their food habits from scats and kill data, and the abundance of their prey species, recorded in the preceding years was entered, analysed and interpreted.

Outputs and Outcomes: Radio-telemetry revealed that in Pench, dhole packs restrict themselves to a small area (15-20 km²) during the denning and nursing season (winter: Nov-Feb). Ranges increase (30-60 km²) gradually during post-denning (pup-rearing) season (spring-summer: Mar-June). A great increase in home range sizes (> 100 km²) occurs during the dispersal and pre-denning season (monsoon: July-Oct). Based on intensive tracking of an optimal pack of 14 dholes, it is concluded that 60-70 km² would constitute the ideal home range area required for a dhole pack. Consequently, Pench Tiger Reserve can ideally support 10-12 dhole packs. Based on direct sightings and indirect evidences, 6-8 dhole packs (80-110 dholes – density 0.1-0.3 dholes/km²) were estimated within the entire Tiger Reserve at the end of the study period.

Analyses of 725 dhole scats revealed that sambar was the most frequent prey item in dhole scats (nearly 50 %), followed by chital (38%). Significantly, 31 scats contained remains of langur. Prey selectivity analysis indicated that sambar was the only prey species preferred by dholes i.e. consumed more than their availability in the study area.

Most dhole kills (n=137) recorded, were that of chital (ca. 80 %), followed by sambar (13 %). Preference analysis of chital kills indicated that though the adult male class constituted most kills by number, it was the juvenile age-class that was preferred or used more than availability by dholes. In the case of sambar, half the number of kills were of the juvenile class. Adult females numerically dominated the populations of both the two major dhole prey species, chital and sambar. Chital, followed by langur, were most encountered dhole prey species from both line transects and road counts within the study area. Chital (115/km²) and langur (66/km²) attain vary high densities in Pench. Sambar densities (12/km²) were also relatively high for the species.

Milestone

This study has the distinction of being the first long-term radio-telemetry study of dholes anywhere in their geographical range, besides being the most in-depth study conducted exclusively on the dholes.



A.K. Gupta

Conservation ecology of endangered mammals in Trishna Wildlife Sanctuary, Tripura.



Funding Source:	Grant-in-Aid
Investigators:	Dr. A.K.Gupta and Dr. K. Sankar
Researcher:	Shri Sabyasachi Dasgupta
Date of initiation:	November, 2001
Date of completion:	July, 2005

Objectives: (i) To study the status, distribution, population structure, habitat use and food plants of the endangered mammals in Trishna Wildlife Sanctuary (TWS), (ii) to prepare land cover and vegetation maps of TWS, (iii) to identify major threats to the endangered mammals, and (iv) to suggest management recommendations for the conservation of target species.

Outputs and Outcomes: Total area estimated for TWS was 213 km² out of which 93.95 % was forest area. The ground flora of the area is represented by 96 plant families. The moist deciduous forest occupied almost one fourth of the total area of the sanctuary, followed by mixed Dipterocarpus forest: 16.56%, highly degraded sal forest: 9.67%, mixed bamboo forest: 8.92%, bamboo brakes dominated by *Oxytenanthera nigrociliata*: 8.29%, clear-felled/*jhumed*/open forest: 3.26%, water body associated vegetation: 0.68%, crop fields/agriculture land: 6.59%, habitation/home garden: 1.99% and barren land: 0.01%.

Density of gaur in the intensive study area (ISA) was found to be 1.5 group/km² and 5.9 individual/km². In the beginning of the study, it was estimated as 2.2 groups/km² and 6.8 individuals/km² respectively. There was no significant variation in the seasonal changes of group density or individual density of gaur in the area but across six different habitats there was significant difference in group and individual densities. Total 56 food plants were recorded as gaur food plants, which include 12 tree species, 22 shrubs and herbs species, 9 climber species, 13 grass species including 4 species of bamboo. Gaur food items are rich in crude protein, fibers and mineral as compared with other three study species. Gaur preferred relatively flat terrain on the hillocks or flat land and valley habitats in undisturbed areas.

Out of fifteen species so far recorded from India, six species namely hoolock gibbon, capped langur, Phayres' langur, pigtailed macaque, rhesus macaque and slow loris were present in the study area. During the study period, total population of pigtailed macaque within the ISA decreased from 107 to 80 individuals whereas capped langur population decreased to 62 from 76 individuals. Though there was emigration and immigration of individuals between groups but no new group formation was observed. For gibbon, ecological density and biomass estimated was 0.44 individuals/km² and 2.89 kg/km² respectively. The estimated ecological density and biomass of pigtailed macaque were 1.69 individuals/km² and 7.95 kg to 26.06 kg/km² respectively.

There was a 21.5% decrease observed in the biomass of pigtailed macaque during the study period. A total of 38 and 33 food items were eaten by capped langur during summer and winter respectively, whereas a total of 35 and 30 plant species contributed in the diet of pigtailed during these seasons. Gibbons diet included 14 tree species for fruits. Only 23 plant species were recorded in the list of food plants of gibbon during summer. Gibbon preferred terrain with more slope compared to pigtailed and capped langur and there was no significant seasonal variation for preferred terrain type by any of the study species.

The study stresses on the immediate need for providing protection to semi-evergreen and degraded semi-evergreen patch within the study area. Protection of gaur would require ensuring adequate grassy glades, dense cover, perennial streams and 'salt-licks'. An attempt should be made to maintain the available grasslands for the use of gaur and no cattle grazing should be allowed. Tree species of Moraceae family needs to be planted in the gaps as part of habitat improvement measures for primates. There is also a need to improve vegetation around water bodies.



Pushp K. Jain

Developing a spatial conservation protocol for Central Indian Highlands through a biogeographical analysis of birds and existing Protected Area network: A Geographical Information Systems approach



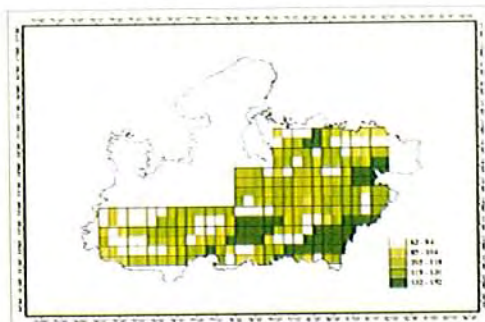
Funding Source:	Grant-in-Aid
Investigators:	Shri Qamar Qureshi and Dr. Ravi Chellam
Researcher:	Shri R. Jayapal
Date of initiation:	February, 2001
Date of completion:	February, 2007

Objectives: (i) To study ecological, environmental and socio-economic correlates of species diversity of breeding land birds in Central Indian Highlands, (ii) to investigate the spatial patterns of bird species richness, and (iii) to examine the adequacy of the current PA network in Central India and to identify potential areas of conservation significance using forest birds as indicator taxa.

Progress: During the reporting period, data on various spatial layers were procured and organized at the level of quarter-degree grids (15' X 15') in Central India. These include topography (NOAA/NGDC-GLOBE DEM), climate (CRU-IPCC 10-minute climatology for 1961-1990), land-use & forest-cover data (UMD-GLCF/AVHRR & FSI 1:250,000 toposheets), primary productivity (2002 monthly NDVI data from GIMMS-AVHRR/NOAA-16), human population (GPW, 1995 & India Census, 1990), night-light density (DMSP/OLS data from NGDC/NOAA), and drainage & road network (Sol 1:250,000 toposheets). All the layers were correlated with species richness of breeding land birds, which were earlier computed for each of the 284 quarter-degree grids through extensive field-surveys between 2002 and 2005.

Outputs and Outcomes: Among the climatic parameters, total annual rainfall, wet day frequency and moisture availability were found to be positively related to bird species richness. On the contrary, bird species richness decreased with increasing levels of mean temperature and diurnal temperature range. Inverse relationship between bird species richness and potential evapotranspiration was also observed. The results are consistent with the predictions of the 'water-energy dynamics' theory of species diversity, which postulates that water availability is the limiting factor for biological diversity at lower latitudes and energy balance constrains species diversity at higher latitudes. Among the other correlates tested, mean elevation range, forest cover %, landscape heterogeneity, and NDVI were found to contribute positively to number of bird species breeding in an area. Expectedly, area under crop-fields had a drastic negative influence over bird species richness. However, the inverse relationship observed between human population density and bird species richness was only weak, suggesting influence of urbanization as a strong covariate. This was also borne out by the negative correlation obtained between bird species richness and night-light density, a measure of urbanization.

Number of Bird Species





Ecology of the leopard (*Panthera pardus fusca*) in Satpura National Park and Bori Wildlife Sanctuary.



Funding Source: Grant-in-Aid
Investigators: Dr. Ravi Chellam and Shri Qamar Qureshi
Researcher: Shri Advait Edgaonkar
Date of initiation: July, 2001
Date of completion: July, 2007

Objectives: (i) To investigate leopard habitat use and preference, (ii) to examine the role of seasons, habitat, sex and social status on territory, ranging and habitat selection, (iii) to quantify the food habits and prey preferences of the leopard, and (iv) to validate and test various methods for estimating leopard numbers, densities, indices of abundance, and to recommend an effective technique for monitoring their population.

Progress: Quantification of leopard (*Panthera pardus fusca*) prey and habitat in Satpura National Park (NP) and Bori Wildlife Sanctuary (WLS) was done. A 280 km² intensive study area was chosen, mostly within the Bori WLS and some portion in Satpura NP.

136 km of jeep trails were uniquely marked every 500m. Vehicle transects were done along 115 km of jeep trails (effort = 388 km) to measure densities of leopard prey. Variables measured included species, group size, perpendicular distance and GPS location. Foot transects were done along 20 randomly laid line transects of 2 and 3 km length. A total of 404 km was walked in 2005-2006. Species, group size and angular distance were measured. Repeated presence-absence surveys of carnivore signs along 500 m sections of the same jeep tracks (totally 191 sections, 1276.5 km) were also conducted. The species monitored were leopard, tiger, dhole, sloth bear, jungle cat and palm civet.

Outputs and Outcomes: Densities of prey obtained using vehicle transects and foot transects were remarkably similar except for peafowl, where the densities for peafowl was higher with vehicle transects.

The percent occupancy (use) for leopards was calculated over 5 seasons using presence-absence of pugmark data from the marked jeep trails. Three sites spatially separated by 3 to 5 km were monitored. The data shows a seasonal dip in the percent use of one area by leopards, but the trend was not evident over three sites.

2788 camera trap nights were done in 75 km² of leopard habitat to calculate leopard densities. Eleven unique leopards were identified (4 male, 6 female and 1 unknown). Mark-recapture analysis indicates that leopard numbers are 11 (SE 0.4), giving a density of 14.6 per 100 km². Detailed analysis of data and final report writing are in progress.

Densities of major leopard prey (individuals per sq km).		
Species	Foot transect	Vehicle transect
Chital	4.3	3.4
Muntjak	2.9	2.1
Peafowl	1	5.2
Langur	34.1	34
Sambar	2.9	2.1

Characterization of species from bone, tusk, rhino horn and antler to deal wildlife offence cases



Funding Source: Grant-in-Aid
Investigator: Dr. S.P. Goyal
Researchers: Smt. Rina Rani Singh, Shri Sudhanshu Mishra and Shri Imran Khan
Date of initiation: July, 2001
Date of completion: July, 2007

Objectives: Various techniques viz. morphological, analytical and DNA based techniques are used to standardize protocols for identifying species in this project to strengthen Wildlife (Protection) Act - 1972 to control illegal trade in India. Thus, in the present project these techniques were used to accomplish following objectives: (a) to develop morphometric, crystallographic and DNA based techniques to characterize species from bones of major animals such as tiger (*Panthera tigris*), leopard (*Panthera pardus*), chital (*Axis axis*), sambar (*Cervus unicolor*), barking deer (*Muntiacus muntjak*) and swamp deer (*Cervus duvauceli*); (b) to establish species-specific characteristics of raw and finished products of Asian ivory and prepare protocols to differentiate from other similar products, used in the trade; (c) to investigate source-area of Asian elephant ivory; (d) to determine characteristics of rhino horn; and (e) to establish species characteristics and keys to identify antler of deer species.

Progress: Morphometric measurements were recorded for major bones of tiger (pelvic girdle-5, femur-8, ulna-2, humerus-3, tibia-2 and radius-2) and leopard (femur-3, scapula-1, tibia-3 and fibula-1) which were undertaken according to Driesch (1976). These will be used for distinguishing tiger and leopard bones from each other. Antler of hog deer was measured according to the data-sheet developed.

Scanning Electron Microscopy (SEM) technique was used to characterize surface (dorsal and ventral) structure of rhinoceros horn (n=2), fake rhinoceros horn (n=3), and surface areas (outer, cortex and core) of antler of swamp deer (n=4), tiger bones (n=3) and leopard bones (n=2).

Outputs and Outcomes: Antlers data was analyzed and based on angles and branching patterns, differentiation of antlers of various species was done. Overlaps in Fig. 1 need to be checked, but when angle measurements were used along with the branching pattern and morphological characteristics of antler of various species, it was possible to distinguish inter-species antlers correctly.

There was marked difference in the real and fake rhinoceros horn. In real rhino horn micro-graphs hairs were observed growing compactly, but in fake rhinoceros horn mostly hairs were not present except in one sample, where offender had tried to paste hairs but, those were far apart and easily visible

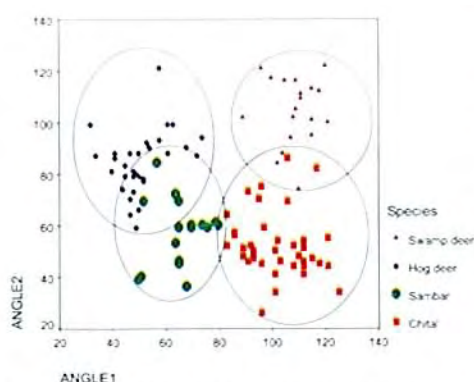


Figure 1: Scatter Plot of angles of antler of various aspects

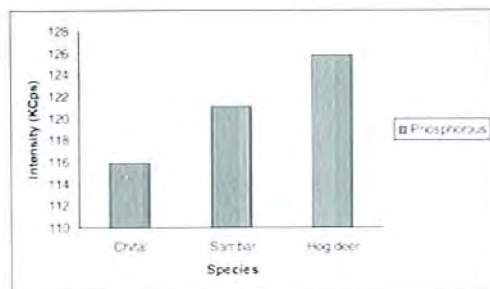


Figure 2: XRF intensities (KCps) of phosphorous in antler of various deer species

under SEM. Swamp deer micrographs also show differences in surface structure from antlers of other species. There was distinguishable difference in tiger and leopard micro-graphs of core portion as in tiger the surface topography was observed to be like reticulated structure, whereas they were interspersed on the plane surface in leopard holes. Thus, small piece of a sample can be differentiated and will serve as an identification tool.

One antler each of three species viz. chital, sambar and hog deer were used for XRF analysis. Data indicates significant difference in intensities (KCps) of calcium, phosphorous and strontium in antler of various species and follows similar trend i.e. hog deer > sambar > chital (Fig. 2). Intensities of zinc and potassium were highest in antler of sambar. Intensities of sulphur, chlorine and iron were highest in antler of chital. These elemental differences can be used to separate different antlers.

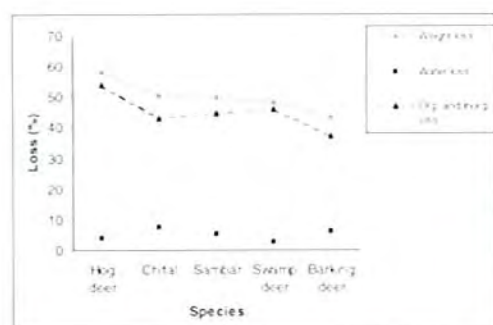


Figure 3: Average losses of total weight, water and organic and inorganic constituents of antler of various species

Thermo gravimetric data analysis of antlers indicates variation in average water loss and few lighter constituents pattern at 100°C. The average water loss pattern is as follows: chital > barking deer > sambar > hog deer > swamp deer. Average weight loss till 1400 °C is highest in hog deer and lowest in barking deer. Average loss of organic and inorganic contents of antlers of various deer species between 100 to 1400°C indicates that it is highest in hog deer followed by swamp deer, sambar, chital and lowest in barking deer (Fig. 3).

Sodium Dodicyl Sulphate Poly Acrylamide Gel Electrophoresis SDS PAGE) was run to examine the number of proteins bands (PB) present at different positions according to their molecular weights and was calibrated using low molecular weight SDS kit, in rhinoceros horn (PB=5), buffalo horn (PB=7) and fake rhinoceros horn (PB=0). The band positions in horns of rhinoceros and buffalo were different and will help in differentiating between these two species.

Isotopic analysis was undertaken for determining source of origin of Asian elephant ivory. Isotopic ratio of carbon, nitrogen and strontium (n=26) indicated that three different clusters were formed while plotting the mean value (Fig. 4). Thus, isotopic ratio would be helpful in determining the source of origin of Asian elephant tusk.

Suitable DNA extraction method was standardized from sambar antler. For DNA extraction, initially four different target regions viz. base, core, cortex, and outer portions were drilled. These drilled samples were ground to a fine powder under liquid nitrogen to make DNA isolation easy. Preliminary DNA extractions from samples of different target region of antlers were done by four different methods: (i) Phenol chloroform isoamyl alcohol treatment and alcohol precipitation yielded highly degraded and less than 100bp DNA. This quality of DNA was not sufficient for Polymerase chain reaction (PCR); (ii) Gene Clean Kit for ancient bone DNA (Bio 101® Systems, Q-BIOgene, USA), yielded 200bp to 300bp DNA. Since DNA was degraded, so gel purification method (Qia Quick® Gel Extraction Kit, QIAGEN GmbH) was used to purify the DNA product. This purification yielded a better DNA product but less than 180bp. In view of universal available primers for mitochondrial Cytochrome 'b' gene, this DNA product size was not suitable for PCR amplification and further analysis; (iii) CTAB + Isoamyl-chloroform extraction method, basically

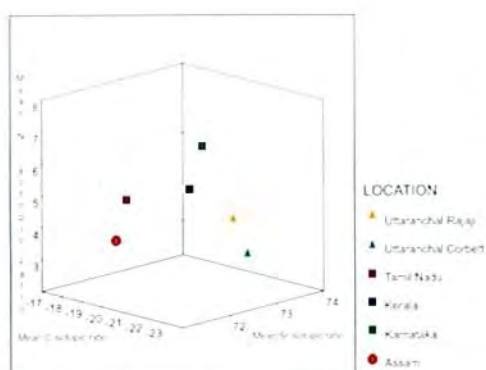


Figure 4: Scatter plot formed by mean isotopic ratios of Strontium, Carbon and Nitrogen

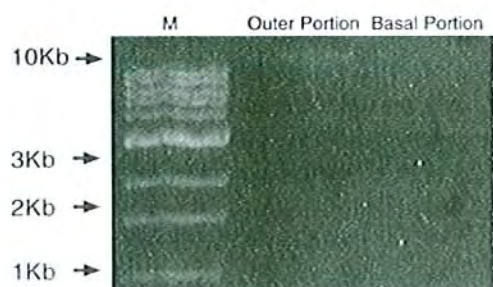


Figure 5: Electrophoretic analysis of sodium acetate precipitation method for DNA extraction from outer and basal portions of antler on 0.8% agarose gel, M = M W marker 1 Kb ladder

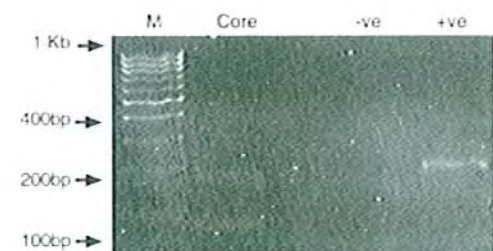


Figure 6: Electrophoretic analysis of PCR products of 146 bp fragment from the cyt b gene with DNA template from core portion of sambar antler on 2% agarose gel. M=M W marker 100bp ladder. -ve, negative control. +ve, positive control.

for the DNA extraction from bones, were used several times but there was no success in the extraction of DNA from antlers; and (iv) Sodium acetate precipitation method yielded a better quality DNA (150bp-180bp) from different target region of antlers (Fig. 5).

Thus, there is a strong need to standardize this method for cortex and basal portions for better yield. Failure of PCR amplification showed that there might be PCR inhibitors. Purification of DNA product was done using gel purification method (Qia Quick® Gel Extraction Kit, QIAGEN GmbH) and direct column purification method (Qia Quick® PCR Purification kit, QIAGEN GmbH). Gel purification method showed better quality and quantity than the direct column purification method.

Nuclear and mitochondrial DNA was extracted from frozen meat of sambar as reference sample using QIAGEN DNeasy tissue kit (Germany) to standardize PCR conditions with two fragments of 146bp & 381bp of mitochondrial cytochrome b gene. Then following the standardized PCR conditions, a 146 bp fragment from mitochondrial cytochrome b gene of DNA, extracted from sambar antler (core portion), was amplified successfully (Fig. 6).

Initially RFLP profiles were analyzed by using 13 restriction enzymes with 146bp amplified fragments of reference DNA sample. Above mentioned DNA extraction methods were applied with samples of target antler regions of sambar. Since the DNA yield was better with sodium acetate precipitation method than the other methods, therefore, this method was used to extract DNA from target antler regions. Out of 13 only 2 restriction enzymes viz. - Hae III and Nde II were cutting this fragment.



Social organization and dispersal in Asiatic lions



Funding Source:

Grant-in-Aid

Investigators:

Dr. Y.V. Jhala, Dr. Ravi Chellam and
Shri B.J. Pathak, IFS, CF (Wildlife)
Junagadh Circle, Gujarat

Researchers:

Ms. V. Meena and Shri Kausik Banerjee

Date of initiation:

March, 2002

Date of completion:

March, 2007

Objectives: The project aims to understand the social organization of male lion coalitions and the role they play in the population dynamics of Asiatic lions.

Progress: The Union Ministry of Environment and Forests, New Delhi has granted approval to radio-collar 20 lions. During the first phase, three male lions belonging to different coalitions were radio-collared in western Gir during December 2005 and January 2006. Satellite GPS collar and GPS/VHF collars were used for the first time on Asiatic lions. Data were collected on ranging patterns, dispersal, habitat and resource utilization from these lions. Additional lions within the protected area and outside are to be collared with GPS and satellite collars to address the objectives of studying dispersal and seasonal movement patterns.

Outputs and Outcomes: Habitat utilization models for lions were developed using data on prey distribution, vegetation types, human disturbance, livestock presence and water availability. The demographic data estimated average litter size as 1.9 (range 1-3, $n = 23$ litters of 43 cubs), 55% of the observed mortality in cubs was due to infanticide by male lions, 32% of the observed adult mortality was due to human caused accidental deaths. The average group size of adult females was 1.2 (range 1-4, $n = 97$) while adult male group size was 1.4 (range 1-3, $n = 72$). Analysis of predation data estimated 52% of lion kills were livestock. Wild prey kills were higher during summer months and constituted 68% of predation events.

The project is likely to be extended to cover aspects of demography including the study of dispersal by satellite telemetry on sub-adult lions and ranging patterns of lions outside of the Gir Protected Area in the coming years.

An assessment of ecodevelopment initiatives in Periyar Tiger Reserve

Funding Source: Grant-in-Aid
Investigators: Dr. Ruchi Badola and Shri A.K. Bhardwaj
Date of initiation: April, 2002
Date of completion: September, 2007

Objectives: (A) To examine the kind of inputs provided to local communities (Eco-development Committees) through eco-development programme. (B) To examine the impacts of such eco-development programme with respect to following parameters: (a) change in socio-economic conditions of local communities (EDC members) prior to and after the initiation of eco-development programme; (b) change in quantum of forest resource (fuel wood, fodder, and NTFP) use by local communities; (c) extent of park-people conflicts after the implementation of the programme; (d) state of attitudes of local communities (EDC members) towards conservation; (e) to examine the viability of EDCs formed under the eco-development; and (f) programme with respect to: (i) structure and membership; (ii) economic status (funds received/generated/invested/spent and audit system); (iii) capacity building of members; (iv) level of participation and empowerment of women and marginal groups; and (v) decision making and conflict resolution mechanism adopted; and (C) on the basis of above findings critically examine the factors responsible for the success and failure of eco-development initiatives with respect to Periyar Tiger Reserve and suggest measures for effective implementation of the future programme.

Progress: During the year, all the fieldwork for selected EDCs (Executive Committees) in the form of structured interviews could be finished. Household survey for 75% of the selected sample could also be covered. Questionnaires for the attitude survey of the staff could also be completed.

Outputs and outcomes: Data collection from the secondary sources is completed. Also the field data collection for the Executive Committees of the EDCs is over. Questionnaire survey for other stakeholders has also been prepared and circulated. Responses to the questionnaires are gradually coming.



All India coordinated project on the taxonomy of orchids



Funding Source:	MoEF, Government of India
Investigator:	Dr. G.S. Rawat
Collaborators/Coordinators:	Dr. Sathish K. Kumar, Tropical Botanical Garden and Research Institute, Thiruvananthapuram
Researchers:	Shri Jeewan Singh Jalal and Shri Pankaj Kumar
Date of initiation:	June, 2002
Date of completion:	December, 2007

Objectives: (i) Survey, collection, identification and preservation of orchids in the States of Uttarakhand and Jharkhand, (ii) to develop user-friendly identification manuals on orchids of these States, (iii) to train college students, teachers and local communities in para-taxonomy.

Progress: Extensive surveys were conducted in various eco-climatic zones of Uttarakhand and different forested areas of Jharkhand. Several localities reported by earlier botanists as orchid rich sites were revisited and new localities were also explored. For each species recorded in the field detailed morphological studies, population estimations and ecological notes were prepared. Detailed taxonomic treatment for various taxa is underway. For conservation awareness, posters on orchids have been designed for each State and same would be printed and distributed.

Outputs and Outcomes: A total of 60 species of orchids have been collected from the State of Jharkhand so far. Of these, 10 species are new to the State. Seven species were collected, which did not have authentic report from the State earlier. From the State of Uttarakhand, a total of 106 species have been collected including three new records and a few re-discoveries. In all, four papers have been presented in various symposia and six papers have been communicated for publication from the findings of the project.

Milestone

Three localities in Uttarakhand have been identified as orchid hotspots viz., Asi Ganga (Uttarkashi), Mandal (Chamoli) and Gori Valley (Pithoragarh). These localities have been recommended for *in-situ* conservation of orchids. Similarly, in the State of Jharkhand, Barka Pahar area near Dudol, Ranchi District has been identified as an important locality for orchid conservation. A detailed plan for the development of Orchid Park at this site has been submitted to the Forest Department, Jharkhand.

Status and ecology of Leopard in Pauri Garhwal. Phase II: Ranging patterns and reproductive biology of leopard (*Panthera pardus*) in Pauri Garhwal



Funding Source:	MoEF, Government of India
Investigator:	Dr. S.P. Goyal
Researchers:	Shri Devendra Singh Chauhan and Shri Bibek Yumnam
Date of initiation:	July, 2002
Date of completion:	June, 2006 extended to June, 2007

Objectives: The project was initiated in Pauri Garhwal District of Uttaranchal to understand the ecological and biological reasons of leopard-human conflict as frequent conflicts have been reported from this area. The study was conducted with the following objectives: (i) to determine ranging patterns in relation to topography, vegetation, prey (wild & domestic) abundance, land use patterns, human dimension and reproductive status; (ii) to study of reproductive biology with reference to frequency of pregnancy/extent of lactation; and (iii) to suggest mitigatory measures to minimize leopard-man conflict based on Phase-I and II studies.

Progress: Camera traps were used intensively in selected Intensive Study Areas (ISA) of various human-leopard conflicts (low, medium and high) zones. Trails were monitored in selected 20 km² of each conflict zone to understand the movement of leopards and find out suitable place to set camera traps. Total 10 camera traps were set for 192 nights on 8 different trails ranging from 1 to 2 km in low conflict zone. In medium conflict zone, 17 camera traps were set with 257 camera trap nights on 12 different trails ranging from 1 to 3.5 km. 12 camera traps were set with 204 trap nights on trail ranging from 1 to 2.5 km in ISA of high conflict area.

Leopard scats were collected from three study sites of different human-leopard conflict zones. A total of 140 scats were collected from different conflict zones. Scats were examined in reference to wild and domestic species. Prey species were identified based on the microscopic hair analysis (cuticular and medullary characteristics) and presence of hard parts such as bone fragments, teeth and nails present in the scat. Rodent species were identified based on mandible present in the scats.

Land use/land cover maps of the study have been prepared along with DEM (Digital Elevation Model), contour, drainage, village location and road network map.

Another aspect of the project was DNA genotyping and to identify sex of individual leopards from scats. Since obtaining traditional sources of DNA such as blood or tissue, from free-ranging, endangered mammals is logistically difficult, this is considered to be a preferred method.

Species identification was carried out by Polymerase Chain Reaction (PCR) using universal primers to amplify a short segment (~170basepairs) of the mitochondrial cytochrome b gene, followed by restriction enzyme digestion of the PCR products to obtain characteristic leopard profiles on electrophoresis. Characteristics of leopard DNA bands were obtained after PCR amplification and cleavage of reaction products with three restriction enzymes- BsuRI, Hinf I and Mnl I. Leopard specific primers for species identification from scats have also been designed, which were based on the conserved mitochondrial cytochrome b sequence.

Outputs and Outcomes: In ISA of low conflict zone, a total of 15 leopard photographs were obtained with 11 right flank photographs belonging to 4 individuals and 3 left flank photographs of 2 individuals. In medium conflict zone, a total of 28 leopard photographs were obtained with 18 right flank photographs belonging to 8 individuals and 10 left flank photographs of 4 individuals. In high conflict zone, a total of 21 leopard photographs were obtained with 11 right flank photographs belonging to 8 individuals and 10 left flank photographs of 7 individuals.

Distribution of leopard varied across the trails within ISA. Leopards were not photographed from 45% of total trails in ISA of high conflict zones and a total of 77% photographs were taken from three trails. In ISA of medium conflict zones, leopards were not photographed from 42% of total trails. Of the 12 trails, 79% leopards' photographs were taken from 4 trails. A total of 8 trails were monitored in low conflict areas in which leopards were photographed from three trails.

The capture frequency for leopard was estimated in different human-leopard conflict zones and found that high conflict zones had higher capture frequency 3.43/100trap nights. Capture frequency in medium and low conflict areas was 3.11 and 2.08/ 100 trap night respectively.

Large proportion (> 80%) of prey for leopard includes domestic species such as livestock and dogs in all categories. The contribution of wild prey species was 5% in low conflict areas, whereas it is 2.5% in high conflict areas. Among livestock, cattle contribute over 45% followed by dog (37.5%) in low conflict areas. In high conflict zones, dog is major prey which contributes over 45% and followed by cow (35%) whereas 45% and 42% is contributed by dog and cow respectively in medium conflict zones. Rodents were also the part of leopard diet in low (5%) medium (5%) and high (10%) conflict areas.

Roadside counts were carried to estimate the relative abundance of livestock. Number of livestock varied in three conflict zones and it was highest in low conflict areas. Among domestic prey species encounter rate of cow was highest (5.8/km n=117 km) in low conflict areas, whereas it was 3.9/km (n=132km) and 2.8/km (n=168km) in medium and conflict areas respectively. Roadside count appeared to be unsuitable for dog estimation as few dogs were sighted in all categories.

PCR sexing of leopard DNA was performed using primers developed for the leopard zinc finger gene (ZFY and ZFX) sequences (Goyal et. al. unpublished sequences). A control experiment was successfully carried out on four female

and four male leopards using high quality tissue DNA. Males (XY) were identified on the basis of amplification of both ZFY and ZFX fragments, while in females (XX) only the ZFX gene was amplified (Figure 1). The ZFX PCR product was 197bp long, while the ZFY fragment was 132bp. The test needs to be checked with prey species to address any artefactual amplification.

Another work in progress is the identification of individual leopards by using micro-satellite loci developed for domestic cat. During initial loci (n=9) screening on tissue DNA of leopards (n= 12), eight loci were found to be polymorphic, whilst one locus is totally monomorphic. More loci are being screened to identify the minimum number of micro-satellite loci, which must be used to generate individual specific multi-locus genotypes.

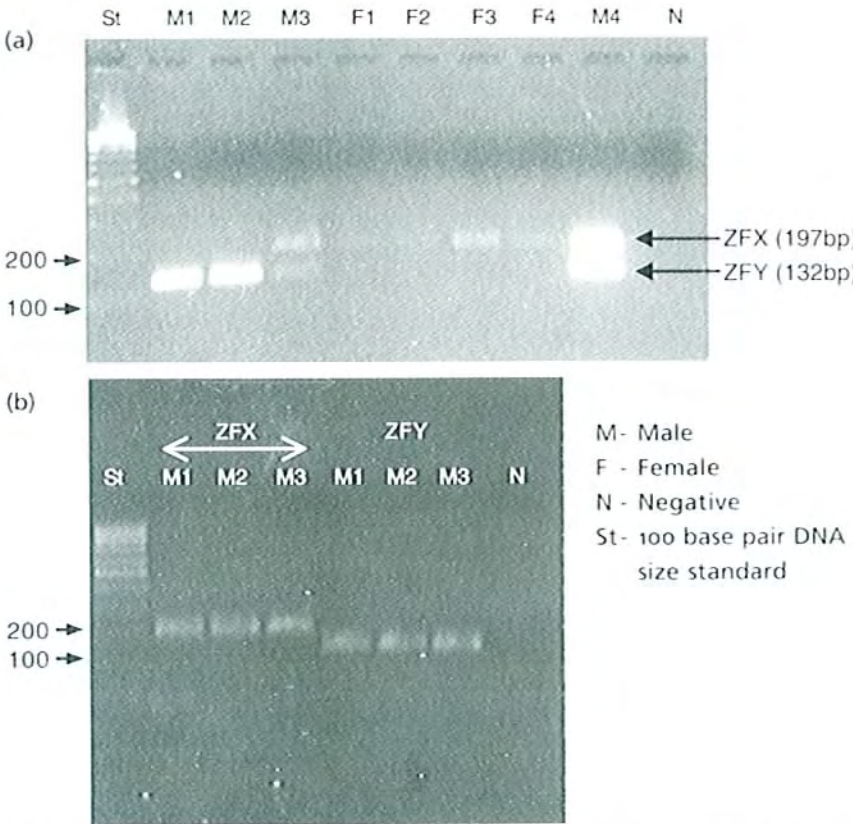


Figure 1: Sex identification of leopard tissue DNA. Note the non-amplified ZFX(197 bp) locus in two male samples M1 and M2 during (a) dual loci multiplex PCR, which was solved by (b) separate amplification of the ZFY and ZFX genes.



Strengthening field conservation through ecological studies, capacity building and conservation awareness in Ladakh Trans-Himalaya: A collaborative initiative



Funding Source:

WII, ISLT, SLC

Investigators:

Dr. V.B Mathur and Dr. Y.V. Bhatnagar

Participating faculty:

Dr. G.S. Rawat, Dr. S. Sathyakumar,
Dr. S.A. Hussain, Shri Qamar Qureshi,
Dr. V.P. Uniyal, Dr. B.S. Adhikari,
Dr. Karthik Vasudevan, Dr. Bivash Pandav and
Dr. K. sivakumar

Researcher:

Ms. Shivani Chandola

Date of initiation:

August, 2002

Date of completion:

July, 2007

Objectives: (i) Generate baseline information through targeted field surveys on rare and endangered taxa and add to the spatial database being developed at WII, (ii) develop resource material for conservation education of various target groups in Ladakh, and (iii) build capacity of the local Government Department(s) and Non-Government Organizations for wildlife monitoring and management of their wildlife-related natural resources.

Progress: For the purpose of "conservation awareness", ecological information available for the region was used for preparing the conservation education material. Hence, in collaboration with Centre for Environment Education (CEE), Ahemadabad, a poster series and an activity booklet 'Hardy Mountains, fragile environments', 'Monarch of the Mountains' were brought out, respectively, in 2003. Implementation of the conservation education component was done through organizing six "Snow leopard conservation education workshops" in Leh and Kargil districts of the region.

Outputs and Outcomes: About 150 school teachers, both primary and the middle level, were trained. In these workshops, concept of conservation education was introduced through set of four posters, activity booklet and interactive games. A questionnaire was administered to the participants to probe into their knowledge and attitude towards conservation education and snow leopard, and also get their feedback on the workshop. The survey revealed that the teachers had an elementary knowledge of conservation education, but they lacked specific knowledge on wild animal's ecology. Teachers in general harbored positive attitude towards conservation, but they also felt that Snow Leopard was a serious threat to people and thus they cannot live harmoniously.



Rohit Namwadekar

An evaluation of endemism of herpetofaunal assemblages in the Western Ghats using molecular techniques



Funding Source: Department of Biotechnology, Govt. of India
Investigators: Dr. Karthikeyan Vasudevan (WII) and Dr. Ramesh K. Aggarwal (CCMB)
Researcher: Shri M.S. Chaitra
Date of initiation: October, 2003
Date of completion: October, 2006

Objectives: (i) To ascertain whether currently recognized taxa represent true natural assemblages/species using DNA typing approaches; (ii) to evaluate the species richness and distribution patterns of *Rhacophoridae* and *Uropeltidae* using DNA sequencing of phylogenetically informative genomic domains; and (iii) if feasible, to develop few frog specific micro-satellite markers and use the same for understanding population structure of some members of the genus *Philautus* and *Uropeltis*.

Progress: Fieldwork in Kudremukh Forest complex, which includes Kudremukh Wildlife Sanctuary, Someshwara Wildlife Sanctuary and Mookambika Wildlife Sanctuary, was carried out. This involved sampling for members of *Rhacophoridae* (arboreal frogs) and *Uropeltidae* (burrowing snakes). The methods involved visual encounter surveys and digging in areas which were considered potential habitats for uropeltid snakes. The voucher specimens and tissue samples collected were preserved and stored using appropriate protocols. The tissue samples were analysed for four target regions.

Outputs and Outcomes: The data indicates that most of the endemic frogs in the Western Ghats are of Gondwana origin and evolved through vicariant events. It also revealed that the clade containing *Micrixalus*, *Nyctibatrachus* and *Indirana* are polyphyletic. Members of *Ranidae* probably evolved much before K-T boundary in the Gondwana landmass. The enigmatic microhylids *Melanobatrachus* and *Ramanella* may be closely related groups, but only detailed analyses will clarify the status of the subfamily *Melanobatrachinae*. Preliminary data analysis has clearly revealed that the genera *Ramanella* and *Melanobatrachus* are Gondwana in origin. This analysis also predicts a fact that both families *Microhylidae* and *Ranidae* are paraphyletic. It is hypothesized that the present day endemism in Western Ghats is due to Gondwana break up of land mass and vicariant evolution.



Monitoring changes in biological diversity after relocation of *gujjars* in Rajaji-Corbett Conservation Area

Bivash Pandav

Funding Source: Grant-in-Aid
Investigators: Dr. B.S. Adhikari, Dr. Bivash Pandav, Dr. Karthikeyan Vasudevan, Dr. K. Sivakumar and Dr. V.P. Uniyal
Date of initiation: November, 2003
Date of completion: November, 2008

Objective: The objective of the project is to monitor the changes in biological diversity after relocation of *gujjars* in Rajaji-Corbett Conservation Area (RCCA).

Progress: As a pilot program of the Uttaranchal Forest Department, 74 *gujjar* settlements have been shifted out of ca. 150 km² from the Chilla Range along the eastern part of Rajaji National Park (RNP). Taking into account the improving status of the protected area and relieving pressure from human habitation within Chilla Range of the RNP, a systematic program to monitor the changes in biological diversity was initiated after the relocation of *gujjars* in the area.

During the reporting period, studies on soil and water quality, floral survey in the grassland area, inventorization of insects, status and distribution pattern of resident avifauna, status and wildlife use of Chilla-Motichur corridor, and prey density and tiger distribution pattern in the Chilla range were carried out.

Outputs and Outcomes: The analyzed results of water quality parameters were compared with permissible limits of Bureau of Indian Standards (BIS) for drinking water. It was observed that Na, Mg, and Ca contents were found to be higher than BIS limits in undisturbed sites. The other elements like Zn, Fe, Cu, Mn, As, and Hg were found below the detection limits in the water samples. A total of 240 plant species were identified and recorded from the grassland area. A total 14 families of Beetles (Coleoptera) and five families of butterflies (Lepidoptera) have been reported from the study area. Preliminary analysis of bird study shows that a total of 114 species have been breeding here and the resident birds seem to be increasing in numbers, however, it is too early to correlate these results with disturbance factors. The prey density in Chilla area suggests that tiger density has increased and the area can attain even higher tiger density. Once the population of tiger increases the dispersal of tiger to adjoining areas is imminent. The current status of Chilla-Motichur wildlife corridor revealed that it is still functioning as a conduit for wildlife populations across Ganges.



Tiger population and habitat status evaluation in Satpura Maikal Landscape

(Collaborative Project between Project Tiger Directorate, M. P. Forest Department & WII)

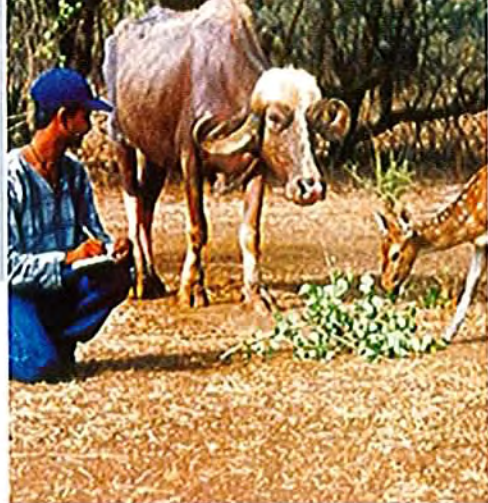


Funding Source:	Project Tiger Directorate
Investigators:	Dr. Y.V. Jhala, Shri Q. Qureshi, Dr. R. Gopal and Shri K. Nayak
Date of initiation:	April, 2003
Date of completion:	December, 2009

Objectives: The project objective is to develop simple but scientifically robust protocols for monitoring tiger status, population trends, habitat occupancy, tiger prey status, habitat and anthropogenic pressures.

Progress: About 50,000 km² covering 3150 beats and 178 ranges were sampled by the frontline staff of the MP Forest Department in the Satpura-Maikal Landscape based on protocols developed for the project. The first phase of data collection, data entry and analysis were completed. The second phase of intensive research level data collection for developing effective strip width models for different habitats and calibrating tiger sign index with actual population estimates were completed. Camera trapping for estimating tiger densities was done in Kanha meadows, Supkhar, Mukki, Phen Sanctuary, Satpura Tiger Reserve. Tiger density for Kanha meadows was estimated at 11-14 tigers per 100 km². A total of 4 tigers were radio-collared with standard VHF and GPS/VHF radio-collars during the reporting year. Data on ranging patterns, behaviour, predation, demography and dispersion is being collected.

Outputs and Outcomes: The project has resulted in development of protocols for monitoring tiger, co-predators, prey and their habitat for the entire country. The project will be able to provide an understanding of tiger dispersal that is vital for tiger conservation outside of Protected Areas i.e. at the landscape level.



Y.V. Jhala

Ecological monitoring of Gir



Funding Source:	Grant-in-Aid
Investigators:	Dr. Y.V. Jhala and Shri Q. Qureshi
Researchers:	Shri C. Dave and Shri K. S. Chauhan
Date of initiation:	January, 2004
Date of completion:	January, 2007

Objectives: The primary objectives of the project have been to continue with the monitoring activities proposed in the consultancy project done by WII for the Gujarat Forest Department. The specific objectives are: (i) to map the entire greater Gir region for land use and potential for lion movement between the protected area and the satellite populations of lions, and (ii) to further refine and continue with the population monitoring of lions, leopards and ungulates.

Progress: Data were collected on the resource utilization of livestock and wild ungulate (chital) to understand the role of livestock grazing in protected areas. Food habits, ranging patterns, habitat use, and density of resident livestock and chital were collected. Permanent grazing exclosures were constructed in areas used by livestock and wild ungulates and in areas devoid of livestock to understand the long-term trends in vegetation caused due to livestock grazing. Each block of the Gir Protected Area (PA) was sampled by foot transects in a systematic design to estimate ungulate densities. Wild ungulate populations were surveyed during the summer peak (pinch period) for body condition scores throughout the protected area. Condition scores, population densities and group sizes of wild ungulates will be compared in areas sympatric with livestock and those devoid of livestock to understand competition, if any between livestock and chital.

Maldhari Ness sites within the intensive study area were monitored on a weekly basis for data on livestock species composition numbers and age composition. Data were recorded on all natural deaths and carnivore predation events at each *ness*.

Outputs and Outcomes: The average density of livestock in the intensive study area was 25.44 km⁻² (Range 23 to 28), while wild ungulate population density was 25.33 (± 5.93 se) km⁻². The estimated number of lions in the intensive study area was between 13 to 17. Fifty one per cent of the biomass consumed by the lions in the study area was estimated to have been obtained from livestock. The economic loss to lion predation in the study area was estimated at Rs 8,300 per 100 livestock per year.

High resolution satellite imagery is being procured for mapping land use patterns around Gir PA. Ground validation of land use categories using hand held GPS unit has already been done in the greater Gir ecosystem.



An ecological reconnaissance of colonial nesting birds in Bhitarkanika mangroves, Orissa, India

Gopi G.V



Funding Source:	Grant-in-Aid
Investigators:	Dr. Bivash Pandav, WII and Dr. S.K. Kar, Orissa
Researcher:	Shri Gopi, G.V.
Date of initiation:	January, 2004
Date of completion:	December, 2007

Objectives: (i) To enumerate the number of bird species and individuals nesting in the heronry; (ii) to study the breeding biology of the birds in the heronry; (iii) to find out resource partitioning in terms of food and nesting requirements among breeding birds in the heronry; and (iv) to study the dependency of birds breeding in the heronry on areas outside the sanctuary limits.

Progress: Annual census of the heronry was carried out in August 2005, which revealed the presence of 11,819 nests on 4,221 nest trees. The breeding patterns among these birds were examined in detail.

Outputs and Outcomes: Egg morphometry studies revealed that white ibis produces larger eggs both in terms of length and mass while little cormorant produces smaller eggs both in terms of length and total mass. The variability in the nest initiation date to clutch initiation date revealed 8-10 days for herons and egrets, while cormorants and darters took 15-18 days to initiate the clutch. Asian openbill showed a delayed clutch initiation of 30 days after nest initiation. Clutch size varied between 2.5 eggs to 6 eggs per clutch across all species. White ibis and little egret showed the least mean incubation duration (18 and 19 days respectively) while darter and Asian openbill showed larger mean incubation duration (28 and 26 days respectively).

Productivity in terms of hatching and fledgling success was low (< 50%) for most species and only purple heron and darters showed higher reproductive success with > 50% eggs surviving till fledgling stage. Reproductive success was compared between edge nests and core nests, which revealed significant difference in success rates, thus indicating reproductive success was not random in space and spatial location played a vital role in higher success. Success rate was independent of their hierarchical order except for purple heron and darter which showed significant relationship between the chick hierarchical order and hatching success rate (*i.e.* older the chick, higher the survival possibility). Growth rate of chicks was highly significant with age, with older chicks showing better growth rate than the younger chicks across species.



Study of animal-habitat interaction in the buffer zone of Nanda Devi Biosphere Reserve

Funding Source: MoEF, Government of India
Investigators: Dr. S. Sathyakumar and Dr. G.S. Rawat
Researcher: Shri Tapajit Bhattacharya
Date of initiation: February, 2004
Date of completion: February, 2007

Objectives: (i) To assess the status of wildlife habitats along the gradients of human use, and (ii) to study the distribution, abundance and habitat use patterns of large mammals and pheasants.

Progress: During the reporting period fieldwork was carried out to assess the status and distribution of large mammals and pheasants, their habitat use between the altitudinal range of 3000 – 3550 m asl. This involved monitoring of trails and transects (n=7; 1.2 to 2 km) and scanning of the opposite slopes from selected vantage points.

Outputs and Outcomes: Eight mammals were encountered in the study area during the study period. Indirect evidences (tracks, signs, dungs, etc.) were recorded for mammals such as Common leopard (*Panthera pardus*), Himalayan Flying Squirrel (*Petaurista sp.*) and rodents. Encounter Rate for wild ungulates were 10.2 ± 1.9 individual/Scan for the Blue sheep (n= 15,204), 0 to 0.17 ± 0.11 /km walk for Himalayan Musk Deer (n=2, 2) and 0 to 1.00 ± 0.33 /km walk for Sambar (n=8, 10). The overall dung density of livestock and wild ungulates in permanent plots along the transects were 14.52 to 191.67/ha for livestock, 4.96 to 15.96/ha for Sambar and 0.79 to 6.75/ha for Himalayan Musk Deer. Clear pattern of change in the distribution and abundance of wild ungulates in response to the livestock grazing was observed. Blue sheep density was estimated as nil during presence of livestock grazing and 6.96 ± 1.3 individuals/km² when livestock grazing was absent. Estimates of the Encounter Rate and Dung density of the Himalayan Musk Deer was 0/km walk and 0.79/ha during the presence of livestock grazing and 0.17 individual/km walk and 6.75/ha when the livestock grazing was absent.

Out of 175 reported species of birds for this area, 64 species were seen during the study period. Himalayan Monal was most commonly encountered in the sub-alpine forests, "tree-line" and alpine regions of the study area.

Lakes Roopkund, Hemkund and the Nanda Raj Jat attract thousands of people, who camp in the Baideni-Ali and depend substantially on firewood from the sub-alpine forests. Local people and livestock graziers collect fire wood and medicinal plants from the study area. More than 4000 livestock (4128 goat & sheep and 233 cattle) used the study area for grazing in the alpine regions (3,000 to 4,000 m) from May to October.

Mapping of national parks and wildlife sanctuaries: A pilot project



Funding Source:	Ministry of Environment & Forests
Principal Investigator:	Dr. V.B. Mathur
Co-Principal Investigators:	Dr. P.K. Mathur, WII; Dr. S.P.S. Kushwaha, IIRS; Dr. A. Khan, AMU; and Dr. S. Sudhakar, NRSA
Research Associate:	Dr. Hitendra Padalia
Junior Research Fellows:	Ms. Ambica Paliwal, Ms. Neha Midha, Shri Amit Kumar Srivastava, Shri Shijo Joseph, Shri Pebam Rocky and Shri Mohit Kalra
Date of initiation:	April, 2004
Date of completion:	March, 2007

Objectives: The pilot study aims to generate accurate, reliable and up to date baseline spatial information on forest types and density (using satellite imagery) and topographic features (supplemented by latest satellite imagery), which will be of direct relevance for preparation/revision of management plans of wildlife sanctuaries and national parks. Efforts will also be made to incorporate the compartment-wise plant and animal density, that wildlife managers could use the information directly for conservation and management purposes.

Progress: Fieldwork was carried in the five pilot sites viz. Corbett Tiger Reserve, Uttaranchal; Dudhwa Tiger Reserve, Uttar Pradesh; Tadoba-Andhari Tiger Reserve, Maharashtra; Annamalai Wildlife Sanctuary, Tamil Nadu; and Kaziranga National Park, Assam. Spatial database at 1:25,000 scale is under preparation for the project sites for which topographical data would be provided by the Survey of India. During the reporting period, fieldwork in the five project sites focussed on the preparation of landuse/ landcover maps and detailed vegetation mapping.



Diclofenac project for vulture conservation

[Collaborative project of BNHS, WII and Royal Society for the Protection of Birds (RSPB)]



Funding Source:	Bombay Natural History Society
Investigators:	Dr. A. Rahmani, Director BNHS & Dr. Y.V. Jhala
Date of initiation:	April, 2004
Date of completion:	December, 2007

Objectives: The project aims to assess the prevalence of diclofenac a non-steroidal anti-inflammatory drug (NSAID) in vulture foods throughout India. The drug, being used extensively as veterinary medication has been implicated as the major cause for the catastrophic decline in vulture populations throughout South East Asia.

Progress: A simulation study has shown that if 0.1 per cent of carcasses eaten by vultures had substantial diclofenac concentration, then it would be sufficient to cause the catastrophic mortality observed in vultures. Samples from over 1900 livestock carcasses from the States of Rajasthan, Uttar Pradesh, Gujarat, Maharashtra, Jammu & Kashmir, Punjab, Madhya Pradesh, Andhra Pradesh, West Bengal, Bihar, Jharkhand and Orissa were collected.

Outputs and Outcomes: 1,400 samples have been analyzed for diclofenac content and 10% were found to be positive. About 4% of the carcasses contained a high dose of diclofenac that could potentially kill vultures, if consumed.

This study provides further evidence to show that the potential of diclofenac poisoning is real and is the cause of the observed catastrophic population decline in *Gyps* vultures throughout India.

Further sample collection and testing will show if the ban in the veterinary use of diclofenac is effective in reducing or eliminating its occurrence in vulture foods within the country.

Management of forests in India for biological diversity and forest productivity – A new perspective - Phase-II



Funding Source:	USDA Forest Service Collaborative Project funded under the US held Indian Rupee Fund (USIF), supported by FERRO, American Embassy
Investigators:	Indian Team - Dr. P.K. Mathur, Dr. Atul K. Gupta, US Team – Mr. Tom L. Darden, Dr. Martin Raphael, Dr. John F. Lehmkuhl, Mr. Richard Holthausen, and Dr. Bruce G. Marcot.
Researchers:	Dr. Anshuman Tripathi and Mr. Ashish Kumar
Date of initiation:	September, 2004
Date of completion:	February, 2007

Objectives: The Institute implemented a major project from January, 1996 to December, 2002 in collaboration with the USDA Forest Service. One of the objectives of the project was to conduct workshops and seminars to disseminate knowledge and begin the process of training scientists and managers.

Thus the Phase-II of 2.5 year duration is to work with State and site level field managers to develop specific plans and guidelines for implementing the recommendations presented in the technical report. Following are the objectives set-forth: (i) convene site level workshops involving field managers for each of the four Conservation Areas (CAs); (ii) prioritize issues and actions for each CA. Select a sub-set of issues for further work during the workshop; (iii) develop specific approaches for implementation of management recommendations on select issues; (iv) develop specific approaches for implement procedure for testing and monitoring management actions; and (v) describe key-steps to implement/execute recommendations and potential pilot projects (including specific tasks, responsibilities, fund requirements and schedule).

Progress: During the reporting period, primarily five site level workshops were organized wherein a large number of professional foresters, scientists, NGOs and other entrepreneurs participated. Two researchers working for the project also undertook work related to the preparation of manuscripts of research papers for publication. Four US scientists collaborating on the project visited India so as to attend different site level workshops and provided their valuable inputs.

Outputs and Outcomes: Site level workshops disseminated research findings and helped to determine priority implementation projects for each of the project site.



Ecological assessment of tiger beetles as indicators for monitoring biodiversity in Shivalik landscape

V.P. Uniyal



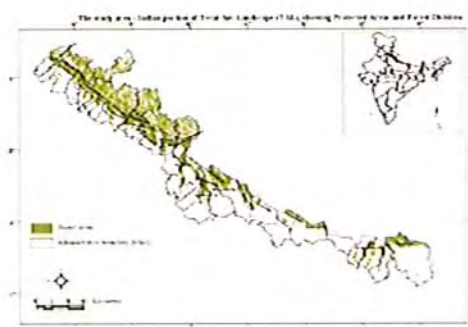
Funding Source: DST
Investigators: Dr. V. P. Uniyal and Dr. K. Sivakumar
Researchers: Shri Vinay Bhargava and Ms. Swati Kittur
Date of initiation: September, 2004
Date of completion: August, 2007

Objectives: (i) Assess species richness, distribution, and abundance of tiger beetles, birds, and butterflies in different vegetation types; (ii) Examine whether tiger beetle species richness is an indicator of biodiversity in the Shivaliks and if it correlates with the diversity of birds and butterflies, along different habitat types and gradients and which taxa is a better indicator at what scale.

Progress: A total of 26 transects were laid in different areas in the Shivalik region namely, Simbalbara Wildlife Sanctuary, Pong Dam Wildlife Sanctuary, Naina Devi Wildlife Sanctuary, Renuka Wildlife Sanctuary and Nahar Forest Division. The vegetation in these areas was studied using 10m x 10m plots. The transects were monitored for birds, butterflies and tiger beetles from April to September 2005 and February to July 2006. The fauna of some of the habitats that were sampled have previously not been studied extensively. Pong Dam is known for its diversity of birds, which is well documented, but no study of butterflies and beetles has been conducted there. This study is expected to provide baseline information on the diversity patterns and composition of species of birds, butterflies and tiger beetles for these areas. The data is being analyzed for further insights into the distribution of these three groups and their use as indicators of habitat quality.

Outputs and Outcomes: A total of 161 species of forest birds, 106 species of butterflies and 14 species of tiger beetles have been identified. Butterflies and beetles that could not be identified in the field have been collected for identification in the laboratory, which is now ongoing.

Evaluation of the functional status and quality of corridors connecting fragmented populations of tiger in the Indian part of Terai Arc Landscape (TAL)



Study Area: The study area (Indian portion of TAL) lies between the Yamuna river in the west (77° 30' E & 30° 30' N) and Valmiki Tiger Reserve (Bihar) in the east (84° 45' E & 27° 15' N). The entire stretch is ca. 900km long and 50-60km wide, covering ca. 42,700 km² with a forest area of ca. 15,000km². Administratively, it is spread across five States of India (Himachal Pradesh, Haryana, Uttaranchal, Uttar Pradesh and Bihar).

Funding Source:

Save the Tiger Fund, National Fish and Wildlife Foundation, USA

Investigators:

Dr. A.J.T. Johnsingh, Dr. S.P. Goyal and Shri Qamar Qureshi

Researcher:

Shri K. Rajapandian

Date of initiation:

November, 2004

Date of completion:

March, 2007

Objective: (i) To describe the functional status (use and intensity) of the corridors with reference to tiger, (ii) to study the biological characteristics (vegetation composition, prey distribution and abundance, and disturbance status) that determine the corridor quality and use, (iii) to document the socioeconomic issues affecting the corridor existence and its use.

The recent study (Phase-I) by Wildlife Institute of India (WII) in collaboration with Save the Tiger Fund (STF) and National Fish and Wildlife Foundation (NFWF) has identified ten Tiger Habitat Blocks (nine with tiger and one without) and ten corridors within the Indian part of TAL (Johnsingh *et al.* 2004). The corridors that have been identified in the Indian part of TAL in the Phase I are as follows (Figure 1): (i) Yamuna River corridor, (ii) Kansrao-Barkote corridor, (iii) Chilla-Motichur corridor, (iv) Rajaji-Corbett corridor, (v) Kosi River corridor, (vi) Nihal-Bhakhra corridor, (vii) Gola River corridor, (viii) Kilpura-Khatima-Surai corridor, (ix) Lagga Bagga-Sukhlaphanta-Tatarganj corridor, and (x) Dudhwa-Katerniaghat corridor. However, information about the functional status of these corridors is lacking and undoubtedly, this knowledge is vital for conservation plans ahead. Keeping this in mind, the Phase-II of this project has been initiated to assess corridors use by tiger, the habitat quality and socio-economic conditions of the people using these corridors.

Progress: Data have been collected from Laldhang and some part of Kotdwar ranges of Lansdowne Forest Division. The area between Chilla range, Rajaji National Park and Kanv Ashram in Kotdwar range, Lansdowne Forest Division was sampled during the survey. Eighteen, 2x2 km grids were sampled out of 32 grids and 174 vegetation plots and 174 plots for prey species pellet groups were laid in these grids (Table 1). Mehli, Nalgatti, Siya and Sikadi sots in Laldhang range, Lansdowne Forest Division were surveyed by foot for evidences of tiger presence and pugmarks were seen in all these sots.

Table 1: Observed pugmarks sets of tiger, leopard and bear during survey in Laldhang and Kotdwar ranges, Lansdowne Forest Division, Uttaranchal

Range	Transect name	Distance walked (km)	No. of Tiger pugmark sets seen	No. of Leopard pugmark sets seen	No. of Bear track sets seen
Laldhang	Mehli sot	3.5	2	2	1
Laldhang	Nalgatti sot	1.0	1	1	0
Laldhang	Siya sot	2.0	1	1	1
Laldhang	Sikadi sot	2.5	1	2	0
Laldhang	Samarriya sot	2.0	0	1	0
Kotdwar	Malan river	3.5	0	1	0

Outcome: Collected data from the vegetation plots and plots for prey species pellet groups is being analysed. The result from the surveyed area for the pugmark, track and other indirect evidences is summarized in Table 1.

Comparison of tiger (*Panthera tigris*) population estimated using non-invasive techniques of pugmark, camera trap and DNA based analysis of hair and scat in Ranthambore Tiger Reserve-Phase I



Funding Source:	Grant-in-Aid
Principal Investigator:	Dr. S.P. Goyal
Co-investigators:	Dr. K. Sankar and Shri Q. Qureshi
Researchers:	Shri Randeep Singh and Shri Udayan Borthakur
Date of initiation:	December, 2004
Date of completion:	June, 2007

This project aims at standardizing various protocols and sampling designs for collecting required data needed for estimating tiger (*Panthera tigris*) populations based on pugmarks, camera traps, and 'genetic identity' determined from scats and remotely collected hairs using DNA-based techniques. This study has been undertaken in order to compare these non-invasive techniques for tiger population estimation.

Objectives: The objectives of the project are to: (i) determine suitable sampling design, sample size and level of saturation in pugmark characteristics, if any, for identifying free ranging individual tigers based on pugmarks and camera traps; (ii) validate identity of individual tiger determined based on pugmark using photo identity; (iii) standardize techniques for collection of non-invasive sources of DNA samples by remotely collection of tiger hair using hair snares, and scats; (iv) development of protocols for extracting DNA from hair and scat and determine number of polymorphic micro-satellite loci needed for identifying individual tigers; and (v) prepare Phase-II proposal based on standardized protocols tiger population estimated by three methods.

Progress: The present study is the first attempt in India in developing protocols and to design proper sampling strategy for estimating tiger population from faecal DNA and possibly by using remotely collected hair. The aspects commonly dealt in this regards are collection and preservation of scats, remotely collection of hair, success rate of DNA isolation and PCR amplification, identifying minimum number of polymorphic micro-satellite needed to identify individuals in the sampled populations, allele drop out due to limitations imposed by degraded and low template or DNA concentration in faecal/hair DNA etc.

Six to ten camera traps were used during October 2005 to February 2006, with a total sampling efforts of 608 camera trapping nights. There were three camera trapping sessions of 20 to 30 days in two different sampling sites. A total of 37 tiger photographs (24 right flanks, 13 left flanks) were obtained of which 30 photographs were identifiable. During study period, maximum five different individuals were identified by stripe patterns.

Pugmarks of individual tigers with casts have also been collected. Quantification, characteristics and measurement of these pugmarks will be



Figure 1: Individuals identified on the basis of stripe patterns during study period.

done using SigmaScan Pro-4™ software (SPSS Inc., Chicago IL., USA) to determine the accuracy and precision of identifying individuals from various measures of pugmarks.

Jungle roads were followed for scat collection. Global Positioning System (GPS) reading and other secondary information for each sample was collected. A total of 64 scats were collected by road survey during the reporting period. It revealed that majority of the scats were deposited in clusters and also revealed that there was a decrease in the number of scats obtained with increasing replicate road surveys. Data indicated that minimum two road survey should be undertaken for maximum collection of scats. Other work related to DNA was in progress.



V.P. Uniyal

Effect of management practices on Spider diversity in Terai Conservation Area (TCA)



Funding Source:	Grant-in-Aid
Investigator:	Dr. V.P. Uniyal
Researcher:	Shri Upamanyu Hore
Date of initiation:	December, 2004
Date of completion:	November, 2008

Objectives: (i) To evaluate species diversity of spiders in all ecosystem of TCA, (ii) to examine the occurrence of spiders in burnt and non-burnt grassland area, (iii) to observe the habitat and species associations in different vegetation community, and (iv) to suggest appropriate measures for the management of grassland, woodland, wetland etc. on the basis of spider diversity.

Progress: Spiders were collected using six possible methods viz. aerial and ground collection, vegetation beating, litter sampling, sweep netting, pitfall trapping and direct searching along transect. Pitfall traps were used across different habitat types. At each sampling site, spiders were collected along 50 m transect length of 10 transects per habitat. Six pitfall traps were laid along a single transect line with the spacing interval of 10 m each. Transects were selected systematically within a stratified stratum to ensure the independent sampling protocol and minimizing spatial autocorrelation. Traps with plastic jars 11 cm deep with opening of 9 cm buried flush with soil surface filled up one third portions by 30% ethyl acetate and detergent solution. Aerial sampling involves searching leaves, branches, tree trunks, and spaces from knee height up to maximum overhead arm's reach. Ground collection involves searching on the leaf litter logs, rocks, and plants between low knee levels.

Outputs and Outcomes: Sampling was carried out in different vegetation and forest cover types in the study area viz, grassland, semi-evergreen woodland, sal woodland and riparian areas. Samples were collected to obtain a comprehensive representation of diversity from all possible micro-habitats along 108 selected transects (17 transects per forest cover types). So far 17 families, 37 genera and 68 species have been recorded along different transects.

Developing management capabilities for wild pigs damage control in agro-ecosystems in and around protected areas of India



Funding Source: Grant-in-Aid
Investigator: Dr. N.P.S. Chauhan
Researchers: Shri Kuldeep Singh Barwal and Shri Avadhoot Dilip Velankar
Date of initiation: December, 2004
Date of completion: December, 2008

Objectives: (i) To prepare habitat maps of Ranthambore National Park and peripheral areas in relation to wild pig occurrence, and quantify vegetation composition and structure within each habitat; (ii) Study the spatial and temporal distribution of wild pigs; (iii) Population status and socio-biology of pigs; (iv) To develop capture techniques; (v) Quantify habitat use and ranging patterns and study the diurnal activity on seasonal basis; (vi) Feeding habits and reproductive biology; (vii) Study health parameters of pigs; (viii) Assess the man-wild pigs conflict; (ix) To evaluate the use and efficacy of power fence in controlling crop damage; and (x) Suggest cost-effective methods to control wild pigs and mitigate agricultural crop damage.

Progress: For vegetation mapping, 40 transects, 1 km length each, in different habitat types within the park have been laid. There are 20 transects in Sawai Madhopur range, 11 transects in Khandar range and 9 in Kundera range. Information on tree, shrub and herb species cover, direct and indirect evidences of wild pigs and biotic pressure are being collected. Information on socio-biology *i.e.* group size, structure, age and sex classes are also being collected. Observations on reproductive activity, breeding season, success and behaviour are also being made.

Outputs and Outcomes: So far, 155 samples of faecal matter have been collected and air dried. Village survey is going on to assess the man-wild pig conflict. Information on agricultural crop damage pattern and crop preference is being collected on seasonal differences in specially designed questionnaire format. Out of 90 villages situated in the periphery of the park, 20 villages with severe crop damage problem have been surveyed. Some of the worst affected villages with wild pig problem are Indala, Khatuli, Padara, Mordungri, Jaitpur, Mai, Kushalpura, Chhan, Rawal, Baso, Shyampura and Bhadlav. Construction of pig-proof power fence and pig and nilgai-proof power fence of about 1.5 km have been completed at Jaitpur village, and are being monitored.

The wild pig group size varied from solitary animal up to 48 individuals, and there were seasonal differences. Pig and nilgai-proof power fences of about 1.5 km length been erected in Jaitpur village in the periphery of Ranthambore National Park. Preliminary observations showed that the pig movement into the fence areas could be effectively controlled by the power fence.



Conservation ecology of Sangai *Cervus eldi eldi* and its wetland habitat



Funding Source:	Grant-in-Aid
Investigator:	Dr. S. A. Hussain
Researchers:	Ms. Kimjah Lai Kipgen, Ms. Sangeeta Angom, Ms. Ngailian Vaiphei
Date of initiation:	December, 2004
Date of completion:	November, 2009

Objectives: (i) To monitor the extent and quality of habitat (*phumdis*) within the Keibul Lamjao National Park, (ii) to estimate the seasonal availability of browsing biomass for Sangai and associated grazers, (iii) to monitor the population of sangai in the Keibul Lamjao National Park so as to derive the population parameters such as density, demography and spacing, (iv) to quantify the basic needs of the species in terms of food, space and cover for sustained reproduction, (v) to determine the stocking rates of sangai and associated grazers in the Park, (vi) to examine the variation in the mitochondrial DNA as well as Nuclear DNA using control region and micro-satellite primers to gain a better understanding of the genetic population structure, and (vii) to explore the possibility of establishing a second home for sangai in wild within Manipur State.

Progress: The project was launched in December 2004 with the engagement of three JRFs. A reconnaissance of the field situation was made by the researchers. Detailed methodologies for achieving the objectives were finalized. The base camp was established in a quarter given by the Manipur Forest Department at Keibul village situated at the western periphery of the Keibul Lamjao National Park. The fieldwork for the project started from October 2005.

Ten enclosures were erected inside the park to estimate the biomass productivity. Dung counts are in progress to examine the habitat occupancy of sangai and hog deer in the park. The methodologies for population estimation of sangai and hog deer have been finalized and it is planned to do the population estimation during the first week of April 2006.

Samples from skin, hair and antlers of sangai and hog deer were collected from Manipur Zoological Garden and also from Keibul Lamjao National Park for genetic analysis.



Research and conservation of endangered and threatened fauna of Kutch: An integrated approach



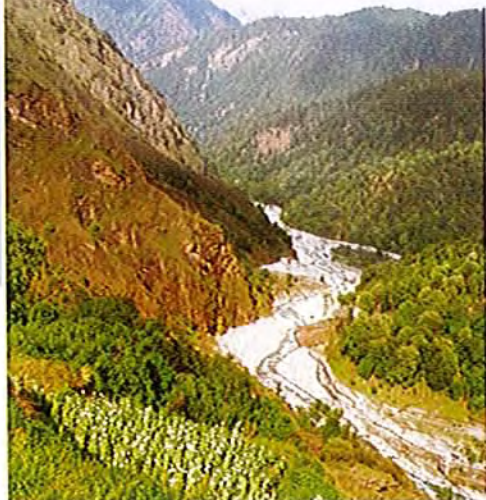
Funding Source: Grant-in Aid
Investigators: Dr. Y.V. Jhala, WII, Dr. A. Rahmani, BNHS and Dr. R. Sankar, SACON
Researchers: Shri Bopanna I.P., Shri Kamlesh Maurya and Ms. Chandrima Home
Date of initiation: December, 2004
Date of completion: December, 2009

Objectives: (i) To study the ecology and seasonal movement patterns of the Great Indian Bustard so as to develop an effective conservation strategy for the species in Kutch, (ii) to monitor the wolf, hyena, and caracal populations and evaluate the role of different mortality factors and dispersal in their population dynamics, (iii) to study the ecology of the Indian fox, (iv) to monitor the visiting populations of lesser floricans and Houbara bustards and study the migratory pathways and wintering habitats of the lesser florican, (v) to monitor the roosts and breeding status of vultures, (vi) to sensitize the local communities to the conservation needs of their endangered and threatened fauna, and (vii) to evaluate the ecological and economic sustainability of traditional pastoral practices, and evaluate the impact of wolf livestock depredation on the economics of these communities.

Progress: The project has several components including continuation of the work undertaken earlier as part of the USFWS funded project "Conservation of the Indian Wolf" i.e. radio-telemetry studies on wolves and striped hyenas. During the reporting period, data was collected on radio-collared wolves and hyenas in Abdasa, Kutch.

Outputs and Outcomes: 1700 vulture sightings were obtained from 7000 km of road transects sampled in 5 tehsils of Kutch for estimating encounter rates of vultures. Eighty six per cent of these sightings were of *Gyps* species. Sixty five nests of white backed vultures were monitored for estimating hatching and fledging success. Ratio of juvenile vultures to mature adults was estimated at feeding sites to evaluate post fledging survival. Fledging success during 2005 was 71% (mortality due to human causes was only 7%); post fledging juvenile mortality was estimated at 10%.

A study on food habits and resource selection by the Indian fox was conducted in the scrub and grassland habitats of Abdasa. Foxes were observed to be opportunistic feeders, though they consumed mammals, reptiles, birds, insects and fruits. They were found to subsist termites, rodents, spiny-tailed lizards and zizyphus fruits. For quantification of available fox foods, gerbils were live trapped and their populations estimated in different colonies. The number of burrows in a gerbil colony was found to be a good predictor of gerbil numbers living in that colony ($R^2=0.97$, $p<0.001$).

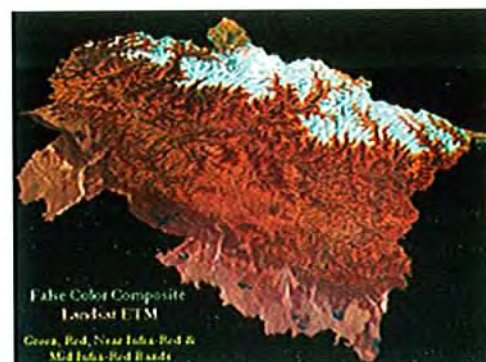


Key areas for long-term conservation of *Galliformes* in north-west India



Funding Source: IUCN/SSC/Pheasant Specialist Group
Investigators: Shri Qamar Qureshi (WII), Dr. K. Ramesh (WPA) and Dr. Philip McGowan (WPA)
Date of initiation: May, 2005
Date of completion: April, 2008

Objectives: (1) To develop a spatial database on the distribution of *Galliformes* species in north-west India, (2) to evaluate the role of existing PA network in *Galliformes* conservation, (3) to delineate key areas of conservation significance for these species in the landscape, and (4) to prepare conservation plans for key areas and species for each State covered under the project, describing necessary management and conservation inputs.



Progress: The project has so far completed fieldwork in most part of Garhwal region (Uttarakhand) and has also accumulated spatial data on various landcover features for future analysis linking species distribution and habitat attributes. Meanwhile, reconnaissance visits were made in Almora, Bageshwar and Champawat Districts in the Kumaon region where the fieldwork is to begin in the coming season. The future plan includes surveying for Himalayan Quail in the reported localities as well as the potential areas that can be predicted from spatially explicit species-habitat association model.

Outputs and Outcomes: The significant findings include records of Western Tragopan, a highly threatened and rare pheasant, in valleys much further east of Tons catchments, which is currently believed to be the eastern most limit of distribution range of this species. Variant of Himalayan Monal (*Lophophorus impejanus*) lacking typical white patch on the lower back were also observed on two occasions in Tehri District; such variants have been seen previously in Chamba District of Himachal Pradesh. Field observations suggest that regardless of protection status, considerable number of localities in the higher areas of Garhwal support substantial population of *Galliformes*. Landscape changes caused by human settlements and agriculture appears to have altered the condition decisively for some species, for instance, the Black Francolin (*Francolinus francolinus*) is moving further up replacing Kalij (*Lophura leucomelana*) in some areas.



Geospatial phytoresource inventory in the outer fringes of Kedarnath Wildlife Sanctuary, Garhwal Himalaya



Funding Source:	Department of Biotechnology, Ministry of Science and Technology, Government of India
Investigator:	Dr. G.S. Rawat
Collaborators/Coordinators:	Dr. P.S. Roy, National Remote Sensing Agency, Hyderabad
Researcher:	Shri Gajendra Singh
Date of initiation:	July, 2005
Date of completion:	June, 2008

Objectives: (i) To quantify the availability of major and minor forest products and their utilization by the local communities in the study area, (ii) to study the factors influencing the abundance and distribution of key phyto-resources in various ecological zones, (iii) to generate a spatial database on the distribution and abundance of major phyto-resources for future monitoring and conservation planning.

Progress: Fieldwork was initiated in the month of October 2005. Based on rapid survey of the area and consultations with the local people, a preliminary checklist of plants along with their use and local names has been prepared. All the seasonal livestock camps have been visited for geo-referencing and mapping of pressure zones. Crude maps of major forest types, land use practices, agriculture, fallow lands etc have been prepared for further geo-rectification and vegetation sampling. All the trails for sampling the representative vegetation types have been identified and marked for quantification of major phyto-resources and population status of key resources. Intensive quantification of these parameters has been initiated. To quantify the availability of major and minor forest products, the study area has been stratified into different macro-habitat types based on the predominant vegetation cover along the elevation gradient.

Outputs and Outcomes: Status of temperate oak forest in terms of structure, composition and peoples' dependence has been worked out.



Ecology of tigers in Pench Tiger Reserves, Madhya Pradesh and Maharashtra

Funding Source:	Grant-in-Aid
Investigators:	Dr.K. Sankar, Dr.Y. V.Jhala, Shri Qamar Qureshi, WII and Dr. Rajesh Gopal, Director, Project Tiger, New Delhi
Researcher:	Shri G. Dhanapal
Date of initiation:	September, 2005
Date of completion:	September, 2009

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

Progress: The fieldwork was initiated in Pench Tiger Reserve, Madhya Pradesh during October 2005. Fifteen line transects, which varied in length from 1.2 to 3.5 km, were permanently marked and walked thrice during winter and twice during summer to obtain density of prey species. Twelve vehicle transects, which varied in length from 10 to 12 km were monitored to study the relative abundance of prey species in different vegetation types during winter. Fifty five tiger scats were collected during the study period and analyzed for prey remains.

Outputs and Outcomes: The results showed that the following is the order of prey preference in tiger scats: chital>sambar>wild pig>gaur>nilgai. Information on age, sex, and body condition of tiger kills were collected whenever a tiger kill was found. A 200 cm tall density board marked into 20 blocks of 10 cm each, was used to find the stalking cover at the kill sites. In addition, information on tree cover, shrub cover, grass height etc. were also collected at each tiger kill site. Twenty seven kills of prey species made by tigers were collected during the study period. The prey selection pattern was observed to be more on adult animals of age group >3 years in cervids. The predation in chital was more biased towards males than females. The permission for radio-collaring three tigers (1 male, 1 female and 1 sub adult) has been obtained and the radio-collaring is scheduled during December 2006. Information on home range, movement, ranging pattern and habitat use will be collected from the radio-collared individuals.

Panthera tigris genome: Implications in wildlife forensics



Funding Source: Grant-in-Aid
Investigator: Dr. S.P. Goyal
Researchers: Shri Sudhanshu Mishra and Shri Sandeep Kumar Rajput
Date of initiation: October, 2005
Date of completion: October, 2009

Objectives: The present study is aimed to develop genotyping protocols of tiger with following objectives: (i) to develop and establish protocols for identification of tiger from various seizures in the form of skin, nails, whiskers and bones based on DNA techniques; (ii) to establish non-invasive genotyping of different population of tigers in India; (iii) to determine source of origin of various tiger parts and products seized under wildlife offences; and (iv) to study genetic diversity in different tiger population of India.

Progress: Nearly 200 scat samples from different tiger reserves were catalogued after drying the samples in oven at 55°C. These scat samples were collected from Corbett Tiger Reserve, Melghat Tiger Reserve, Palamau Tiger Reserve, Panna Tiger Reserve, Kalakad Mundanthurai Tiger Reserve, Kanha National Park and Rajaji National Park. Diameter and photographs were taken of all sample catalogued so far.

A reference DNA was extracted from known tissue sample of tiger (*Panthera tigris tigris*) by using DNeasy Tissue Kit (QIAGEN, Germany). This DNA sample was prepared to standardize PCR conditions for species, individual and sex identification and to standardize PCR conditions for primers of micro-satellite loci.

Polymerase chain reaction (PCR) conditions were standardized (Fig. 1 and 2) for amplifying partial fragments of different molecular markers using various primers (Table 1).

Table1: Primer pairs used for different molecular markers for identifying species, individual and sex

No.	Primer	Location	Product Size	Source
1	Primer 'A' (mcb898 & mcb 869)	Cytochrome b gene	471 bp	Verma <i>et al.</i> 2003
2	Primer 'B'	Cytochrome b gene	381bp	Meyer <i>et al.</i> 1995
3	Primer 'C'	16S rRNA	ca. 550bp	Guha 2005
4	Primer 'D'	Mitochondrial D loop region	ca. 250bp	Unpublished
5	Primer 'E'	Mitochondrial D loop region	ca. 550bp	Unpublished
6	Primer 'F'	ZFX/ZFY gene	ZFX-197bp ZFY-132bp	Unpublished

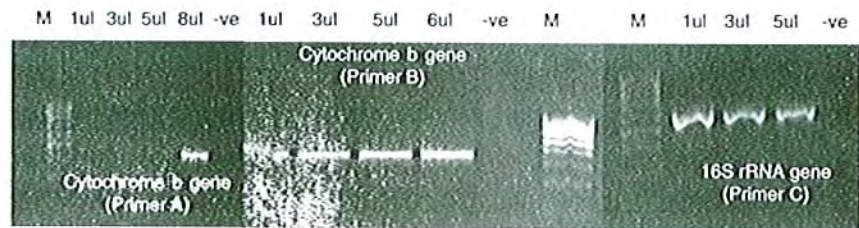


Figure 1. Optimization of PCR conditions for primers of cyt b gene and 16S rRNA gene with different template concentrations of reference DNA on 2% agarose gel. M, MW marker 100bp ladder. -ve, negative control.



Figure 2. Optimization of PCR conditions for primers of mt. D loop region and ZFX/ZFY gene with different template concentrations of reference DNA on 2% agarose gel. M, MW marker 100bp ladder. -ve, negative control.

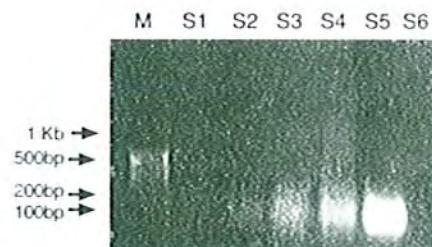


Figure 3. Electrophoretic analysis of DNA extracted from different scat samples (S1-S6) sample of tiger on 0.8% agarose gel. M, MW marker 100bp ladder.

Genomic and mitochondrial DNA was extracted (Fig. 3) from scat samples (probably of tiger) of Corbett Tiger Reserve using QIAamp DNA Stool Mini Kit (Qiagen, Germany). After initial optimization of scat DNA extraction method for limited samples (n=20) the success rate was 98% regardless of quantity and quality of extracted DNA.

Following the optimized PCR conditions, Partial fragments of mt. D loop region and ZFX/ZFY gene were amplified with scat DNA samples using primer 'D' primer 'E' and primer 'F' (Fig. 4) respectively. PCR conditions were also optimized to amplify partial fragment of amelogenin gene.

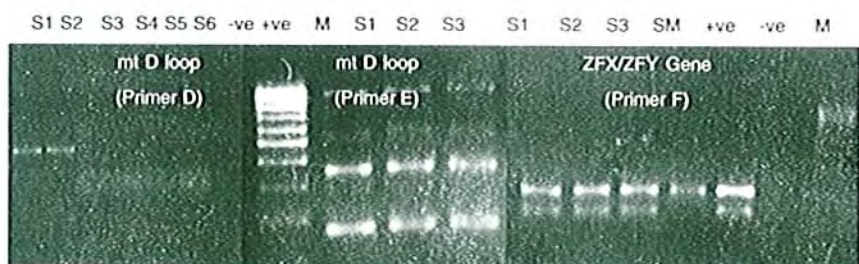


Figure 4: Optimization of PCR conditions for primers of mt D loop region and ZFX/ZFY gene with different template concentrations of scat DNA (S1-S6) on 2% agarose gel. SM, sambar. M, MW marker 100bp ladder. -ve, negative control.

Outputs and Outcomes: PCR conditions were optimized successfully with reference to DNA sample for identifying species, individual and sex. These PCR products were sequenced successfully to get reference sequences using DNA sequencer (Applied Biosystems 3130 Genetic Analyzer). Amplified PCR products of scat DNA samples were also sequenced successfully and these sequences were matched with their corresponding reference DNA sequences. Seventy per cent scats analyzed so far were found to be of tiger.

During the studies for sex identification from scat DNA samples using primers for ZFX/ZFY gene, there is a need to check its cross amplification with other species. This would enable use of these primers with scat DNA. Another primer pair for amelogenin gene was also used for sex identification from scat DNA samples, but success could not be achieved to amplify these fragments therefore more trials will be carried out.

Comparative study of man-leopard conflict and socio-economic impacts on rural community in Mandi and Hamirpur districts, Himachal Pradesh



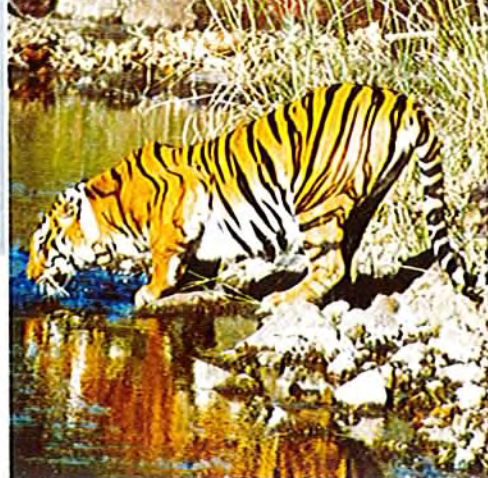
Funding Source:	Grant-in-Aid
Investigator:	Dr. N.P.S. Chauhan
Researchers:	Shri Devendra Kumar and Shri Lalit Kumar Sharma
Date of initiation:	December, 2005
Date of completion:	December, 2008

Objectives: (i) To prepare land cover and land use pattern maps and determine areas suitable to leopard using Geographical Information System, (ii) to study distribution and relative abundance of leopard in relation to habitat characteristics, (iii) to assess impacts of biotic pressures on leopard habitat, (iv) to study nature and extent of man-leopard conflict problems in relation to land use pattern, (v) to study food habits in relation to prey species (wild and domestic) availability, (vi) to study the socio-economic impacts of leopard menace on rural community, (vii) to make comparison of man-leopard conflict problem of Mandi and Hamirpur districts with that of Pauri Garhwal, (viii) to suggest measures to minimize/contain man-leopard conflict in Mandi and Hamirpur districts, and (ix) to develop education awareness package for people living in the vicinity of man-leopard conflict areas.

Progress: Information has been collected on human casualties and livestock killing by leopard from Mandi and Hamirpur districts by contacting the forest department, referring their records and interviewing the victims, their families and affected villages.

Output and Outcomes: In Mandi and Hamirpur districts, leopards were responsible for 259 human casualties, whereas black bear caused nine casualties, wild pig attacked eleven persons and monkey injured 9 persons during this period. A total of 7331 livestock killings by leopard were reported in Mandi and Hamirpur districts of Himachal Pradesh. Goat, sheep and cows suffered maximum in Mandi, Sunder Nagar, Joginder Nagar, Nachan, Karsog and Hamirpur Forest Divisions. Livestock killing showed much variation over the years, it showed increasing pattern from 1996 onwards. For stratified vegetation sampling, 23 transects have been laid in Hamirpur Forest Division and 24 transects in Mandi district.

To study the food habits of leopard, faecal matter samples have been collected. So far, 103 samples have been collected and air dried. Village survey is also ongoing to assess the socio-economic condition of local villagers. 23 villages have been surveyed and 73 families have been interviewed to collect information on agricultural crop damage pattern and crop preference in specially designed questionnaire format.



All India monitoring tigers, co-predators, prey & their habitat

(Collaborative Project between Project Tiger Directorate, WII & State Forest Departments)



Funding Source:	Grant-in-Aid
Investigators:	Dr. Y.V. Jhala, Shri Q. Qureshi and Dr. R. Gopal
Researchers:	A team of 40 researchers
Date of initiation:	2005
Date of completion:	2007

Objectives: The Project Tiger Directorate, Ministry of Environment & Forests, Govt. of India, entrusted the Wildlife Institute of India to develop and implement All India Tiger Status Evaluation and Monitoring in collaboration with the State Forest Departments. The tasks assigned to the WII were to: (i) develop an appropriate technical protocol and disseminate it to the State Forest Departments for implementation; (ii) to facilitate easy data entry at the State level, (iii) to collate and analyse the data for statistical inference in estimating tiger distribution and status; (iv) to generate spatial and aspatial data for modeling, evaluating and prioritizing landscapes for tiger conservation; and (v) to estimate tiger and prey densities in stratified samples within landscapes for long-term monitoring.

Progress: The Ministry of Environment & Forests, Govt. of India conducted a sensitization workshop for PCCF's & CWLW's of States to review the simple scientific protocols developed by the Wildlife Institute of India for monitoring tigers, co-predators, prey and their habitat in New Delhi in August 2005. Subsequently, after ratification, the protocols were published in the form of a field guide in English, Hindi, Marathi, Assamese, Bengali, Kannada, Tamil, Telugu, Malayalam, and Oriya. Over 50 thousand copies were distributed so as to reach each beat guard in 17 tiger States. 'Training of Trainers' workshops were conducted in Corbett, Kanha, Bandipur and Kaziranga National Parks for imparting field training of protocol implementation to trainers from various States. Special protocols were developed and workshops were conducted for the Sunderbans and the North-Eastern States considering their unique habitats. As and when required, the States were provided assistance with the training and field implementation of the protocols. The Phase I exercise was completed by the tiger States by March 2005. Special software was developed in Microsoft Access and Visual Basic for easy data entry at the division level of all States. over 1,000 hand-held GPS units were procured and supplied to the tiger States for recording coordinates of survey routes for subsequent GIS mapping. WII initiated data procurement and landscape level analysis for Phase II.

Outputs and Outcomes: The project will result in the country wide distribution and relative abundance mapping of tigers, co-predators and their prey. It will provide a basis for prioritizing and evaluating habitats for tiger conservation and for guiding landuse policy at varied scales of landscapes and small forest patches.



V. Deepak

Ecology of two endemic turtles



Funding Source:	Grant-in-Aid
Investigators:	Dr. Karthikeyan Vasudevan and Dr. Bivash Pandav
Researcher:	Shri V. Deepak
Date of initiation:	January, 2006
Date of completion:	January, 2009

Objectives: (i) To estimate the population density of Travancore tortoise and Cane turtle in a fragmented landscape; (ii) to quantify the diet of these two species and describe the feeding ecology with respect to their role in seed dispersal; (iii) to identify threats to the turtle population based on their habitat use, ranging pattern and food habits and recommend measures for their conservation; and (iv) to carry out a survey of these two species along the Western Ghats to ascertain the exact distribution in the context of Protected Area network in the region.

Progress: The study area was located in the Indira Gandhi Wildlife Sanctuary (IGWLS) and Parambikulam Wildlife Sanctuary (PWLS). In order to sample for the Travancore tortoise and Cane turtle the entire area was categorized into four major habitat types. These were: (i) evergreen, (ii) moist deciduous, (iii) teak plantation, and (iv) bamboo mixed jungle. The sampling design was developed based on recent literature on estimating site occupancy in wildlife populations. The sampling design for Travancore tortoise involved laying 2 km transects and running them in twilight hours from 1700-1900 hrs. These transects are identified randomly in each of the four habitat types and are marked so that they can be revisited. In these transects, at three randomly selected points habitat characterization and phenology of trees will be recorded. In the event of spotting the tortoise on the transect, similar data will be recorded at that location. Spotting the tortoise involved listening to the sounds that it makes as it moves on the ground trampling dry leaf-litter.

Outputs and Outcomes : Ten transects have been laid so far and each of them walked at least once. This effort has yielded sighting of two Travancore tortoises in evergreen forest. During the study, enquiry with locals yielded poor information on Cane turtle. Many of them did not know the species and often confused it for Travancore tortoise. Those who knew the species reported that the species was active in the morning and late evening hours. They fed on fruits of *Dileneia pentagyna*, wild mushroom, snails and carcasses. The sighting of this species is restricted to water courses. In the Anamalais, this species was earlier reported from Karian Shola (Kerala and Tamil Nadu part), Orukomban range in PWLS, Anaikundi Shola in IGWLS and Chalakudy Reserve Forest.



K. Sivakumar

Current status and conservation of the Nicobar megapode (*Megapodius nicobariensis*)



Funding Source: Grant-in-Aid
Investigator: Dr. K. Sivakumar
Date of initiation: March, 2006
Date of completion: August, 2006

Objectives: (i) To assess the present conservation status and distribution of the Nicobar Megapode *Megapodius nicobariensis*, (ii) to assess the habitat availability, threats and conservation of this species, and (iii) to identify the permanent sampling sites for continuous long-term monitoring of population and habitat of these birds.

Progress: A field survey was initiated from March 10, 2006 on the Nicobar megapode along with other coastal endangered species in the Nicobar group of islands in an effort to document the adverse impacts on their populations due to tsunami that occurred on December 26, 2004. During the reporting period, southern group of Nicobar Islands where *Megapodius nicobariensis abbotti* occur was surveyed. To estimate the total number of active mounds occurs in these islands, the coastline of each island was divided into two segments such as 'Potential coastal habitat for megapode (PCHM)' and 'Non-conductive coastal habitat for megapode (NCHM)'. Potential coastal habitat of megapode was identified based on the habitat preference of this species. Of the 313.95 kilometer long coastline, 94.9 kilometer long coastline was surveyed for Megapode.

Outputs and Outcomes: *Megapodius nicobariensis abbotti* now occurs on all the southern group of Nicobars. A total of 297 active mound nests occur on the southern group of Nicobar. It was estimated that 594 breeding pairs of megapode occur in the coastal forests of these islands. The largest population of megapode occurred on the Great Nicobar Group of Islands, where around 405 breeding pairs were estimated on the coasts and the second largest population was encountered on the Little Nicobar Island.

More than 90% of the mounds were built within 30 m distance from the shore and this preference for nesting near the beach is due to availability of certain substratum. It was assessed that the tsunami may have killed the coastal populations of megapode in the Great Nicobar group of islands. There was no terrestrial fauna and flora in the Megapode Island Wildlife Sanctuary. Entire megapode population in this Island is either extinct or flew to adjoining Great Nicobar Group of Islands (Kokoan area). Megapode population in the Trax Island is also either extinct or too small in number to detect.

Survey has just started and a summary report of the survey has been submitted to the Andaman & Nicobar Forest Department to take necessary management actions to safeguard the Nicobar Megapode on the southern group of Nicobar Islands.

Ecology of brown bear (*Ursus arctos*) with special reference to assessment of man-brown bear conflicts in Kugti Wildlife Sanctuary, Himachal Pradesh, India



Funding Source:	Grant-in-Aid
Investigator:	Dr. N.P.S. Chauhan
Researcher:	Shri Vivek Joshi
Date of initiation:	March, 2006
Date of completion:	March, 2008

Objectives: (i) To prepare land cover, land use, habitat maps, and quantify vegetation composition and structure in Kugti Wildlife Sanctuary, and determine areas suitable to brown bear using Geographical Information System; (ii) to study distribution and relative abundance of brown bear in relation to habitat characteristics; (iii) to study nature and extent of man-brown bear conflict: human casualties, livestock killing and nature and extent of agricultural crop damage; (iv) to assess impacts of biotic pressures on brown bear habitat; (v) to study food habits and seasonal changes in the dietary intake of brown bear; (vi) to study the socio-economic impacts of brown bear menace on rural community; and (vii) to formulate recommendations for mitigation of man-brown bear conflict and suggest conservation and management plans for bears in affected areas of Chamba district.

Progress: With the appointment of one senior research fellow, the project was initiated on March 6, 2006. A base camp was established in Bharmour and in Kugti village in Kugti Wildlife Sanctuary. Information has been collected on human-brown bear conflicts by contacting the forest officials and staff, from the records of forest department and by interviewing the victims, their families and affected villages.

For stratified vegetation sampling, 25 transects have been laid within Kugti Wildlife Sanctuary, three transects in Tundah Wildlife Sanctuary and ten transects in Bharmour Forest Division. Information of tree, shrub and herb species cover, direct and indirect evidences of brown bear, biotic pressure are being collected.

Output and Outcomes: More than 78 plants have been collected and kept in herbarium for their identification. In Kugti, brown bears have been sighted 25 times; single individual was sighted most of times, while groups of 2 to 3 individual bears seven times and mother with cubs were sighted three times. Based on direct and indirect sightings, information on crop depredation is being collected. To study the food habits of brown bear, scat samples are being collected. So far, 67 samples have been collected and air dried. Village survey is also ongoing to assess the socio-economic condition of local villagers. Villagers of Kugti village were interviewed to collect information on agricultural crop damage pattern and crop preference in specially designed questionnaire format.

Academic & Training



Vinod Verma

IX M.Sc. in Wildlife Science

Status of Doctoral Research

XXVI PG Diploma Course

XXVII PG Diploma Course

XXI Certificate Course

Academic Programmes

IX M. Sc. (Wildlife Science) Course July 2003 to July 2005.

The IX M. Sc. course in Wildlife Science, commenced in July 2003 and ended in July, 2005. A dissertation project in the IV semester (November 04 - July 05) was developed by all students in consultation with their supervisors. All eight students have successfully completed the course and secured first class, of which five have secured distinctions. The list of dissertation topics is given below:

IX M. Sc. (Wildlife Science) field project/dissertation titles and supervisors

Abishek Harihar, Population, food habits and prey densities of tiger in Rajaji National Park, Uttaranchal, India. (Supervisors) Dr. B. Pandav & Dr. S.P. Goyal.

Amit John Kurien, Response of tiger (*Panthera tigris*) and prey populations to varying magnitudes of human disturbance in Chilla Wildlife Sanctuary, Uttaranchal. (Supervisors) Dr. S.P. Goyal & Dr. B. Pandav.

Chandrima Home, Resource utilization and parental investment in the Indian fox (*Vulpes bengalensis*) in Kutch, Gujarat. (Supervisor) Dr. Y.V. Jhala.

Hari Sridhar, Patterns in mixed species flocking of birds in rainforest fragments of the southern Western Ghats. (Supervisor) Dr. K. Sankar.

Rishi Kumar Sharma, Estimation of tiger (*Panthera tigris*) densities through pugmark sets and camera traps in a mark-recapture framework. (Supervisor) Dr. Y.V. Jhala.

Rohit S. Naniwadekar, Patterns in diversity of amphibians along an elevation gradient in the Western Ghats, south India. (Supervisor) Dr. Karthikeyan Vasudevan.

Tamo Dada, Relative sensitivity of mammalian carnivores to disturbance. Dr. S.A. Hussain (Supervisor).

Vidhyadhar M. Atkore, Conservation status of fishes in tributaries of Ramganga upstream with special reference to Golden mahseer (*Tor putitora*). (Supervisors) Dr. K. Sivakumar & Dr. A.J.T. Johnsingh.

X M. Sc. (Wildlife Science) Course July 2005 to July 2007.

The X M. Sc. course in Wildlife Science commenced from July 2005 with eight meritorious students. As a part of the first semester course curriculum, the students visited Koluchaur of Lansdowne Forest Division and Sonanadi Wildlife Sanctuary of the Corbett National Park in August, 2005 and were familiarized with animal tracks, local birds and plants identification, and oriented in field biology and natural history. They visited Sariska Tiger Reserve from November 5-19, 2005 on their techniques tour to learn various aspects of field techniques related to vegetation quantification, habitat evaluation, population ecology and behavioral observations. All the students have successfully completed the first semester in December, 2006. During the second semester, besides classroom inputs, the students were taken to Keoladeo Ghana National Park and National Chambal Sanctuary from February 13-22, 2006 on the wetland tour to learn about the state-of-art methods of research and data gathering techniques of wetland management.



Pranav Chanchani

Status of Doctoral Research in WII

THESIS SUBMITTED

Ahmad K., **Aspects of ecology of hangul (*Cervus elaphus hanglu*) in Dachigam National Park, Kashmir, India.** Wildlife Institute of India and FRI Deemed University. Shri Qamar Qureshi (Supervisor).

Ashish Kumar, **Assessment of the diversity, successional changes and forest management in *jhum* influenced forest ecosystem of South Garo Hills, Meghalaya.** Dr. P.S. Roy (Supervisor) and Dr. A.K. Gupta (Co-supervisor). FRI (DU), Dehradun.

Neeraj Sharma, **Analysis of landscape features in part of Kumaun Himalaya with special reference to woody vegetation.** Dr. G.S. Rawat (Supervisor) and Dr. A.K. Tiwari (Co-supervisor) FRI (DU).

Priyadarshini, K.V.R., **Interactions between Forage, Recruitment and Activity Patterns of Blackbuck (*Antelope cervicapra*).** Saurashtra University, Rajkot, India. Dr. Y.V. Jhala (Supervisor).

AWARDED

Jeewan S. Jalal, **Study on the ecology and systematics of orchids in Uttaranchal, India.** Prof. Y.P.S. Pangtey (Supervisor) and Dr. G. S. Rawat (Co-supervisor), Kumaun University, Naini Tal.

Pranab Pal, **Effect of management strategies on resource use by local people on habitats in Kaziranga National Park, Assam** Prof. J.P. Pachauri (Supervisor) and Shri V.B. Sawarkar (Co-supervisor). H.N.B. Garhwal University, Srinagar.

REGISTERED

Ambica Paliwal, **Geospatial modelling of ungulate relationships in Tadoba-Andhari Tiger Reserve, Maharashtra.** Saurashtra University, Rajkot. (Supervisor) Dr. V.B. Mathur.

Devender Kumar, **Study of leopard menace, food habits and habitat parameters in Mandi district, Himachal Pradesh.** Dr. N.P.S. Chauhan (Supervisor). Saurashtra University, Rajkot.

Gajendra Singh, **Patterns of plant species diversity across the environmental and human use gradients in the outer fringes of Kedarnath Wildlife Sanctuary, Garhwal Himalaya.** Prof. K.R. Verma (Supervisor) and Dr. G.S. Rawat (Co-supervisor), Kumaun University, Naini Tal.

K. Nayak, **Resource use and habitat management strategies for the barasingha in Kanha Tiger Reserve.** Dr. Y.V. Jhala (Supervisor). Dr. H.S. Gour University, Sagar (M.P.).

Kuldeep Singh Barwal, **Ecology of wild pig (*Sus scrofa*) and human-wild pig conflict in and around Ranthambore Tiger Reserve, Rajasthan.** Dr. N.P.S. Chauhan (Supervisor). Saurashtra University, Rajkot.

Meena V., **Social organization and reproductive strategies of male Asiatic lions (*Panthera leo persica*).** Dr. Y.V. Jhala (Supervisor). FRI (DU) Dehradun.

Neha Midha, **Land Use, Forest Fragmentation and River Dynamics in Dudhwa Landscape and their Conservation Implications.** Dr. P.K. Mathur (Supervisor). Saurashtra University, Rajkot.

Pankaj Kumar, **Studies on the systematics and some aspects of the ecology of orchids in the State of Jharkhand, India.** Dr. G.S. Rawat (Supervisor), FRI (DU).

Sandeep Tambe, **Ecology and management of alpine landscape in Khanchendzonga National Park, Sikkim Himalaya.** Dr. G.S. Rawat (Supervisor), FRI (DU).

Sanjeeva Pandey, **Assessment of alternative livelihood development as a strategy for long-term conservation of biodiversity at the Great Himalayan National Park, India.** Dr. G.S. Rawat (Supervisor) and Dr. Sejal Worah (Co-supervisor), FRI (DU).

Shirish K. Kyatham, **Tiger habitat quality and connectivity in Kanha-Pench landscape.** Shri Q. Qureshi (Supervisor), Dr. Y.V. Jhala, Dr. Rajesh Gopal (Co-supervisor). FRI (DU) Dehradun.

Shivani Chandola, **An economic assessment of the human-wildlife interactions in the Indus Valley, Ladakh, Trans-Himalayas.** Saurashtra University, Rajkot. Dr. V.B. Mathur (Supervisor).

LIST OF DISSERTATION TOPICS

A. Majumdar, **"Vegetation structure and composition at and around Lower Chenab Valley, Chamoli District, Uttaranchal"** FRI Deemed University, Dehradun. Dr. S. Sathyakumar (Co-supervisor).

Badoni, V., **Lion monitoring software version 1.0.** Master of Computer Application, Maharishi Dayanand University, Rohtak, Haryana. 150pp. Dr. Y.V. Jhala (Supervisor).

Bannerjee, K. **Developing prey density estimation models for Kuno.** FRI, Deemed University, Dehradun. Dr. Y.V. Jhala (Supervisor).

Basu, S. **Ungulate and tiger occupancy models for the Satpura Tiger Reserve.** Forest Research Institute, Deemed University, Dehradun. Dr. Y.V. Jhala (Supervisor).

Caroline Howe, **"Reconciling protected area management and sustainable development: A study of the socio-economics and wild food use of local communities in the Nanda Devi Biosphere reserve, Indian Himalayas"**. Imperial college, University of London. Dr. Ruchi Badola (Supervisor).

Home, C. **Resource utilization by Indian fox (*Vulpes bengalensis*), in Kutch, Gujarat.** WII - Saurashtra University, Rajkot. Dr. Y.V. Jhala (Supervisor).

Kuladeep Roy, **"Status and behaviour of captive Himalayan Musk Deer at the Musk Deer Breeding Centre, Kanchulakharakh, Chamoli District, Uttaranchal"**. FRI Deemed University, Dehradun. Dr. S. Sathyakumar (Supervisor).

S. Harikrishnan, **Behaviour of Indian Peafowl *Pavo cristatus* Linn 1758,** FRI Deemed Univ., Supervisor(s) Dr. K. Vasudevan and Dr. K. Sivakumar.

Sahil Nijhawan, **Optimizing livestock holdings using linear simulation model - A study of *Gujjar* community in Rajaji National Park, Uttaranchal.** Netaji Subhash Institute of Technology, Delhi University. (Supervisors) Dr. V.B. Mathur, Dr. Sonika Bhatnagar and Dr. Vijayant Agarwal.

Sharma, R. **Evaluating tiger population estimation approaches in a high density area in Kanha Tiger Reserve.** WII - Saurashtra University, Rajkot. Dr. Y.V. Jhala (Supervisor).

Shiva Garg, **An assessment of solid waste management through public participation in the Valley of Flowers National Park, Uttaranchal.** Gurukul Kangri University, Haridwar. Dr. V.P. Uniyal (Supervisor).

Sinha, P. **Vulture breeding status and diclofenac use in Kutch, Gujarat.** Forest Research Institute, Deemed University, Dehradun. Dr. Y.V. Jhala (Supervisor).

T. Bhattacharya, **Abundance and habitat use patterns of ungulates and pheasants during spring at Chenab Valley, Chamoli District, Uttaranchal** FRI Deemed University, Dehradun. Dr. S. Sathyakumar (Supervisor).



D. Chakraborty

Training Activities

XXVI Diploma in Wildlife Management *September 2004 to May 2005.*

The Institute's
Gold Medal for
Top Trainee

Shri M. Rajkumar

Wildlife
Preservation
Society Silver
Medal for Second
in Merit

Shri Rajesh Gupta

Silver Medal for
Best All Round
Wildlifer

Ms. P. Balakrishnan
Shri Vijay Ranjan Singh

N.R. Nair
Memorial Silver
Medal for Best
Management Plan

Shri M. Rajkumar

Best Management
Term Paper

Shri Rajesh Gupta

Top Trainee in
Wildlife Biology

Shri S. Sri Saravanan
Shri M. Rajkumar

The XXVI Post Graduate Diploma course commenced on September 1, 2004. As a part of the training curriculum, the officer trainees were taken to Melghat Tiger Reserve from April 6-25, 2005 for Management Plan Exercise. The officer trainees conducted field surveys and exercises to collect first hand information on the resources, its problems and existing management practices. Through working in groups, collation of information and group discussion, ideas were crystallized and management plans prepared. Assessment was based on written examination and viva voce. All officers successfully completed the nine-month course on May 31, 2005. Eight officers achieved Honours viz. Shri M. Rajkumar, Shri Rajesh Gupta, Shri Vijay Ranjan Singh, Ms. Padmapriya Balakrishnan, Shri S. Sri Saravanan, Shri Anjan Guha, Ms. Richa Dwivedi and Ms. Nidhi Srivastava.

XXVII Diploma in Wildlife Management *September 2005 to May 2006.*

The XXVII course of nine-month duration commenced on September 1, 2005. Nineteen officer trainees joined the course of which fourteen candidates viz. two each from Madhya Pradesh, Manipur, Maharashtra, Chhattisgarh and Kerala and one each from West Bengal, J & K, Uttaranchal and Assam. In addition, five foreign nationals, two under SAARC fellowship, one each from Bhutan and Bangladesh, and one each from Vietnam, Bhutan and Bangladesh have been sponsored by Global Tiger Forum, New Delhi.

The officer trainees were taken on a High Altitude Tour to Kedarnath Wildlife Sanctuary and Nanda Devi Biosphere Reserve on November 7-12, 2005 and Orientation-cum-Techniques Tour to Rajaji National Park on November 14-27, 2005.

Management Tour was undertaken from January 28 - February 18, 2006 to several protected areas and zoological parks, in Gujarat and Madhya Pradesh. The objective of the tour was to expose the participants to a variety of management practices. The tour covered both terrestrial and wetland protected areas such as Nal Sarovar, Thol and Wild Ass Sanctuary, Gulf of Kutch Marine National Park, Gir and Velavadar National Parks in Gujarat and Kanha Tiger Reserve in Madhya Pradesh. They were also taken to Centre for Environment Education, GEER Foundation, Kamla Nehru Zoological Park in Ahmedabad and Sakkarbaug Zoo in Junagarh. During the tour, they learnt about the values of protected areas, management issues – the problems, present management practices and strategies. Interpretation, role of different protected areas/

wildlife sanctuaries, organizations and zoological parks in conservation education and tourism management were some other issues that were discussed in the field.

From March 5-18, 2006 Management Term Paper Exercise was undertaken in Periyar Tiger Reserve, Kerala. The objective of the exercise was to familiarize the officer trainees in the collection of field data and for writing a scientific paper based on the data collected through both primary and secondary sources. Prior to going to field the trainees were assigned specific topics on various aspects of management of Periyar Tiger Reserve. Under the guidance of faculty members, they collected field data. On their return, the officer trainees analysed the data collected during field exercise and wrote term papers. The officer trainees presented the term paper along with the recommendations in an in-house seminar in the Institute.

XXI Certificate Course in Wildlife Management *November 2005 to January 2006.*

The Wildlife
Conservation Gold
Medal for the Top
Trainee/Best All
Round Wildlifer/
Best Foreign
Trainee

Shri Jigme Dorji

Institute's Prize
for Wildlife
Management.

Shri S. Ganeshan

The three-month course commenced from November 1, 2005. Twenty officer trainees joined, viz. two each from A & N Island, Andhra Pradesh, Gujarat and Uttaranchal and one each from Punjab, Madhya Pradesh, Maharashtra, Jharkhand, Diu & Daman, Manipur and Orissa. The five foreign participants included four from Bhutan and one from Vietnam, of them two officer trainees from Bhutan and one from Vietnam were sponsored by Global Tiger Forum, New Delhi. The other two officer trainees from Bhutan were sponsored by the Govt. of Bhutan.

The trainees were taken on an Orientation-cum-Techniques tour to Rajaji National Park from November 28 - December 5, 2005. After completion of theory inputs, Management Tour was conducted from January 2-19, 2006. The officer trainees visited three National Parks (Corbett, Dudhwa and Kanha), three Wildlife Sanctuaries (Katarniaghat, Nawabganj and Kishanpur), three Zoological Parks (Kanpur Zoo, Lucknow Zoo and Delhi Zoo), and the Crocodile Breeding Centre, Kukrail.

All twenty officer trainees successfully completed the Course on January 31, 2006 and thirteen of them received the Honours Certificate for securing more than 75% marks viz. Mr. Jigme Dorji, Shri S. Ganeshan, Shri Chukka Ganga Reddy, Shri Suthar Hemant Premanand, Shri Mushtak Farooqui, Mr. Jangchuk Gyeltshen, Dr. Mahendra Kumar B. Sapara, Mr. Kharga Bahadur Gurung, Mr. Kezang Jigme, Shri Poosa Ramesh, Shri Madan Mohan Sharma, Shri Brajesh Kumar Srivastava and Shri Manas Ranjan Parida.



B.S. Adhikari

Capacity Building



Vinod Verma

Workshops, Seminars & Conferences

Organized

Attended

Workshops, Seminars and Conferences Organized



Vinod Verma

Nature guide training programme on "Wildlife Ecotourism", Dehradun, April 25-30, 2005. This programme was organized in collaboration with the Uttaranchal Forest Department for the local educated youths from the villages around Gangotri National Park (GNP). Twenty four participants joined the course, of which four participants were from the Uttaranchal Forest Department and the rest from the adjacent villages of GNP. The objective of the course was to train the youths from Uttarkashi district as Eco-guide for Gangotri National Park and Dyara Bugiyal Area. The participants were exposed to the general habits and habitats of plants and wild animals in the GNP and adjacent high altitude regions, and different aspects that would enable them to be effective ecoguides. A day trip was organized to Surkanda Devi and Dhanoulti to acquaint them with the high altitude flora and fauna.

Training of Wildlife Staff of Himachal Pradesh State Forest Department in "Abundance Estimation and Monitoring of Pheasants", April 28-May 5, 2005. The Himachal Pradesh State Forest Department conducted the state-wide abundance estimation and monitoring (census) of Pheasants from May 16-18, 2005. For this purpose, over 700 forest and wildlife staff and over 20 officers (ACF & above) of H.P. Forest Department were trained in abundance estimation and monitoring of pheasants. The Wildlife Institute of India (WII), Dehradun, conducted the training along with the World Pheasant Association (WPA), India.

The training was conducted in 16 locations by two groups. The training included a brief introduction on the seven species of pheasants that occur in Himachal Pradesh, their conservation values and the need for long-term conservation and management. A write-up in Hindi explaining these methods and the data sheets (in English & Hindi) were provided to the participants.

Training of Wildlife Staff of Uttaranchal State Forest Department in 'Wildlife Abundance Estimation and Monitoring', Gopeshwar, May 16, 2005. The Uttaranchal State Forest Department conducted state-wide abundance estimation and monitoring (census) of wildlife during May-June 2005. The Wildlife Institute of India (WII) conducted the training for over 130 forest and wildlife staff of Kedarnath Wildlife Division, Nanda Devi Biosphere Reserve and other Forest Divisions under the Garhwal Circle.

The training included a brief introduction on the major mammals and pheasants that occur in the Western Himalaya, their conservation values and the need for long-term conservation and management. A write-up in Hindi explaining these methods and the data sheets (in English & Hindi) were provided to them. During the training, emphasis was given on monitoring wildlife populations.

Vacation Training Programme on Bioresources for School Children, Dehradun, June 9-25, 2005. The National Bioresource Development Board (NBDB), Department of Biotechnology, Government of India, has taken a pro-active role in creating better awareness on issues concerning biodiversity and bioresources. The NBDB is engaged in promoting awareness among school children about the importance of environment, biodiversity, biotechnology and the relationship with everyday life. In pursuance of this, the fourth 'Vacation Training Programme on Bioresources for School Children' was jointly organized by the Wildlife Institute of India, Dehradun and the Institute of Himalayan Bioresources Technology, Palampur. The objectives of the programme were: (i) to inculcate among school students an appreciation of the importance of biological resources of the country, their use and management; (ii) to create opportunities for students for hands-on experience in the laboratory/field on the subject of bioresources; (iii) to study locally available bioresources, their sustainable use and conservation, and (iv) to bring about interaction of students with leading experts in the field from a pool of core and visiting faculty. Twenty four students from seven schools each in Uttaranchal and Himachal Pradesh participated in this training programme. Unlike in the past, this training programme had students from Central Schools and Government funded schools only and was largely conducted in Hindi language.

The training schedule included classroom interactions, laboratory exercises, and visit to various scientific institutions. All students participated in the project work on: (a) Understanding and documenting bird diversity; and (b) Designing individual websites. A 'Biodiversity Quiz' was organized as part of the training programme. The participants visited the Institute of Himalayan Bioresources Technology (IHBT) from June 17-25, 2005 for getting an in-depth knowledge on bioresources.

One-week Compulsory Training Course for IFS officers on 'Wildlife Management: Issues, Concerns and Practices, Dehradun, June 20-26, 2005. The basic objective of this course was to acquaint the forest managers in issues, concerns and practices in wildlife management. Seventeen participants attended the course from 14 States/UT viz. Andhra Pradesh, Chandigarh, Himachal Pradesh, Haryana, Jammu & Kashmir, Jharkhand, Maharashtra, Meghalaya, Madhya Pradesh, Manipur, Orissa, Sikkim, Tamil Nadu and West Bengal. The participants visited Rajaji National Park to gain first hand experience of the protected area management, challenges and practices. The panel discussion on 'Proposed Scheduled Tribe (Recognition to Forest Rights) Bill, 2005: Consequences on the Biodiversity and Wildlife Conservation' produced a lively discussion among the participants.

Orientation Course on Wildlife Conservation and Management for the Officers of Comptroller & Auditor General (C&AG) of India, July 21-23, 2005. The objectives of the course were: (i) to provide a better perspective of the range of issues, concerns and practices in the field of wildlife and protected area management in the country; and (ii) to discuss the approach and methodology to be adopted for conducting the performance review of protected areas, based on objective and scientific criteria. Ten officers from the office of the Comptroller & Auditor General (C&AG), Government of India.



Sensitization Workshop for All India Tiger, Large Carnivores, Ungulate and Habitat Status Evaluation and Monitoring, New Delhi, August 29, 2005. This workshop was held at the India Habitat Centre, New Delhi. The Principal Chief Conservator of Forests, Chief Wildlife Wardens and Field Directors/Deputy Directors of Tiger Reserves participated in the workshop. Shri R.P.S. Katwal, Addl. DGF (WL) highlighted the objective of the workshop, which was to apprise the participants of new estimation method to be followed in the forthcoming country level estimation of tigers, co-predators and their major prey. The Project Tiger Directorate, in the last three years had refined the estimation methodology in collaboration with the WII. Dr. Prodipto Ghosh, Secretary (E&F) and Shri J.C. Kala, DGF & SS also expressed their views.

The technical session comprised of presentations by Dr. Y.V. Jhala and Shri Qamar Qureshi on the following aspects: (i) Monitoring tigers and large carnivores, (ii) Monitoring ungulates, (iii) Monitoring habitat and anthropogenic pressures, and (iv) Discussion on protocols, datasheets, analysis and interpretation. Shri P.R. Sinha, Director, WII highlighted the role of observers and their importance along with spearhead teams at every level of the exercise. This was followed by a presentation by Shri K. Nayak, Field Director, Kanha Tiger Reserve on the lessons learnt while implementing the pilot project in the Satpura Maikal landscape of Madhya Pradesh.

Name	Topic of Presentation
Bibek Yumnam	Assigning species identity to putative leopard faeces using DNA techniques.
Neha Midha	Development of spatio-temporal database on natural resources in Dudhwa Tiger Reserve with a focus on changes in river morphology and its impact on wildlife habitat.
Upamanyu Hore	Effect of Management Practices on Spider Diversity in Terai Conservation Area.

Internal Research Seminar, Dehradun, September 19, 2005. The seminar was chaired by Dr. A.J.T. Johnsingh, Dean, Faculty of Wildlife Sciences, in which a total of 23 presentations, by research fellows and Principal Investigators of the project, were made in four sessions. The presentations were evaluated by a panel of judges comprising five faculty members of the Institute. Three presentations were adjudged to have been the best among the presentations made and were awarded book prizes each worth Rs. 1000/-.

XIX Annual Research Seminar (ARS), Dehradun, September 22-23, 2005. Shri V.B. Sawarkar, Chairman, Training, Research and Academic Council (TRAC), chaired the Seminar. In all, 29 presentations were made in sessions. These included Monitoring and Population Estimation; Predator-Prey Relationships; Wildlife Forensics; Studies on Herpetofauna & Fishes; Avifaunal Studies; Studies on Vegetation & Animal-Habitat and Endangered Mammals & Primates. The presentations were based on completed and on going research studies.

About 300 delegates from all over the country attended the ARS including the Principal Chief Conservators of Forests (PCCFs), 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 Post Graduate Diploma Course Officer Trainees of WII.

The following publications and software were released during the inaugural session: (i) A Guide for Planning Wildlife Management in Protected Areas and Managed Landscapes was released by Shri K.K. Singh, IFS, Chief Wildlife Warden (West Bengal), (ii) Relationships among large herbivores, habitat and humans in Rajaji-Corbett National Parks, Uttaranchal, northern India was released by Mr. Dave Ferguson, Division of International Conservation, US Fish & Wildlife Service, (iii) Proceedings of the National Seminar on Wildlife Conservation, Research & Management were released by Shri S.C. Dey, Director, Global



Tiger Forum, New Delhi and Chairman, SAP (I), WII. (iv) Software on "Monitoring lions" was released by Shri S.K. Patnaik, Former CWLW, Orissa and Member, Governing Body, WII.

The presentations made by the researchers on the subjects cited were judged and the five best presentations were given book awards, each worth Rs. 1000/-:

Name	Topic of Presentation
Amit J. Kurien	Do tigers shy away from people? What happens when people stop living in a tiger habitat? - A case study from the Shivaliks of Uttaranchal.
Rohit S. Naniwadekar	Patterns in diversity of anurans along an elevational gradient in Ashambhu hills, southern Western Ghats.
R. Jayapal	Influence of climate, floristics, and forest structure on breeding bird diversity and composition in Central Indian Highlands, M.P.
Rashid H. Raza	Patterns in diversity and rarity in avifaunal and floral assemblages along an elevation gradient: Commonalities and Differences.
Ashwini Upadhyay	Effects of Livestock Grazing on Argali Habitat Use at Tso Kar Basin, Ladakh.

Regional Workshops on All India Tiger Co-predators, Prey and Habitat Monitoring, October 17 - December 2, 2005. As a part of the All India Tiger, Co-predators, Prey and Habitat Monitoring, the Wildlife Institute of India conducted four regional level workshops at Corbett Tiger Reserve (Uttaranchal), Kanha National Park (M.P.), Bandipur Tiger Reserve (Karnataka) and Kaziranga National Park (Assam) for training the spearhead teams and trainers from States across the country.

The States then conducted workshops for their frontline staff and to enable them to lay transects in forested landscapes in their respective areas for the estimation methodology. 312 participants from 23 States participated in the four workshops.

One-Week Compulsory Training Course on Managing Wildlife: Emerging Global Scenario and the Indian Experiences, Dehradun, November 21-25, 2005. The training course was organized in the Institute for IFS officers as part of their ongoing compulsory training programme. Seventeen officers from the States of Manipur, Kerala, Punjab, Nagaland, Tamil Nadu, Jharkhand, Himachal Pradesh, Madhya Pradesh, Maharashtra and Karnataka participated in this programme. WII faculty and outside experts provided inputs in the training programme.

The course was aimed at sensitization of field officers in various issues concerning wildlife management and biodiversity conservation. This course focused on various wildlife management trends in the international scenario as well as the latest initiatives being undertaken in the country. Inputs were provided on "Millennium Ecosystem Assessment, Challenges of Wildlife Conservation in India, A Critique on Tiger Task Force, Wildlife Trade Issues and



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their relevance to Wildlife Conservation, Management Effectiveness Evaluation of Protected Areas, Experiences of Community Participation in Biodiversity Conservation in South Asia, Wildlife Management Plan Preparation, and Regional Cooperation for Tiger Conservation". One session was devoted for a panel discussion on "Improvements in the working of Forest Department". Participants were also given two sessions for sharing experiences. The participants were taken to Rajaji National Park for field visit.

One-day training workshop on identifying and marking wildlife products for Forest Officers of J & K Government, Dehradun, December 21, 2005. On a special request from Addl. P.C.C.F. and Chief Wildlife Warden, J & K Government, one-day workshop was organized for three officers at the Wildlife Institute of India on identification of wildlife products. The participants were given hands-on-training for identification of species based on hair samples from shatoosh shawls and other woollen products. Various protocols for identifying bear bile, elephant tusk, antlers, musk deer pods, canine, claws and other products reported in the trade were explained. Participants were exposed to different techniques employed in marking various wildlife products including use of "electronic chip".

Training Workshops on Wildlife Crime Prevention, Detection & Identification of Wildlife Parts and Products in Illegal Trade for enforcement agencies. In view of the recent crisis due to local extinction of tiger from Sariska Tiger Reserve and for controlling wildlife trade, the Ministry of Environment and Forests, Govt. of India, requested the Wildlife Institute of India to organize four workshops for the officers of enforcement organizations to sensitize them on the above issues. The officers were from the Directorate of Revenue Intelligence, Sashastra Seema Bal, Border Security Force and Indo-Tibet Border Police. The four workshops were conducted during October 17–19, 2005; December 12–15, 2005; January 17–20, 2006; and February 21–24, 2006. In all, 67 participants from these organizations attended the four workshops. Topics covered during workshops were: Biodiversity and its need for conservation – national and global perspectives; relevant National and International Acts, a few case studies related to control of illegal trade; Wildlife trade and role of other agencies and identification of wildlife items reported in trade including plants.

WII-USDA Forest Service Collaborative Project: Site Level Workshops on Forest Management in India, December, 2005 to January, 2006. The Wildlife Institute of India-USDA Forest Service (USFS) Collaborative Project titled "Management of Forests in India for Biological Diversity and Forest Productivity – A New Perspective" was conceived in 1992 and formally approved by the GOI in 1995. The project principally aimed to demonstrate an approach to achieve integration of concerns in India for biological diversity, forest based products, and their sustained flow in support of technological, economic and social benefits to urban and rural sector lifestyles.

Second phase of the project was initiated in September, 2004 to work with State and site level field managers for developing the specific plans and guidelines so as to implement the recommendations made in the field guides of previous phase leading to logical conclusion of the project and meaningful utilization of the research findings. In order to disseminate the learning of previous phase and to chalk out the priority management implementation



projects that the WII-USFS program might promote, immediate action for each conservation area, site level workshops were organized at Dudhwa Tiger Reserve, U.P., December 5-8, 2005; Garo Hills Conservation Area (GCA), Shillong, Meghalaya, December 13-14, 2005; Chikaldara (Maharashtra), January 14-16, 2006; Anamalai Conservation Area (ACA), Coimbatore (Tamilnadu) January 20-22, 2006; and Pachmarhi, Madhya Pradesh during January 28-30, 2006.

The main objectives of these workshops were: (i) to present the overall purpose and findings of the collaborative project; (ii) to learn from the outcomes of other researches and review of current issues and programs of Forest Department; and (iii) to stimulate and organize discussion for activities to be implemented based on the project findings and guidelines for forest biodiversity conservation. Each workshop produced a set of management concerns and recommendations for priority implementation projects for each conservation area.

XIV Zoo Management Course for the middle level supervisory staff, New Delhi, January 9-19, 2006. The Course (with emphasis on animal rescue and rehabilitation) was jointly organized by the Wildlife Institute of India and Central Zoo Authority. The purpose and goal of the training course was to discuss the critical areas related to management of zoos ranging from policy issues, animal welfare, nutrition, housing, modern concepts to wild animal rescue and rehabilitation. One of the important aspects of the course was to enhance skills and capabilities of the participating officers in understanding the basics of zoo management and implementing them for an efficient, scientific and professional management of zoos.

A total of 30 officers from eighteen States viz. Andhra Pradesh, Assam, Arunachal Pradesh, Chhattisgarh, Gujarat, Jammu & Kashmir, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Mizoram, New Delhi, Sikkim, Tamil Nadu, Tripura, Uttaranchal and Uttar Pradesh participated in the course. In addition to interactive classroom sessions at New Delhi, field tours were conducted to M.C. Zoological Park, Chhatbir; Vulture Conservation Breeding Centre, Pinjore, and Bear Rescue and Rehabilitation Centre, Agra.

National Diploma on Zoo and Wild Animal Health Care and Disease Management, Dehradun, February 21-24, 2006. Based on the request from IVRI, a 4-day program was designed for the officer trainees in the area of wildlife conservation and disease surveillance at the Institute. Teaching inputs were provided on wildlife medicine and wild animal immobilization and restraint. Five officer trainees participated in the programme.

Two-week course for the probationers of 56th batch of Indian Revenue Service (Customs & Central Excise) Group "A", Dehradun, February 28 - March 9, 2006. As a part of the ongoing training programmes for enforcement agencies, this course was organized by WII. The objective of the course was to sensitize the Indian Revenue Service Probationers about the unique biodiversity of the country and problems of illegal trade in wildlife and wildlife products.

The course was attended by 40 probationers. Participants were exposed to: biodiversity values of India, issues related to illegal trade of wildlife and wildlife products, the role of custom officers and other enforcement agencies in dealing with problems of illegal wildlife trade, existing legal mechanisms available in

the country to deal with these issues and the possibilities of linkages between different organizations/departments to control illegal wildlife trade. To make the programme more interactive and effective, a combination of theory inputs and field visits were provided to the probationers by faculty of the Institute and external resource persons. Field visits were made to Asan Barrage Conservation Reserve and Rajaji National Park. During field visits, the officers were exposed to the management issues of a Protected Area and the strategies adopted by the department to deal with them.

Workshop on Rangelands and Wildlife Conservation in the Himalaya, Dehradun, March 9-10, 2006. The Wildlife Institute of India (WII) and the Department of Biology, Faculty of Science, University of Tromsø (UiT), Norway, initiated a three-year (extended to four-year) collaborative project on 'Alpine Rangelands and Wildlife Conservation in Greater and Trans-Himalaya' in 2002. To mark the occasion of completion of the current collaboration under the Indo-Norwegian Programme of Institutional Co-operation (INPIC) between WII and the UiT, Norway, and to explore and expand future scientific collaborations on this topic between two countries, a workshop was held at the Institute.

The objectives of the workshop were: (i) to review the state of present knowledge on the conservation and management issues in the alpine rangelands of the Trans-Himalayan and Greater Himalayan regions; (ii) to identify gaps and to explore and expand future research; and (iii) develop a consensus on evolving appropriate guidelines for the development of a policy framework for sustainable livestock grazing in the Himalaya.

The workshop was organized in three sessions, viz., research findings of the WII-UiT ICP from the Trans-Himalaya; research findings of the WII-UiT ICP from the Greater Himalaya; and research findings from contemporary studies.

Nature Guide Training Programme, March 20- 24, 2006. A one-week programme was organized in collaboration with the Uttarakhand Forest Department for local educated youths from the villages around Corbett Tiger Reserve. Seventeen youths including four frontline staff of Corbett Tiger Reserve joined the course. The aim of the training programme was to motivate eco-guides towards biodiversity conservation and sensitize them towards conservation and preservation of wildlife.

During the training programme, about twenty classroom sessions were conducted on various issues. The trainees were exposed to vegetation identification in WII campus and bird watching. Apart from this, trainees were taken for a day trip to visit the museums at the Forest Research Institute, Dehradun.

Workshops, Seminars and Conferences Attended



Training on Biodiversity Informatics at National Chemical Laboratory (NCL), Pune, April 11-15, 2005. Shri Rajesh Thapa, Shri Panna Lal, Shri Dinesh Singh Pundir and Dr. Jagat Singh Kathayat attended the training course on Biodiversity Informatics, which was organised at Pune. The objective of the training was to get exposure in the emerging field of biodiversity informatics and study the advances made by NCL, Pune in this area. Sessions were conducted on electronic catalogue development; digitization of biological collections; access to data of Indian origin specimens; ecosystem specific databases; and standards and interoperability in biodiversity data. Hands-on-training was also given to the participants attended the training.

International Workshop on Management Effectiveness, Monitoring for World Heritage Values and Statutory Reporting in Paris, France, May 2-5, 2005. Shri P.R. Sinha and Dr. V.B. Mathur were invited to participate in the International Workshop on Management Effectiveness, Monitoring for World Heritage Values and Statutory Reporting organized by the UNESCO World Heritage Centre, Paris. The objectives of the workshop were to: (i) to assess how the management effectiveness project can contribute to monitoring and reporting obligations under World Heritage Convention; and (ii) to establish the basis for the evaluation of periodic reporting process. Dr. Mathur presented a paper on 'Challenges and opportunities highlighted by the management effectiveness project in South Asia'.

Meetings of the DBT Task Force on 'Application of Biotechnology for Biodiversity Conservation', New Delhi, As member of the Department of Biotechnology (DBT) Task Force on 'Application of Biotechnology for Biodiversity Conservation', Dr. V.B. Mathur attended three meetings (12th to 13th May, 2005, 21-22nd June, 2005, 13th to 14th October, 2005) during the reporting period and provided professional inputs in the evaluation of project proposals for funding by the DBT along with the review of progress of various on-going projects.

First Meeting of the State Board of Wildlife, Himachal Pradesh, Shimla, May 9, 2005. Dr. P.K. Mathur represented the Institute in the first meeting of the State Board of Wildlife, Himachal Pradesh held under the chairmanship of the Hon'ble Chief Minister, Himachal Pradesh.

Mainstreaming Biodiversity in EIA for Improved Environmental Decision Making, Boston, USA May 29-30, 2005. This international pre-meeting training course was organized under the Capacity Building for Biodiversity in Impact Assessment (CBBIA) Project of the International Association for Impact Assessment (IAIA) at Boston, USA. The objectives were to: (i) Professionalize integration of biodiversity issues in EIA through guidance on methods, tools and process; (ii) Build capacity of participants to initiate best practices in conducting, supervising and reviewing EIAs to ensure integration of biodiversity



considerations in EIA; (iii) Facilitate sharing and peer based learning among EIA professionals based on their experience and practices. The training course was sponsored by International Association for Impact Assessment (IAIA). A total of 22 participants from 19 countries participated in the training course.

Annual Conference "Ethic and Quality" of the International Association of the Impact Assessment (IAIA), Boston, USA, May 31–June 3, 2005. Dr. Asha Rajvanshi and Dr. V.B. Mathur attended the 25th Annual Conference of the IAIA. The conference theme for IAIA'05 – 'Ethic and Quality' provided EIA professionals with an opportunity to examine and debate issues of ethical conduct and standards of quality in Impact Assessment and consider what hallmarks of good assessment and ethical practice should be adopted by EIA professionals. In the technical session of the biodiversity stream, Dr. Asha presented a paper 'Quality of biodiversity related information in EIA documentation for environmental decision making and conservation planning: The Indian Experience'. Dr. V.B. Mathur also presented a paper 'Improving wildlife conservation prospects through better impact mitigation options for an irrigation project in Central India' in the technical session on biodiversity. The participation of Dr. Rajvanshi and Dr. V.B. Mathur was funded by the IAIA under the project Capacity Building in Biodiversity and Impact Assessment (CBBIA) Project.

Meeting of the State Board for Wildlife, Government of Chhattisgarh, Raipur, July 7, 2005. Dr. Sushant Chowdhury attended the first meeting of State Board of Wildlife, Government of Chhattisgarh. The meeting was chaired by Dr. Raman Singh, Hon'ble Chief Minister of Chhattisgarh and vice-chaired by Shri Naki Ram Kanwar, Minister for Forests, Housing and Environment. The meeting discussed 20 agenda items on various issues of wildlife conservation and management in the State. The key issues in the meeting agreed upon were preparation of a comprehensive Wildlife Action Plan for Chhattisgarh and creating separate wildlife cell for effective functioning.

XXII IUFRO World Congress in Brisbane, Australia, August 1-17, 2005. The International Union of Forest Research Organization (IUFRO) invited Dr. V.B. Mathur to participate in the XXII IUFRO World Congress: Forests in the Balance – Linking Tradition and Technology and also to attend the pre-Congress Training Course on 'The use of information and communication technology tools in forest research'. Dr. Mathur organized and chaired a technical session on 'Environmental Planning for Harmonizing Forest Biodiversity Conservation and Sustainable Development' in which 42 professionals participated and 5 speakers made presentations. Dr. Mathur presented a paper 'Mitigation of biodiversity impacts of water resource projects: Pitfalls and lessons learned'.

Advanced course on Analysis and Management of Animal Populations, Bangalore, August 16-22, 2005. The objectives of the course were: (i) to provide a conceptual framework for the use of models in the conduct of science and management, (ii) to review the construction of ecological models, with emphasis on tailoring models, to their intended use in conservation and/or science, (iii) to present a general conceptual framework for animal population/community estimation methods, (iv) to show how this framework can be used to develop estimation methods applicable to various sampling and logistic situations, (v) to present the specific rationale and logic underlying the more commonly used approaches to estimating population and community-level attributes, with emphasis on tailoring these methods to meet objectives under

logistical constraints, (vi) to present a general rationale and approach for the development of an animal monitoring program, with emphasis on the use of resulting inferences for conservation and management, (vii) to present a logical framework for making management decisions and to identify the major components of uncertainty typically encountered in the management process, (viii) to discuss the implementation of a formal adaptive management process for making informed management decisions in the face of uncertainty. The course was organised by the Centre for Wildlife Studies. Dr. K. Vasudevan attended the course.

Sensitization workshop for PCCF's and CWLW's of States on Monitoring Tigers, Co-predators, Prey and their Habitat, India Habitat Center, New Delhi, August 29, 2005. Dr. Y.V. Jhala and Q. Qureshi conducted the sensitization workshop. The workshop was organized by Ministry of Environment & Forests and Project Tiger Directorate.

All India Professional Development Programme on "Environmental Issues in Mining Sector - Legal and Statutory Requirements (As per MoEF Guidelines)", September 13 – 15, 2005. The Engineering Staff College of India, Hyderabad organized and All India Professional Development Programme. The objective of this programme was to familiarize the participants on environmental issues in mining sector including socio-economic aspects and how to promote environmental management systems duly meeting the legal and statutory requirements. Dr. Asha Rajvanshi made a presentation on Environmental Issues in Mining Sector - Legal and Statutory Requirements (As per MoEF Guidelines)".

National Seminar on Advances in Plant Sciences, Dehra Dun, September 23 - 25, 2005. It was jointly organized by the Indian Botanical Society and Botanical Survey of India, North Circle, Dehra Dun. Major objectives of the seminar were to update the recent researches in various disciplines of botany and prioritize them for future research. The seminar was attended by over 400 participants from all over India. Dr. G.S. Rawat served as one of the members of organizing committee in the seminar. In addition, he presented a theme paper on the "Rapid mapping exercise (RME) for quantification of medicinal and aromatic plants: Lessons from Uttaranchal". Status of medicinal plants in terms of density and frequency based on recent surveys in the alpine region of Uttaranchal were discussed in detail during the seminar.

Workshop on Grassland Ecology and Gene Pool Conservation, Jaipur (Rajasthan) September 26-28, 2005. Dr. P.K. Mathur participated in the workshop organized by the Rajasthan State Forest Department. He presented a paper entitled "Grasslands in India – Diversity, Management Concerns and Conservation Perspective" and also served as a Chairperson for one of the technical sessions.

International Conference on Experiences and Perspectives in Strategic Environmental Assessment, Prague, Czech Republic, September 26-30, 2005. Dr. Asha Rajvanshi and Dr. V.B. Mathur attended the International Conference on Meeting 'Experiences and Perspectives in Strategic Environmental Assessment'. The objectives of the conference were to advance the Strategic Environmental Assessment (SEA) in three main directions viz.: (i) Drawing lessons and insights on SEA good practice,

particularly in implementing the legal regimes established by the SEA Directive and SEA Protocol and the policy frameworks being introduced by multilateral and bilateral aid agencies; (ii) Clarifying the role and relationship of SEA to sustainability appraisal and other integrative approaches that are now being rolled out internationally, focusing particularly on how to ensure appropriate considerations of the environment; and (iii) Identifying options and opportunities for better and more collaborative capacity development, including training, networking and professional development. Dr. Rajvanshi presented a paper 'SEA of the India Eco-development Project: A review of prospects and challenges for biodiversity conservation' and Dr. V.B. Mathur presented a paper 'Integrating biodiversity considerations in SEA of an irrigation project in Central India' in the Stream E: Improving Standards and Building Capacity for SEA.

16th International Conference on Bear Research and Management, Trentino, Italy, September 27 to October 2, 2005. Dr. S.Sathyakumar participated in the conference and presented a oral paper "Status and distribution of Asiatic Black Bear (*Ursus thibetanus*) in India: An assessment of changes over 10 years"; and two posters viz., "Status and distribution of Himalayan Brown Bear (*Ursus arctos isabellinus*) in India – an assessment of changes over ten years", and "Observations on Asiatic Black bear at Dachigam National Park, India" co-authored with Shri Khursheed Ahamad and Shri Qamar Qureshi.

First Meeting of the State Board of wildlife, Maharashtra, Mumbai, October 20, 2005. Dr. P.K. Mathur represented the Institute in the first meeting of the State Board of wildlife, Maharashtra held at the Mantralaya, Mumbai under the chairmanship of the Hon'ble Chief Minister, Maharashtra.

16th International Conference on Bear Research and Management, Trentino, Italy, September 27 – October 1, 2005. Dr. N.P.S. Chauhan attended the international conference. The objective of the conference was the conservation and management of bear species in world. It was organised by the International Bear Association, Ministry of Environment and Protection of Landscape, Italy, Council of Europe. The knowledge gained will be used for conducting management oriented research on four species of bears in India, and for conservation and management of these species.

International Symposium on Frontiers of Wolf Recovery: Southwestern US and the World, Antlers Hilton, Colorado Springs, Colorado USA, October 1-4, 2005. Dr. Y.V. Jhala attended the international symposium on "Frontiers of Wolf Recovery: Southwestern US and the World". He presented two papers and chaired a technical session. A film made by BBC on Indian wolves based on the WII research project was screened at the symposium. A proposal was put forth to the IUCN Wolf Specialist Group to consider Indian Wolf lineages as unique & ancient and accordingly enhance their conservation status.

VII National Symposium on Indian Entomology: Productive & Health- A Silver Jubilee Celebration, October 2-4, 2005. The objective of the symposium was to evaluate the status and prospective of entofauna in India. It was organised by the Uttar Pradesh Zoological Society, Muzaffarnagar. Dr. V.P. Uniyal represented the Institute in the symposium.



Conflux 2005 – The e-Government Conference, New Delhi, October 17-19, 2005. Centre for Science Development and Media Studies (CSDMS) in collaboration with Govt. of NCT, New Delhi organized the conference. The objective of the conference was to showcase e-Government developments in India and the Asia Pacific and learn from the successful practices in the region. More than 350 delegates attended the conference and this served as a platform to bring experts from the various countries, key Govt. representatives, industry and academia together to discuss the issues and prioritize them. From WII, Dr. M.S. Rana, Shri V. Sukumar and Shri Dinesh Singh Pundir attended the conference.

Biodiversity Conservation in Asia: Current Status and Future Perspectives, Kathmandu, Nepal, November 17-20, 2005. Dr. S. Sathyakumar participated in the symposium and presented a paper "Harvesting musk from wild deer: Community-based approaches to maintaining biodiversity and supporting local livelihoods in the Mountains of Central Asia" co-authored with Drs. M.J.B.Green, Duncan Knowleer and Jesser Wood.

International Capacity Building Workshop Enhancing IUCN World Heritage Evaluation Process: A contribution to achieve a credible and balanced World Heritage List in the Island of Vilm Germany, November 23-30, 2005. The IUCN-World Commission on Protected Areas invited Dr. V.B. Mathur to participate in international capacity building workshop 'Enhancing IUCN World Heritage Evaluation Process: A contribution to achieve a credible and balanced World Heritage List' in the Island of Vilm, Germany. The objectives of the workshop were: (i) to strengthen the IUCN/ WCPA World Heritage network through provision of focused capacity building on the evaluation process; (ii) to review lessons learned on the policy and practice of the IUCN evaluation process; and (iii) to define key strategic directions and actions for enhancing the IUCN evaluation process. Thirty-one participants from twelve countries participated in this workshop. Dr. Mathur specifically contributed in the deliberations of the Working Group on 'Assessing Outstanding Universal Values (OUVs) of proposed World Heritage Sites'.

Workshop on Sustainable Environmental and Livelihood Issues in the Mountain and Hill Regions of India, New Delhi, December 8, 2005. The objectives of this workshop were to: (i) showcase the final results and recommendations of the projects; (ii) provide a forum for discussing the recommendations with various stakeholders; (iii) open a dialogue with policy-making community on the recommendation for future action.

About 60 participants comprising academicians from Canada and India, NGO representatives and policy-makers participated in this workshop. The broad issues for this workshop were: (i) assessing water resources of hills; (ii) role of various sectors in sustainability of environmental management; (iii) sustainability of flood plains of Yamuna; (iv) sustainability of biodiversity in the hill regions of India. Dr. B.K. Mishra participated as expert panelist in the workshop, which was organized by the Shastri Indo-Canadian Institute, New Delhi.

Biodiversity Conservation and Sustainable Livelihood with special reference to Millennium Development Goals, December 8-9, 2005. Shri A.K. Bhardwaj attended the workshop, organised by Amity School of Natural Resources & Sustainable Development Amity University-Uttar Pradesh and MoEF. The

objectives were: (i) to have an overview of the millennium ecosystem assessment goals and strategies for India; (ii) to understand the existing initiatives of biodiversity conservation and livelihood security of local community; and (iii) to devise the possible path for achieving millennium ecosystem goals through biodiversity conservation and poverty alleviation. About 100 participants took part in the workshop.

Issues involved in man-animal conflict – Strategies for mitigation, Kolkata, December 19-20, 2005. Shri A.K. Bhardwaj attended the workshop. It was organised by the Centre for Biosocial Advancement, Kolkata. In all eighteen participants attended in the workshop. The objectives of the workshop were: (i) to debate upon the issue of man-animal conflict in India; (ii) to get an overview of different strategies adopted for dealing with this issue in the country; and (iii) to suggest strategies for mitigation of man-animal conflict.

Ecotourism in Himalayas: Prospects and Challenges, December 21-22, 2005. The objectives of the workshop were: (i) to discuss the Ecotourism Initiatives in different parts of India; (ii) to chalk out a strategy for ecotourism programme in Himachal Pradesh; and (iii) to work out a strategy for Product Development and Marketing with reference to the Ecotourism in Himachal Pradesh. It was organised by Biodiversity Conservation Society of Himachal Pradesh and Ford Foundation. About 50 of participants attended the workshop. Shri A.K. Bhardwaj represented the Institute in the workshop.

Participation in the Inception Meeting of the IAIA-CBBIA (Asia) Project, Colombo, Sri Lanka, December 22 – 24, 2005. As a start up to the Capacity Building for Biodiversity and Impact Assessment Project (CBBIA) component in South Asia, the Inception Meeting of the IAIA-CBBIA (Asia) Project was held.

The workshop had the following objectives: (i) Developing synergy and a common understanding of the project objectives, amongst the project partners. (ii) Discussing results of the Needs Assessment Survey i.e. area of focus (EIA or SEA) and capacity and training needs of the identified institutions in the five countries. Based on this, the future approach for the project was to be chalked out. (iii) Deciding on the focus: EIA, SEA or both. (iv) Finalizing outputs, activities, detailed work plan of the project. (v) Basing environment work on environmental economics arguments, as the latter field has been noted to be the key player in biodiversity and EIA.

Dr. Asha Rajvanshi and Dr. V.B. Mathur participated in the inception meeting at Colombo, Sri Lanka. Both, Dr. Asha Rajvanshi and Dr. V.B. Mathur assisted IUCN in development of project proposal and linking it with the overall goals of the IAIA-CBBIA global project. The Inception Workshop was attended by 16 participants from four South Asian countries- Bangladesh, India, Pakistan and Sri Lanka.

Review Workshop on the Forest Type Mapping of India's Forests, Dehra Dun, January 31, 2006. It was organized by the Forest Survey of India (FSI), Dehra Dun. The objectives of the workshop were to review the methodology and approaches of forest type mapping for India being undertaken by the FSI, and revalidation of Champion & Seth's classes. The workshop was attended by 55 participants from various States and research institutions. The issues discussed

in the workshop included preparation of a working manual, projection system to be used, format for output maps and accuracy estimation. It was recommended that the plantations should not be assigned any forest type and instead they may be shown as 'Plantations' only. The workshop gave an opportunity to interact with various scientists and forest managers involved in the mapping of various vegetation types. The deliberations of workshop had direct relevance with wildlife habitat mapping. Dr. G.S. Rawat attended the workshop.

Sneak Peak Event, New Delhi, January 11, 2006. Dr. Asha Rajvanshi was invited by the Confederation of Indian Industry (CII) to participate in the Sneak Peak Event organized by Global Reporting Initiative (GRI) to promote G3 guidelines for sustainability reporting and participated in the deliberations on the draft guidelines. The objective of the event was to promote G3 guidelines for sustainability reporting and to deliberate on the draft guidelines. The workshop was organized by Confederation of Indian Industry (CII) in association with CIDA, ITC and Tata Sons Limited and GRI.

Meeting of National and Regional Committees of IUCN in Hague, Netherland, February 13-15, 2006. The meeting was organised by IUCN. Shri A.K. Bhardwaj represented the Institute in this meeting to discuss the working of National Committees. The meeting helped in establishing contacts with important conservation organizations from Netherlands and other countries.

GEF National Dialogue Initiative Workshop, Mussoorie, February 15-17, 2006. The workshop provided a forum for multi-stakeholder country level consultations with the aim of: (i) promoting in-depth understanding of the GEF's strategic directions, policies and procedures; (ii) strengthening country coordination and ownership in GEF operations and sharing lessons learned from project implementation; and (iii) achieving greater mainstreaming of GEF activities into national planning frameworks and coordination and synergies amongst the GEF focal areas and convention issues at the national level.

More than 100 participants, including senior officers from Gol, State Governments, NGOs, Academic and Research Institutions, Private Sector, UNDP, UNEP, World Bank and GEF Secretariat participated. Dr. B.K. Mishra participated in the workshop which was organized by MoEF and UNDP.

National Seminar on Environmental Management in 21st Century: Issues & Challenges, Varanasi, February 16-18, 2006. The seminar was organized by Centre of Advanced Study in Botany, Banaras Hindu University, Varanasi. The major objectives of the seminar were to discuss the issues related to sustainable management of natural resources in the 21st century and to discuss the challenges in the present millennium. The seminar deliberated upon ten different themes including natural resource monitoring and management, green house gas monitoring and management, desertification and deterioration of soil quality, preservation and restoration of ecosystems and biodiversity. The seminar was attended by over 100 participants from all over India. For the focal theme on 'Preservation and Restoration of Ecosystems', Dr. G.S. Rawat gave a key-note address titled "Management and restoration of tropical ecosystems in theory and practice".



Participation in the Workshop of Contacts IAIA-CBBIA (Asia) Project, Islamabad, Pakistan, February 16–19, 2006. The Contacts' workshop was a follow-up of the Inception Workshop of IAIA-CBBIA (Asia) Project held in Colombo, Sri Lanka, from December 23–24, 2005. Dr. Asha Rajvanshi and Dr. V.B. Mathur participated in the workshop. IUCN, Pakistan in collaboration with the Wildlife Institute of India organized the Consultative Workshop of Contacts under the Capacity Building in Biodiversity and Impact Assessment (CBBIA) Project in Islamabad, Pakistan. This workshop was designed to bring professionals and decision-makers from key sectors (mining, oil and gas and road) and from the relevant ministries from the five countries on a single platform, to share the country specific EIA frameworks, mechanisms of incorporating biodiversity in national EIA systems and their experience of integration of biodiversity concerns in the Environmental Impact Assessment including both ecological and economic instruments of evaluation.

Dr. Rajvanshi made a presentation on "Development of practitioners' and reviewers' guide for biodiversity inclusive EIA under CBBIA-Asia Project of IAIA" to help the participating countries conceive a vision about the template and the contents of the guidance tools to be generated as key outputs of the project. Dr. Mathur highlighted the relevance of information on foreign direct investments as a reliable indicator for assessment of future developments in different key development sectors through his presentation on "Foreign Direct Investment – The life blood of progress". Dr. Rajvanshi and Dr. Mathur also made presentations to share the country level scenario with respect to developments in road and oil and gas sectors through their presentations "Developments in Road Sector in India" and "Developments and in Oil Gas Sector in India" respectively. The workshop was attended by 37 participants representing five south Asian countries- Bangladesh, India, Nepal, Pakistan and Sri Lanka.

Brainstorming Workshop on Ecological Economics, Almora, February 24–25, 2006. The objectives of the workshop were to improve the knowledge, based on ecosystem services and values and stimulate the integration of this knowledge in planning and decision making for sustainable Ecosystem Management through development of case studies, guidelines, and dissemination. It was organized by G.B. Pant Institute of Himalayan Environment and Development, Kosi-Katarmal, Almora. The workshop focused on assessment of ecosystems viz., forests, agro-ecosystems and aquatic ecosystems goods and services, valuation techniques for and natural resources, implementing efficient policies for hilly region and integration of natural resources with environmental services. Dr. B.S. Adhikari participated in the workshop.

Meeting of the Consultative Group on Biodiversity Issues, New Delhi, March 3, 2006. Dr. V.B. Mathur participated in the meeting of the 'Consultative Group on Biodiversity Issues' constituted by the Ministry of Environment & Forests for the 8th Meeting of Conference of Parties to the Convention on Biodiversity (CBD) and made a presentation on 'India's position on the CBD Programme of Work on Protected Areas'.

International Expert Workshop on Protected Areas, Curitiba, Brazil, March 17–18, 2006. The Secretariat of the Convention on Biodiversity (CBD) invited Dr. V.B. Mathur to participate in the workshop. 23 experts from Africa, Asia and



Pacific, Central and Eastern Europe, Latin America and Caribbean countries, Western Europe and representatives from NGO and indigenous communities participated in the workshop. The main purpose of this workshop was to preview the possible elements of the 'Programme of Work on Protected Areas' for review by the Conference of Parties (CoP) in its 8th Meeting and also to review the 'Evaluation Matrix for the Review of Implementation of the CBD Programme of Work on Protected Areas'. Dr. Ahmed Djoglaf, Executive Secretary, CBD in his opening remarks underscored the importance of protected areas and the effective implementation of the programme of work on protected areas. Dr. Mathur provided inputs in developing the evaluation matrix for reviewing the implementation of the CBD Programme of Work on Protected Areas. The outcomes of this workshop were fed into the discussion on the Agenda Item on 'Protected Areas' during the 8th CoP CBD Meeting held in Curitiba, Brazil from March 20 – 31, 2006.

8th Meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD), Curitiba, Brazil March 20-31, 2006. Dr. V.B. Mathur was nominated by the Government of India as part of the inter-ministerial delegation for the 8th Meeting of the Conference of the Parties (CoP) to the Convention on Biological Diversity (CBD). Approximately 3900 delegates representing parties and other governments, UN agencies, inter-governmental, non-governmental, indigenous and local community organizations, academia and industry participated in the meeting. The meeting attracted the largest number of participants in the history of the CBD, with record participation of stakeholders, most notably the private sector and an unprecedented series of side events. The substantive achievements of this meeting were: (a) the adoption of the new island biodiversity programme of work; and (b) the continuation of the ban on field testing of genetic use restriction technologies. On the two topics that largely dominated the meeting's agenda *i.e.* Access and Benefit Sharing (ABS) and Marine PAs, discussions focused more on the process. The decision on ABS focused on identifying further steps with regard to the negotiation of an international regime on ABS, while discussions on Marine PAs sought to redefine the CBD's role in relation to high seas PAs. These and other decisions served to set priorities for the next biennium. Dr. Mathur participated in the discussions of the Working Group-I, which held 18 meetings to consider agenda items on Island Biological Diversity, Forest Biological Diversity, Marine and Coastal Biodiversity, Protected Areas, Impact Assessment and Biodiversity and Climate Change and negotiated India's position in the Working Group deliberations and in the specially constituted 'Friends of the Chair' to evolve consensus on several contentious issues.

Uttaranchal State Council for Science & Technology, Dehradun, March 25, 2006. Dr. V.P. Uniyal participated in Uttaranchal State Council for Science & Technology: Brain Storming Session on Identification of Priority Areas. It was jointly supported by Department of Science & Technology, New Delhi and Uttaranchal State Council for Science & Technology. The event was attended by over 70 participants from administration, academics, NGOs, industries, scientific institutions and media persons. The objective was to identify the priority areas in policy planning, science popularization, R & D, entrepreneurship and societal programs.

Seminar on Biodiversity of Uttarakhand State, Haridwar, March 27-28, 2006. The objective of the seminar was to know the biodiversity of Uttarakhand at different levels including insects, fish, medicinal plants etc. It was organized by Department of Zoology & Environmental Sciences at Gurukul Kangri University, Haridwar. The status of different floral and faunal taxonomic groups were presented in the meeting and discussed. Dr. B.S. Adhikari made a presentation on "Medicinal and Aromatic Plants (MAPs) of Shiwalik hills in Uttarakhand State: Status and Use Patterns".

National Symposium on Himalayan Biodiversity: Issues and options for Priority Research, Kosi, Almora, March 27-28, 2006. This symposium was organized by G.B. Pant Institute of Himalayan Environment and Development, Kosi, Almora at the behest of National Academy of Sciences, India to mark its Platinum Jubilee. The major objectives of this symposium were to bring the research scientists, academicians and young research students working in the Himalaya and discuss the current trends in the biodiversity research, challenges and opportunities. The symposium was attended by over 70 participants including several fellows of National Academy. Dr. G.S. Rawat gave a key-note address on "Biodiversity Surveys in the Himalayan Region: Recent Experiences". The presentation dealt with recent experiences gained by WII, through its research projects on various components of biodiversity in the Himalayan region with focus on study techniques and broad findings.

Professional Exchange



B.S. Adhikari

Study Tours

Study tour of Sri Lankan officials on wildlife management practices in India, Dehradun, October 16-30, 2005. A group of 26 middle level officers from the Department of Wildlife Conservation, Sri Lanka participated in a study tour. The participants spent first two days in WII. They were briefed on the conservation scenario prevailing in India. They visited institutions such as Forest Research Institute (FRI), Forest Survey of India (FSI), Zoological Survey of India (ZSI) and Botanical Survey of India (BSI) during this period. Subsequently, they were taken to various Protected Areas, prominent of which are Rajaji National Park, Periyar Tiger Reserve, Ranganthittu Bird Sanctuary, Bandipur Tiger Reserve, Mukurthy National Park and Mudumalai Wildlife Sanctuary.

The field visit was aimed at providing hands-on experience of various Protected Areas of south India. The choice of areas was made based on similarity in local conditions and wildlife habitats with Sri Lanka. Inputs in the field were provided by a team of WII faculty members. Protected Area Managers were invited to discuss the conservation prospects and management issues in each of the Protected Areas visited.

Faculty Exchange Visit to the University of Tromso (UiT), Norway, November 14-28, 2005. Dr. G.S. Rawat and Dr. B.S. Adhikari visited the Department of Biology, University of Tromso, Norway under the Institutional cooperation, funded under the Ind-040 Institutional Cooperation Programme by NORAD. Specific objectives of the visit were: (i) to share experiences on the Himalayan alpine vegetation with the faculty and students at UiTo and gain experience on the arctic vegetation, (ii) to get familiar with the Post Graduate courses (syllabi and course material) on Natural Resource Ecology and Management/ Environmental Science offered at UiTo, (iii) to interact with the biologists working on Arctic region and reindeer herding patterns and management system in Norway and draw management implications for the Himalayan rangelands, if any, and (iv) to discuss the contents of final report on WII-UiTo Institutional Cooperative Programme.

International Collaborations

UNESCO-UNF Project on 'Enhancing Our Heritage: Monitoring and Managing for Success in World Natural Heritage Sites'

The UNESCO World Heritage Centre (WHC) in collaboration with the IUCN World Commission on Protected Areas (WCPA), the University of Queensland, Australia and with funding support from the United Nations Foundation (UNF) have initiated a project 'Enhancing Our Heritage: Monitoring and Managing for Success in World Natural Heritage Sites'. The project aims to improve the management of World Heritage Sites through the development of better assessment, monitoring and reporting systems and the application of the results of these systems to adopt/enhance site management as required. Based on the results of the project, IUCN will provide recommendations to the World Heritage Committee on a consistent approach to assessment, monitoring and reporting on the state of conservation and management effectiveness of the World Heritage Sites.

Ten World Heritage Sites in Africa, Latin America and South Asia have been included under this project. The three South Asian pilot sites are Kaziranga National Park, Assam, Keoladev National Park, Bharatpur and the Royal Chitwan National Park (RCNP), Nepal. The Ministry of Environment and Forests,

Government of India has entrusted the responsibility of project implementation to the Wildlife Institute of India (WII) as a Regional Partner Institution.

During the reporting period extensive monitoring of the waterfowl populations was carried out in Keoladeo National Park. To assess the ecosystem health, population trends of all 6 species of raptors were monitored. An extensive survey of wetlands within 150 km periphery of the park was carried out and 26 satellite wetlands were identified and their avifaunal populations were monitored. In Kaziranga National Park, capacity building programme for frontline staff were conducted. Insurgency and civil strife in Royal Chitwan National Park, Nepal constrained the project activities in this pilot site. In the final year of the project i.e. 2006-07, Management Effectiveness Evaluation (MEE) as per the IUCN-WCPA framework will be carried out in the project sites. This project is being coordinated by Dr. V.B. Mathur and Shri B.C. Choudhary.

Professionalizing Protected Area Management for the 21st Century – A World Heritage Biodiversity Programme for India

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 ten-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 UN foundation, UNESCO, Ford Foundation and ATREE. The UN Foundation and its partners have agreed to provide funds amounting to US \$ 5 million for the 4 year implementation phase of the WHBPI.

During the reporting period all necessary clearances for project implementation from the Planning Commission, Ministry of Human Resource Development, Ministry of Finance and Ministry of External Affairs were obtained. The SFC Memo of the project was approved in March, 2006 in a meeting chaired by Secretary (E&F), Government of India. With these approvals in place, the implementation of Phase-I of WHBPI would shortly begin. This programme is being coordinated by Dr. V.B. Mathur.

Capacity Building Programme through IAIA – CBBIA Project (Asia)

The International Association for Impact Assessment (IAIA) has initiated 'Capacity Building for Biodiversity and Impact Assessment (CBBIA)' project which is funded by the Netherlands Government. This three-year global project, aims to share information and experience and support capacity building, through transfer of knowledge, institution-building and networking. The CBBIA project seeks to integrate biodiversity conservation in Impact Assessment (both Environmental Impact Assessment or EIA at project-level, and Strategic Environmental Assessment or SEA at policy, plan or programme levels), and develop capacity among stakeholders in developing countries in several regions, including southern Africa, Central America and Asia. Specific outcomes of this project will take the form of guidance on biodiversity-inclusive

EIA and SEA, training materials and the documentation of case studies. In Asia, IUCN Asia is the focal organization responsible for implementing the Project.

The project will culminate in the development of three major outputs: (i) Practitioners Guide on how to incorporate biodiversity in the EIA Process; (ii) Reviewers Guide on how to review for biodiversity concerns in the EIA Reports with guidance from the CBBIA on EIA / SEA; and (iii) If required, a pilot training course supported by guidance materials and examples from the target countries.

The IUCN is implementing this South Asia component of the project in collaboration with the Wildlife Institute of India as a partner institute. Dr. Asha Rajvanshi and Dr. V.B. Mathur, who are both members of IAIA and have been actively contributing in training initiatives of IAIA, have been identified to play a lead role in project implementation.

Collaboration for EIA related research

In order to provide a mechanism for scientific and professional collaboration between India and Italy, the Wildlife Institute of India (WII) and the Department of Civil and Environmental Engineering (DICA) of the University of Trento signed an international exchange agreement to conduct mutually beneficial cooperative activities including developing research and training activities within the scope and expertise of the two institutions. The cooperative activities between WII and DICA shall primarily consist of the following : (i) Exchange of technical and scientific information; and (ii) Short and medium-term exchange of PhD students and academic staff to give lectures, talks and intensive courses, as well as to collaborate in ongoing research activities.

Under the provisions of a joint MoU, between WII and DICA, a collaborative research 'Development of spatial decision support system for ecological impact assessment of linear infrastructure in natural areas' has been initiated under the joint supervision of Prof. Corrado Diamantini and Dr. David Geneletti of Department of Civil and Environmental Engineering, University of Trento and Dr. Asha Rajvanshi of this Institute.

Services

State Empowered Committee on Forests and Wildlife Management, Government of Rajasthan

In the wake of the crisis faced by the three prominent protected areas in Rajasthan viz. Sariska, Ranthambhore and Keoladeo, the Government of Rajasthan constituted a State Empowered Committee (SEC) on Forests and Wildlife Management under the Chairmanship of Shri V.P. Singh, Member of Parliament. Dr. V.B. Mathur was invited to become a member of the SEC. The SEC requested the Institute to provide technical inputs in the planning and implementation of herbivore and carnivore census operations in Sariska and Ranthambhore Tiger Reserves. For the first time, ungulate population estimation was carried out by laying permanent line transects in all 'forest beats'. A spatial database in GIS domain was developed for the two tiger reserves. Tiger population in Ranthambhore and leopard population in Sariska were estimated using camera traps. The technical support and valuable scientific inputs provided by the Institute's scientists and researchers was deeply appreciated by the SEC.

Site inspection for diversion of forest land from National Chambal Sanctuary, Rajasthan for construction of four lanes Kota by-pass, November 20-21, 2005. The Standing Committee of National Board for Wildlife (NBWL) constituted

an expert team comprising Dr. R.B. Lal, IGF (Wildlife), MoEF, Shri P.R. Sinha, Director, WII and Dr. Sushant Chowdhury, Professor, WII for site inspection on the proposal of National Highway Authority of India (NHAI) for diversion of forest land from National Chambal Sanctuary for construction of four lanes by-pass. The expert team after looking into all aspect of this proposed development and its likely impact on the protected area and its supporting endangered biota submitted its report to NBWL.

Site inspection for de-notification of 12.75 ha of already broken area forest land from Kotagarh Wildlife Sanctuary, Orissa for graphite mining, December 3-6, 2005. The Standing Committee of National Board for Wildlife (NBWL) constituted a team comprising Ms. Dilnavaz Variava, Member, NBWL and Dr. Sushant Chowdhury, WII to undertake inspection for proposed de-reservation of 12.75 ha of already broken forest land from Kotagarh Wildlife Sanctuary, Orissa for graphite mining by T.P. Mineral & Industries. The team visited the site from December 3-6, 2005 and investigated all positive and negative aspects of environmental, economical and social issues that might impact the protected area conservation and management including various endangered biota therein. Lack of livelihood options, poverty and shifting cultivation are the major management issues impacting wildlife and protected area. The recommendations were submitted for the consideration of NBWL.

Joint meeting of senior wildlife officials of Karnataka, Maharashtra, Goa and wildlife experts, Panaji, January 24, 2006. Concerned with recent spread and colonization of elephants in Maharashtra and Goa from adjoining Dandeli forests of Karnataka, a tri-state joint meeting of senior wildlife officials was convened at Goa International Centre, Dona Paula, Panaji to evolve strategies to tackle the problem of cross border movement/straying of wild elephants into human habitations. Dr. Sushant Chowdhury participated in the meeting to facilitate formulation of necessary strategies of these strayed elephants. The meeting was presided over by Shri J.K. Dadoo, Chief Secretary, Goa along with Chief Wildlife Wardens of the three States or their representatives. Traditionally, elephants were never known to occur in Maharashtra and Goa, their recent movement from the year 2002 across Tillari catchments area, Maharashtra and adjoining Goa is a great concern for people and authorities for destruction of paddy and other horticulture crops viz. coconut, areca nut, cashew and plantain. Occasional human interaction and kills were major issues for public opposition. Undertaking a detailed elephant movement study, use of barriers, paying compensation for loss and damages and eliciting public cooperation were the major components of the formulated strategy.

High Level Committee for re-introduction of tigers in Shivpuri National Park, Government of Madhya Pradesh

The Government of Madhya Pradesh constituted a High Level Committee for the re-introduction of tigers in Shivpuri National Park under the Chairmanship of Shri Samar Singh, former Secretary General, WWF-India. Shri P.R. Sinha and Dr. V.B. Mathur were invited to become members of this committee. The Institute was requested to conduct a survey of the park in January, 2006 based on which a report 'Rapid Assessment of Habitat Use and Wildlife Values of Madhav National Park, Shivpuri' was submitted to the committee. Meetings of the committee were held in Shivpuri and New Delhi to work out strategies. The final report of the committee is expected to be finalized shortly.

Delhi Development Report for the Planning Commission

The Planning Commission, Government of India requested the Institute to prepare a chapter on 'Wildlife Conservation and Management' for the Delhi Development Report (DDR). Dr. V.B. Mathur and Dr. Ashish David provided inputs in the deliberations of the committee constituted by the Planning Commission and submitted a chapter on 'Wildlife Conservation and Management' for the DDR.

India's Tentative List of Natural Heritage Properties

The Ministry of Environment and Forests assigned the responsibility to the Institute of preparing India's Tentative List of Natural Heritage Properties to be inscribed on the UNESCO World Heritage List. Dr. V.B. Mathur coordinated the task. Meetings with the Forest Departments of all states and concerned stakeholders were organized on a regional basis. Based on criteria that included world heritage values, habitat integrity and contiguity, absence of large settlements and pressures, absence of conflicts with existing or proposed development projects, inclusion in other lists such as Important Bird Area, Project Tiger, Project Elephant and socio-cultural-historical values, the WII-ATREE-NCF team identified sites for single and serial nominations. 39 sites in 7 sub-clusters were identified as serial sites in the Western Ghats along with 3 single sites viz. Wild Ass Sanctuary, Gujarat; Kangchendzonga National Park, Sikkim; and Namdapha National Park, Kamlang Wildlife Sanctuary and Jairampur Forest Division in Arunachal Pradesh. This list has been submitted to the World Heritage Centre, UNESCO, Paris by the Ministry of Human Resource Development, which is the nodal agency for the world heritage sites in India.

Smithsonian Institution

The Smithsonian Institution, Washington, USA annually conducts International Biodiversity Assessment and Monitoring Course. This course guides participants through the rigorous process of designing, implementing and monitoring local and regional biodiversity programmes. Dr. V.B. Mathur was invited to be a member of the selection committee for reviewing and selecting the best candidates for this prestigious course.

IUFRO Task Force on Endangered Species and Nature Conservation

Dr. V.B. Mathur was invited to become a member of the International Union of Forestry Research Organizations (IUFRO) Task Force on Endangered Species and Nature Conservation. The Task Force is chaired by Dr. Robert Szaro, Chief Scientist for Biology, US Geological Survey and has 10 scientists from Russia, Sweden, Slovenia, USA, Belgium, Slovakia, Malaysia, Canada, Switzerland and United Kingdom. The goal of the Task Force is to increase the understanding of the role of conservation efforts in responding to endangered species and the development of a set of recommended best management practices.

Consultancy

In-depth Final Evaluation of UNEP Project

Dr. V.B. Mathur was entrusted a short-term consultancy assignment by the United Nations Environment Programme (UNEP) to conduct an in-depth final evaluation of UNEP Project 'Asia and the Pacific: Networks for Data-Information Generation, Analysis, Observation and Assessment'. The project was implemented by the UNEP Regional Resource Centre for Asia and the Pacific, Bangkok and the Asian Institute of Technology (AIT), Bangkok. Dr. Mathur submitted the evaluation report in January, 2006, which was highly appreciated by the Chief, Evaluation and Oversight Unit, UNEP, Nairobi for its professionalism.

Visitors



S. Wilson



- ◆ Students of M. Sc. (Botany) and staff members from Chaudhary Charan Singh University, Meerut on *April 26, 2005*.
- ◆ Officers from Nature Conservation Division, Ministry of Agriculture, Royal Government of Bhutan headed by Dr. Sangay Wangchuk, *April 26 - May 4, 2005*
- ◆ In-service Forest Guards accompanied by their Instructors from Natural Resource Management Centre, Forest Department of Haryana, Sohna (Gurgaon) on *April 28, 2005*.
- ◆ Trainees from Navdanya, Dehradun on *April 29, 2005*.
- ◆ Students of B.Sc. Forestry from College of Forestry & Hill Agriculture, G.B. Pant University of Agriculture and Technology, Ranichauri, Tehri Garhwal on *May 3, 2005*.
- ◆ IFS Officers of 1995 batch from IGNFA on *May 11, 2005*.
- ◆ Students from Indian Cambridge School on *June 1, 2005*.
- ◆ IFS officers of 17 years of service, undergoing Special Advanced Forest Management Course at IGNFA, on *June 7, 2005*.
- ◆ Children from Summer Adventure Camp organized by Golden Division, Mussoorie on *June 16, 2005*.
- ◆ IFS Officers of 17 years of service from IGNFA, Dehradun on *July 18, 2005*.
- ◆ Scientists from Institute of Forestry and Environment Science, University of Chittagaong (Bangladesh) on *July 19, 2005*.
- ◆ 2005 Batch of IFS Officers from IGNFA, Dehradun on *July 19, 2005*.
- ◆ IFS Officers of 10 years of service from IGNFA, Dehradun on *July 29, 2005*.
- ◆ Participants of Professional Skill Upgradation Course from IGNFA, Dehradun on *July 29, 2005*.
- ◆ Cadets accompanied by Masters from Rashtriya Indian Military College, Dehradun on *August 1, 2005*.
- ◆ Participants of Professional Skill Upgradation Course for IFS Officers from IGNFA, Dehradun on *September 1, 2005*.
- ◆ Students of IV B.Sc. 2002-2003 Batch from Tamil Nadu Agricultural University, Forest College and Research Institute, Mettupalayam on *September 2, 2005*.
- ◆ Students from Hindu College, Department of Zoology, University of Delhi on *September 9, 2005*.



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- ◆ Range Forest Officer Trainees along with faculty member from State Forest Service College, Coimbatore on *September 12, 2005*.
- ◆ Students and faculty member from School of Environment Management, Guru Govind Singh Indraprastha University, New Delhi on *September 13, 2005*.
- ◆ IFS Officers of 17 years officers belonging to 1988 batch from IGNFA, Dehradun on *September 27, 2005*.
- ◆ Trainees of Regular Basic Training Course for FGDC, 15th Batch from Forestry Training Centre, Sundernagar (H.P) on *September 30, 2005*.
- ◆ Students of PG Programme and their faculty members from National Centre for Biological Sciences, Bangalore during *October 2-8, 2005*.
- ◆ Trainees (Forest Guards) from N.R.M.C., Sohna, Gurgaon, Haryana on *October 4, 2005*.
- ◆ Students of M.Sc. Environmental Science & staff members from Shivaji University, Vidyanagar, Kolhapur on *October 7, 2005*.
- ◆ Students and faculty members from Department of Zoology, Nalbari College, Assam on *October 14, 2005*.
- ◆ Students and members of staff from Ecological Society, Pune on *October 19, 2005*.
- ◆ Students of M.Sc. Environmental Science & Researchers from University of Rajasthan on *October 21, 2005*.
- ◆ IFS officers of Advance Management Course, undergoing training at IGNFA, Dehradun on *October 25, 2005*.
- ◆ The Hon'ble Minister of State for Forests, Govt. of West Bengal, Shri Maheswar Murmu on *October 26, 2005*.
- ◆ Students of B.Sc. Forestry and two faculty members Kerala Agricultural University, Kerala on *October 31, 2005*.
- ◆ IFS officers of 1988 batch from IGNFA, Dehradun on *November 11, 2005*.
- ◆ B. Ed. students with 6 faculty members from Isabella Thoburn College, Lucknow on *November 11, 2005*.
- ◆ Students of class V and their teachers from Grace Academy, Dehradun on *November 25, 2005*.
- ◆ IFS officers of 1984 batch from IGNFA, Dehradun on *November 28, 2005*.
- ◆ Students of class IX and their teachers from Grace Academy, Dehradun on *December 6, 2005*.



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- ◆ Students of B.Sc. Forestry and staff members from University of Agri. Sciences, Bangalore on *December 7, 2005*.
- ◆ Students accompanied with staff members from North Eastern Regional Institute of Science & Technology, Nirjuli, Itanagar on *December 15, 2005*.
- ◆ IFS officers of 1986 batch from IGNFA, Dehradun on *December 19, 2005*.
- ◆ Students of M. Sc. Botany with their teachers from Pt. L.M.S. Govt. PG College, Rishikesh on *December 23, 2005*.
- ◆ M. Sc. Forestry students and their faculty from H.N.B., Srinagar, Garhwal on *December 26, 2005*.
- ◆ M. Sc. Forestry students from H.N.B. Garhwal University, Srinagar on *January 5, 2006*.
- ◆ Participants undergoing Special Advanced Forest Management Course for IFS Officers of 1992, 1994 & 1998 year of allotment at IGNFA on *January 13, 2006*.
- ◆ Forest Guards from Himachal Pradesh Forest Department Sundergarh on *February 7, 2006*.
- ◆ IFS Officers of 1990 & 1991 year of allotment undergoing 3rd special Advanced Forest Management Training Course on *February 13, 2006*.
- ◆ Forestry trainees from Kashmir Forest Training Institute, Jammu on *February 13, 2006*.
- ◆ Forest Officials of the Department of Forests, Haryana on *February 15, 2006*.
- ◆ Students of M. Sc., Govt. P.G. College, Gopeshwar, Chamoli, on *February 22, 2006*.
- ◆ Students with faculties from Khun Khun Ji Girls Degree College, Lucknow on *February 22, 2006*.
- ◆ Journalists from Kottayam and Pathanamthitta Districts in Kerala on *March 1, 2006*.
- ◆ Students from Department of Applied Zoology, Kuvempu University, Karnataka on *March 14, 2006*.
- ◆ Students of B.Sc. Forestry (6th and 8th Semester) from Allahabad Agricultural Institute (Deemed University), Allahabad on *March 24, 2006*.

Professional Support

Computer & GIS

EIA

ENVIS

Wildlife Forensic

National Wildlife Database

Audio Visual & Wildlife Extension Cell

Library and Documentation Centre

Research Laboratory

Herbarium

Wildlife Health Management

Conservation Genetics Laboratory

Professional Support



Computer & GIS Cell

The computer facility of the Institute has a very impressive array of computer hardware and software. This facility has been considerably strengthened with inputs from the Institute's own resources and those from various collaborative projects. At present, the computer facility of the Institute is well developed to serve research, training, database, GIS, remote sensing, cartographic and desktop publishing requirements of the Institute.

Computers are now used in every sphere of the Institute activities from simple word processing to complex data analysis. All the eight faculty departments and the library, administration and finance sections are equipped with a range of Pentiums systems. Major scientific activities of the Institute, including database management, graphic analysis, statistical operations, mapping and desktop publications are carried out on these machines. There are four UNIX based Sun workstations with ArcGIS software for Geographical Information System (GIS) and ERDAS Imagine for digital image processing of remotely sensed data.

The Institute has a heterogeneous computer hardware setup connected to Local Area Network (LAN). There are two Pentium II file servers, two Pentium III internet servers and 175 plus nodes. The LAN is based on the state-of-the-art structured cabling with fibre optics as the backbone connecting all the office buildings. The computers are connected to LAN through network switches on UTP cable.

The Institute has 512Kbps leased line internet connectivity with its own internet server hosting the website and mailing system. All the computers of the institute are provided with internet and mailing services. The users are provided with individual email account on the Institute's server.

Intranet Services: The Institute has established intranet services (<http://intranet>) to facilitate the users within the campus to disseminate information online viz. Computer AMC Call Management System, Map Management System, Submission of tour programmes, Circulars, Trainees database, Meteorological data, Shabdavali – online Hindi glossary, Newspaper Clip Management Services, Email and Internal phone directory.

e-Governance Project at WII: The Ministry of Environment and Forests (MoEF) has initiated the e-Governance project "ENVISION" with the objective of applying principles of good governance to the management and regulation of use of environmental resources.

In this regard, the Institute submitted a "Concept proposal for establishment of National Wildlife Informatics System (NWIS) at the Institute" to MoEF. A questionnaire for "ENVISION AS IS STUDY" was also submitted.

The Institute has constituted e-Governance Committee under the Chairmanship of Dean, WII and e-Champions have been nominated within the Institute for the implementation of e-Governance project.

LAN extension with Wi-Fi connectivity to Guest House, Old Hostel and New Hostel: The Local Area Network (LAN) of the Institute has been extended to Guest House, Old Hostel and New Hostel with Wi-Fi connectivity. The Wi-Fi connectivity is provided to other office premises viz. Auditorium, Library, Board Room, office of Director and Dean, Porta Cabin and Diploma Classroom.

Training: The Computer/GIS Cell conducted computer-training courses for the students, researchers and officer-trainees of the PG Diploma Course and Certificate Course in Wildlife Management. Inputs were given on concepts of computer, LAN/internet, software packages viz. MS Windows, MS-Office, SPSS, S-Plus and specialised software packages related to wildlife research. Hands on training were also given on Arc/Info and ERDAS Imagine software packages for Geographical Information System, Remote Sensing and Global Positioning System technology.

Application of GIS/RS/GPS in Research Projects: Geographic Information System (GIS), Remote Sensing (RS) and Global Positioning System (GPS) technology is being used in most of the research projects of the Institute for wildlife research and conservation. The major application of the GIS technology was made in the development of spatial database on the boundaries of all the national parks and wildlife sanctuaries in the country; the work is presently ongoing. Similarly, digitization of the division, range and beat boundaries of the 17 tiger range States in the country have also been initiated.

Environment Impact Assessment (EIA) Cell

CONSULTANCY SUPPORT

Ecological study of the area under consideration for renewal of mining lease of M/s Narmada Cement Company Ltd., Jafarabad, District Amreli, Gujarat

Funding Source: Narmada Cement Company Ltd.

Objectives: The above study was initiated in February 2004 under the joint supervision of Dr. Y.V Jhala and Dr. Asha Rajvanshi with the following specific objectives: (i) Assessment of the impacts of mine renewal on distribution of lions in and the around mine lease areas; (ii) Assessment of habitat suitability for lions and wild ungulates in the mine lease areas; (iii) Evaluation of the importance of the mine lease area for long-term viability of lion population in the area; and (iv) Provide recommendations arising out of the study to facilitate environmental decision making.

The final report arising out of the work has been submitted to Gujarat Forest Department and M/s Narmada Cement Company Ltd., Jafarabad, District Amreli, Gujarat.



A. Rajvanshi



Impact Assessment of MMPL Phase-II (Manglya - Mathura - Piyala - Bijwasan) Pipeline Project on Wildlife Values

Funding Source: Bharat Petroleum Corporation Limited (BPCL)

Investigator: Dr. Asha Rajvanshi

Researchers: Ms. Malvika Onial and Parichay

Date of initiation: August 24, 2004

Date of completion: July 13, 2006

Objectives: The specific objectives are: (i) Assessment of the impacts of mine renewal on distribution of lions in and the around mine lease areas; (ii) Assessment of habitat suitability for lions and wild ungulates in the mine lease areas; (iii) Evaluation of the importance of the mine lease area for long-term viability of lion population in the area; and (iv) Provide recommendations arising out of the study to facilitate environmental decision making.

The study supervised by Dr. Asha Rajvanshi, has been completed and the final technical report has been submitted to M/s Bharat Petroleum Corporation Ltd.

Impacts of Majghawan Diamond mines of National Mineral Development Corporation Limited (NMDC) on the biodiversity values of Panna Tiger Reserve

Funding Source: National Mineral Development Corporation Limited (NMDC)

Investigators: Dr. Asha Rajvanshi and Dr. S.P. Goyal

Researchers: Ms. Parichay and Mr. Pragaseeth

Date of initiation: September 27, 2005

Date of completion: September 26, 2006

Objectives: The study has been taken up in response to the directives of MoEF for facilitating environmental decision-making with respect to renewal of mining lease of National Mineral Development Corporation with the following objectives: (i) Identify key sources of impacts of Kimberlite mining on terrestrial and aquatic ecosystems within Panna Tiger Reserve; (ii) Review efficacy of existing environmental management practices; (iii) Develop ecological criteria for evaluation of impacts of mining operations on biodiversity values of Panna Tiger Reserve; (iv) Assess impacts of mining on physico-chemical properties of soil and water; (v) Assess impacts of mining on forage values using select species of plants; (vi) Determine impacts of mining operations on habitat quality and use by select wild animal species; (vii) Determine the significance of ecological impacts; and (viii) Develop best practice guidance and monitoring code for mitigation of impacts on biodiversity of Panna Tiger Reserve.

Review of the socio-economic aspects of the rehabilitated *gujjar* population in Gaundikhatta relocation sites, Rajaji National Park (RNP)

The objectives of the study were to: (i) assess whether the experiences of initial resettlement programme in Pathri were utilized for improving rehabilitation conditions in Gaundikhatta; and (ii) assess whether the long-term prospects of *gujjar* relocation as implemented in Gaundikhatta would ultimately help in meeting the conservation objectives of RNP.

Soil and Water quality as indicators of resource conditions in protected areas – A case study of Rajaji National Park

The objectives the study were to: (i) review the changes in the resource condition of the park as compared with past condition using soil and water as indicators of habitat quality; (ii) establish correlation between changes in the soil and water quality and *Gujjar* relocation; and (iii) establish comparisons in environmental quality of Rajaji National Park and Gaidikhatta relocation sites using soil and water quality as parameters.

ADVISORY SUPPORT

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

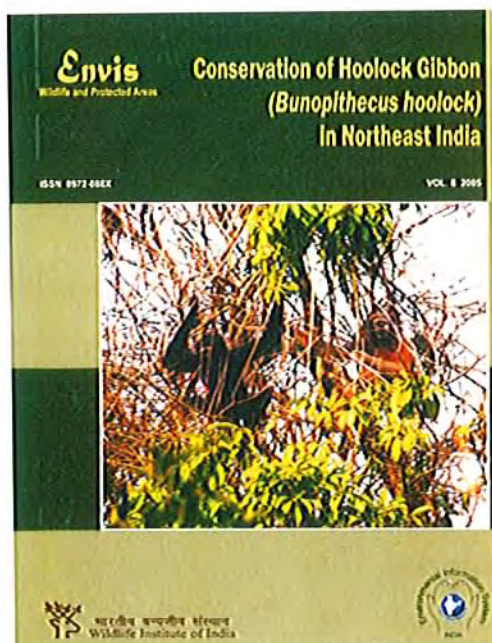
WII continued to provide advisory services to MoEF on matters related to environmental decision making. WII is represented on the Expert Committee for mining projects. In this capacity, WII is advising the Environment Division of MoEF in the evaluation of EIA reports on mining projects for decision making with respect to environmental clearance. The nature of work involved extensive review of EIA documentation, attending Expert Committee Meetings at MoEF for environmental appraisal of projects and review of project specific Conservation Plans prepared as part of Environmental Management Plans (EMP). Dr. Asha Rajvanshi continued to provide this as a member of the Expert Committee (Mining).

Development of criteria for registration of EIA consultants

As a part of the ongoing initiative of MoEF for revision of environmental clearance process, the Quality Council of India initiated the development of registration scheme for EIA consultants through National Registration Board for Personnel and Training (NRBPT). Dr. Asha Rajvanshi was invited to serve as an expert in the core group constituted by Quality Council of India for developing comprehensive criteria for registration of EIA consultants. In this capacity, she participated in the consultative meetings organized by NRBPT and provided professional support in the development of guidelines/criteria for certification of EIA consultants for the focal area – Ecology & Biodiversity. These guidelines were presented to the Board in the 27th January 2006 at New Delhi.

ENVIS Centre 'Wildlife and Protected Areas'

The Ministry of Environment and Forests, Government of India established the 23rd Centre on Environment Information System in September, 1997 at Wildlife Institute of India. The thematic area of WII-ENVIS Centre is 'Wildlife and Protected Areas'. The mission of ENVIS is to support and facilitate the diverse group of clientele from policy makers to researchers and industries and promote national and international level cooperation and exchange of environmental data and information through a nation-wide web enabled network. The goals of 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 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 ENVSI Bulletin on "Conservation and Hoolock Gibbon in Northeast India". This thematic bulletin has seven chapters and a bibliography with over 500 references. It provides baseline information on current distribution and status of Hoolock Gibbon in the States of Mizoram, Meghalaya and Assam.

In recognition of the activities of the Institute's ENVIS Centre it was included as ENVIS-SDNP node on "Protected Area Management". A dedicated website (<http://www.wii.gov.in/envis/sdnp/index.htm>) 23 MB was developed during the reporting period. It provides information on (i) Emerging Issues; (ii) Convention and Treaties; (iii) Agenda 21 & PA Management; (iv) National Legislations and Policies. The ENVIS Centre is currently working on two thematic bulletin viz. (i) Bibliography of Rajaji National Park; and (ii) Galliformes Conservation in India.

Wildlife Forensic Cell

During the reporting period, Wildlife Forensic Cell (WFC) received eighty-four wildlife offence cases for identification of species from the seized biological products. Under these offence cases, the various biological products included were of shahtoosh shawls, skins, hair, bones, claws, meat, ivory and its products, paint brushes, and other finished products like, shoes and waist belts, fishing flies, pendants etc. Various types of fake products like fake skins with stripe pattern, elephant ivory, candle stand made of fake ivory, fake wrist watch straps suspected to be of crocodilian species etc. were also received. During the current year, a total of twenty eight cases were disposed of successfully. Apart from analyzing the offence cases, WFC personnel have to appear regularly in the court of law as "Expert Witness". During the year WFC assisted the court of law as "Expert Witness" in four cases.

In view of dealing wildlife offence cases related to meat, the Institute has established the state-of-the-art DNA facility by procuring equipments like automated DNA sequencer; Real Time PCR, Qiagen Bio Robotic for DNA extraction and others. WFC is aimed to standardize protocols for extracting DNA from highly degraded samples found in wildlife offences and develop DNA profiles of Indian species reported in the trade. The Institute has already initiated the work on establishing DNA profiles of tiger, leopard, musk deer, sambar, chital and other species using highly conserved genes of mtDNA like cytochrome 'b', 12S RNA, 16S RNA and Control region. Reference samples for developing such protocols have been provided by different zoos of New Delhi; Chandigarh; Hyderabad, Tripura and Forest Department of various States.

As per the directions of the Ministry of Environment and Forests, WFC organized four Training Workshops of four days each on "Wildlife Crime Prevention, Detection & Identification of Wildlife parts and products in Illegal Trade" for Enforcement agencies on October 17-19, 2005, December 12-15, 2005, January 17-20, 2006 and February 21-24, 2006. The agencies involved are Indo-Tibetan Border Police (ITBP), Sashastra Seema Bal (SSB), Directorate of Revenue Intelligence DRI, Indian Customs and Border Security Force (BSF). A total



number of 67 participants were trained in the above training courses that included theory and practical for physical examination and collection of guard hair and wool from shahtoosh shawls, identification of antlers, canines, rhino horn, Ivory by morphological and microscopic characteristics, examination of fake and real skins, preliminary identification of bear bile and characterizing musk pods and musk powder. One-day was kept for field visit to the Rajaji National Park to familiarize the participants about the various problems in managing the wildlife in Indian Forests.

Theory and practical inputs of WFC to various other courses included: (i) Special Course in Wildlife Protection, Law and Forensic Science for the Indian Revenue 95 Service (Customs and Central Excise) Group "A" Probationers of 56th Batch, (February 27th – March 9th 2006); (ii) Wildlife Forensic Cell (WFC) conducted one day workshop on identification of wildlife articles for the participants of the 2nd Special Course on Wildlife Crime for Forest Officers from L.N.J.N. National Institute of Criminology and Forensic Science, Ministry of Home Affairs, Rohini, Delhi on November 12, 2005. There were twenty eight participants in the above course; (iii) In pursuance to Hon'ble Supreme Court orders, Additional PCCF and Chief Wildlife Warden, Jammu & Kashmir Government, Jammu had requested Wildlife Institute of India to organize two days workshop on Identification, marking and certification of Shahtoosh items. Shri C.P. Sharma Wildlife Forensic Cell organized two-day workshop for assisting J&K Wildlife Protection Department in identification of Shahtoosh items from March 3-4, 2006. A manual for Identification and Marking of Shahtoosh shawls was prepared and distributed among the participants.

TRAINING ACQUIRED

- (i) Shri C.P. Sharma, Laboratory Technician and Shri Bibek Yumnam, JRF, (Project - Human- Leopard conflict in Pauri Garhwal) attended the Genetic Analyzer Training for Sequencing and Fragment analysis from March 9-11, 2006 at the Molecular Biology Technical Support and Training Centre, Gurgaon, Haryana of M/S LABINDIA Instruments PVT. Ltd. The course was specifically designed for users of the Applied Biosystems Genetic Analyzer.
- (ii) Shri C.P. Sharma, Laboratory Technician and Smt. Rina Rani Singh SRF attended a two-day seminar on Protein Databases & Protein Structure Confirmation Techniques, at Reliance Web World, Gomti Nagar, Lucknow from November 26-27, 2005 organized by the Bio-informatica Solutions, Kanpur.

National Wildlife Database

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 also with 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 the reporting period, the main thrust of the activities was on the development of web based databases besides the collection, compilation,

validation and input of data on the protected areas and faunal species as a regular activity. The PA Database was updated further. Currently there are 597 Protected Areas including 95 National Parks, 500 Wildlife Sanctuaries and 2 Conservation Reserves in India, covering 155,979.85 km² which is 4.75% of the geographical area of the country. Species database was updated further by adding information on the distribution status of mammalian species in various protected areas and states. Bibliographic database on Indian wildlife was updated by incorporating the latest information published in various issues of journals, periodicals etc received during the said period. Trainees database was also updated and currently there are information on 517 Diploma officers and 385 Certificate officers trained in various courses including 117 foreign nationals.

Website of the National Wildlife Database has been modified and updated and efforts are on to make it more informative and user friendly. Wildlife Protected Area Network report has been updated further by incorporating the latest information received/ collected by the Cell.

Audio Visual & Wildlife Extension Cell

The Audio Visual & Wildlife Extension Cell of the Institute caters to the various requirements of academic activities. The unit maintains 16mm films, video films, synchronized programme, various audio-visual equipments, still camera & video cameras with accessories and photo library.

During the reporting period, the unit screened 45 shows of nine projectors synchronized programme of the Institute "We are Nature, Nature is our world", on different occasions. Photographic documentation of the activities of WII was done. Computerized database is being prepared for the quick retrieval of these photographs. Support was provided to the forensic cell for photo documentation of seized material. The negatives and prints were classified and documented.

The cell is now developing capacity in producing short films. During the reporting period a short film on Gujjar relocation in Rajaji National Park was made. The film was shot on Sony PD 170 and its non linear editing done inhouse.

As part of the information dissemination programme, four issues of WII Newsletter were published during the reporting year.

World Environment Day celebration was organised by the cell in the Institute on June 5, 2005. The theme of this years' celebration was 'Green Cities'. The children of WII family participated in the following activities: (i) Plastic collection in faculty houses Block II and staff quarters Block III; (ii) A film on 'World Conservation Strategy' was screened; and (iii) The children were taken for a visit to 'State Level Energy Park'. A total of fifty seven children participated in the visit. The children were exposed to different non-conventional sources of energy. A discussion on the importance of environment was also held after the screening of the film.



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The 'Wildlife Week' celebrations were organised by the cell from October 2-8, 2005. Activities were organized for the children which included: (i) Puppet shows at different schools, (ii) Nature Card preparation by children from

nominated schools, (iii) Wildlife Poster (A3 Size) with slogan for children from nominated schools, (iv) Wildlife Film Shows at different schools, and (v) Wildlife Quiz for Staff. The winners of different competitive events were given prizes.

The Institute participated in Virasat '05 a heritage festival, which was organized by REACH (Rural Entrepreneurship for Art & Cultural Heritage) at Ambedkar Stadium, Dehradun. Virasat '05 was a presentation of the Indian heritage through craft bazaar, art & painting, workshops, folk-dances, music, theater etc. Exhibits from various government organizations and other groups were the integral part of the festival. An exhibition on Biodiversity of India and the role of WII was set up at the festival.

Library and Documentation Centre

The WII Library and Documentation Centre was established as a multi-disciplinary information and learning resource centre on biodiversity conservation and management. The Library & Documentation Centre (L & DC) has the following objectives :-

- a. To serve as a repository of all wildlife related literature published in India.
- b. To acquire, organize and disseminate all relevant world wide literature on biodiversity conservation and related fields.
- c. To serve the user readership through normal and special library & information services, like circulation, reference, photocopy, documentation, etc.
- d. To establish and maintain links with other national information systems in India and other countries to ensure free flow of information at national and international levels.
- e. To serve as a training center for information personnel and users.
- f. To provide the above services to :
 - WII,
 - Protected areas all over the country,
 - Institutions engaged in nature conservation research in the country & abroad,
 - Universities & Colleges,
 - Individual scholars working in related areas, NGOs, etc.
- g. To bring out periodic publications on the following :
 - Current content of periodicals,
 - Research in progress,
 - List of unpublished research literature, covering dissertations, thesis etc.,
 - Compilation of bibliographies,
 - Compilation of abstracts.

The L & DC now holds over 24918 books, 17740 newspaper clippings, 7150 maps/toposheets and more than 5695 bound volumes of old and rare journals. The library also maintains collection of scientific papers numbering 9578. It subscribes to more than 306 periodicals. During the reporting year, 718 books, proceedings, theses & reports, 278 scientific papers and 2040 press clippings were acquired.

The L & DC is fully computerized, using LIBSYS Library Management Software, UNESCO'S WINISIS Software, CD Server, Barcode and related technologies. For optimum resources use by researchers, students, officer trainees and



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other users, 12 computer terminals available in the library premises and the faculty desks have been inter-connected with a LAN. Being connected to the library facility, the users have the privileges to access all in-house databases like books, reprints, Indian wildlife abstract, 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, etc. Users also have access to CD-ROM databases like Wildlife Worldwide 1935 -, E-CD and CAB Spectrum 1973 available on the LAN.

During 2005-06, over 2,21,530 pages of photocopies were provided to the users. Approximately 36,000 documents were issued and consulted during 2005-06. Value Added Service was provided to 175 clients while Ready Reference Service to approx. 3750 clients. Approximately 267 queries were attended from outside users and more than 10,130 bibliographic references were provided to the users. 45 documents have been procured on Inter-Library Loan from nearby libraries.

Research Laboratory

The laboratory extends technical inputs in teaching, training and analytical fields to research projects and ongoing training programmes of the Institute. The laboratory is equipped with various basic and modern equipment (pH Meter, Conductivity Meter, Spectrophotometer, Digital Balance, Hot Air Oven, Atomic Absorption Spectrophotometer (AAS), High Performance Liquid Chromatograph (HPLC), UV-Visible Spectrophotometer, Microwave Digester, Automatic Protein Analyser, Automatic Fiber Analyser, Microscopes, Ultra pure Water Purification System etc.) required for the analysis of various physio-chemical parameters of plant, soil and water samples. Teaching classes followed by practical for various ongoing courses of the Institute, for the students from FRI Deemed University & University of Mumbai, and Forest Officials from Bhutan & Sikkim were conducted at the laboratory on 'Instrumentation and Analytical Techniques'. This includes herbivore pellet and carnivore scat analysis, collection & preservation of biological materials, collection of meteorological data, age and sex determination of animals, osteology of mammals and analysis of plant, soil and water samples for various parameters.

Several research projects utilized the analytical facility of the laboratory for plant, water & soil samples, pellet/dung analysis and carnivore scat analysis. In total 1,866 samples were analyzed. Of these, 586 were plant, soil and water samples (analyzed for ADF, NDF, lignin, cellulose, crude protein, Ca, Mg, Zn, Cu, Fe, Ni, Mn, EC, pH, Cl, CO_3 , HCO_3 , Cr, Hg, Ni, Pb, OC), 680 pellet and scat samples (for food habits studies) and 600 tissue/ blood samples (for the determination of Diclophenac salt).



The laboratory staff provided technical inputs in field, which included demonstration of various traps, camera traps, mist netting for birds, electric fence and radio telemetry in various training programs. The laboratory staff also collected meteorological data (rainfall, temperature, humidity, wind velocity and direction) in the WII campus, water and soil samples from Chilla, Rajaji National Park, water samples from Banganga reservoir, Uttaranchal, water samples from WII campus and soil samples from Sariska Tiger Reserve, Rajasthan for the analysis of various physio-chemical parameters.



Herbarium

During the reporting period Herbarium received plants (ca. 600) for identification from Corbet Tiger Reserve, Askot Wildlife Sanctuary, Jhilmittal Conservation Reserve and Rajaji National Park, Uttaranchal, Katarniaghat Wildlife Sanctuary, Uttar Pradesh, Trishna Wildlife Sanctuary, Tripura, Tadoba National Park, Maharashtra, and Chamba District, Himachal Pradesh. The plants collected by Dr. G.S. Rawat from his Western Himalayan expedition were also incorporated (ca. 450) in the herbarium along with the orchid specimens (ca. 196) from Uttaranchal State.

The herbarium section provided inputs to regular courses, viz. M.Sc., Certificate and Diploma courses. The herbarium staff also provided inputs in training programmes, such as Nature Guide, Junior Research Fellows working for different projects at WII. Staff of herbarium gave field inputs in the orientation-cum-technique tour of Certificate and Orientation tour of Diploma to Rajaji National Park and during Management Planning tour to Melghat Tiger Reserve, Maharashtra. Front line staff of different State Forest Departments and students from various Colleges/Universities visited herbarium during this year.

The herbarium section is also engaged in the campus biodiversity monitoring programme and undertook vegetation surveys of Baanganga Conservation Area. Efforts are on to make a digital herbarium.

Wildlife Health Management

Technical assistance in management of a leopard, Garhi Shyampur, July 12-13, 2005. Based on the request from DFO, Dehradun, WII provided technical assistance in management of a leopard that had fallen in a deep dry well (60 ft) at Garhi Shyampur near Rishikesh on July 12, 2005. The leopard could be successfully rescued on July 13, 2005 following chemical immobilization and was later released in Motichur area of the Rajaji National Park. The field inputs were provided by Shri Sameer Sinha and Shri Ranjan Mishra from Uttaranchal Forest Department, Dr. P.K. Malik, Dr. Sushant Chowdhury and Dr. (Capt) Parag Nigam from WII.

Rescue of wild elephant calf, Resham Majri, July 14, 2005. Wild cow elephant along with a calf had strayed in the crop fields adjacent to the Resham Majri village near Rishikesh. The cow elephant was reported dead and it was essential to rescue the wild elephant calf. The elephant calf was chemically immobilized and translocated successfully to elephant camp at Chilla range of Rajaji National Park on July 14, 2005. The field operation was carried out by Dr. (Capt.) Parag Nigam.

Chemical restraint of tusker, Rajaji National Park, February 27, 2006. An adult captive tusker Raja at Chilla range of Rajaji National Park was reported to have run into the forest after exhibiting signs of *musth*. The animal was searched for three days and was ultimately found near a *Gujjar Dera* at Shyampur range. The animal was aggressive and was a threat to life and property. The tusker was successfully immobilized and restrained. The field operation was carried out by Dr. (Capt) Parag Nigam.

Conservation Genetics Laboratory

During the reporting period, Ms. Tripti Negi, working on the Satpura-Maikal Pilot Project as a junior research fellow extracted DNA from tiger and lion scats and amplified several micro-satellite loci. This work attempts to identify individual animals from their micro-satellite polymorphism and gain an understanding of the conservation genetics of individual populations. Work on nuclear markers for wolves, dogs, and jackals continued to enhance the understanding on molecular phylogeny. Dr. Y.V. Jhala worked with collaborating scientists at the Smithsonian Institution, Washington DC in October 2005, for designing and selecting micro-satellite loci for tigers and lions and on analysis using the automated sequencer. A paper was co-authored with collaborating scientists from the Bombay Natural History Society and the Smithsonian Institution and published in the Proceedings of the Royal Society, London on comparative aspects of avian malarial parasites in India and Hawaii. Avian malaria was introduced in Hawaii through introduction of Indian birds. It was a major threat to native endemic bird species of Hawaii. The Indian component of this work was done at the Institute's Conservation Genetics laboratory.

Governance



Society

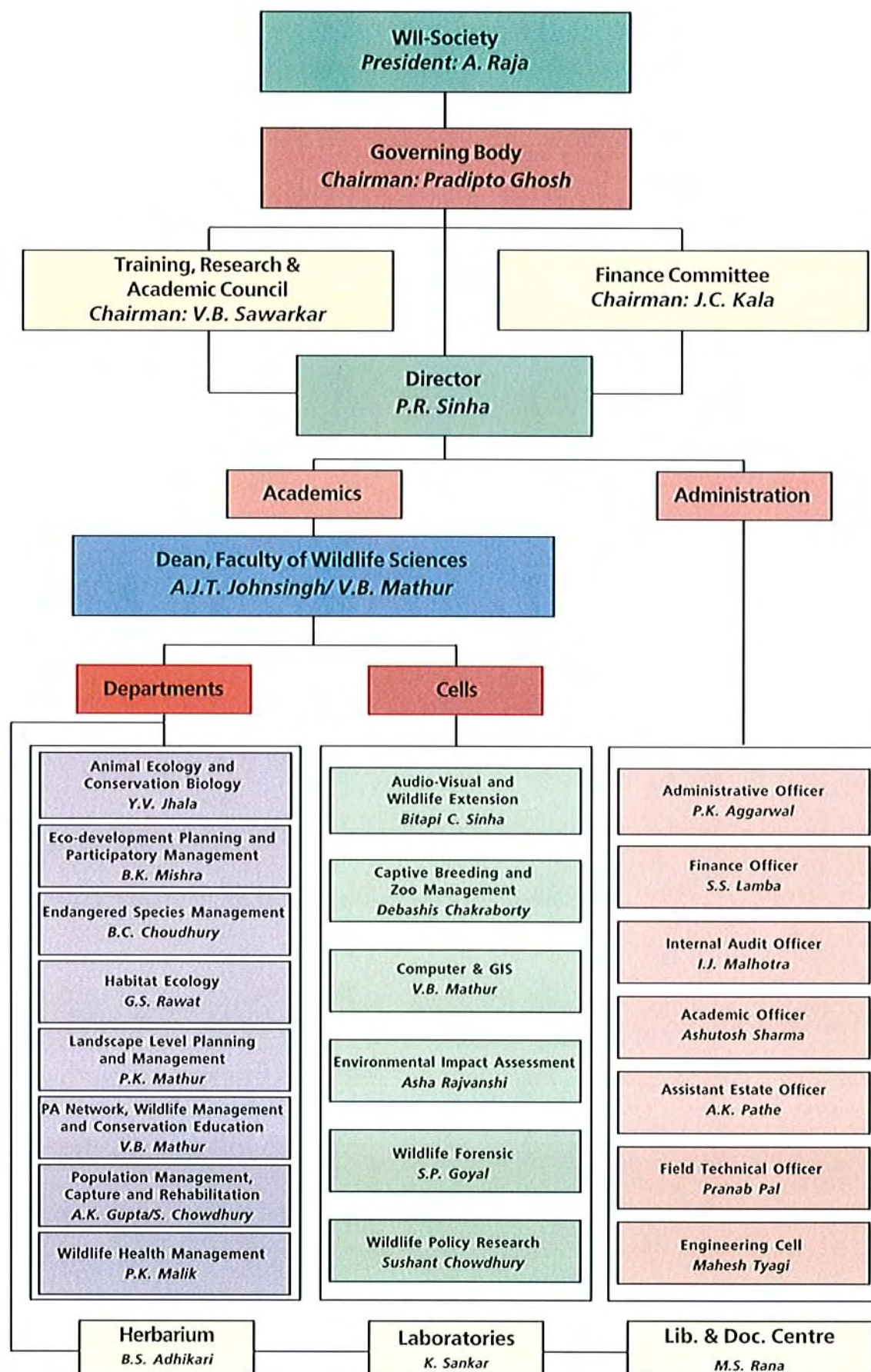
Governing Body

TRAC

Finance

Building

Organizational Structure of WII



Governance

The Society of Wildlife Institute of India

(According to Rules & Regulations of the WI-Society)

With the approval of the Competent Authority and in pursuance of Rule 4, (Sub-Rule i to XXII) of the Rules & Regulations of the Institute, the Wildlife Institute of India - Society has been reconstituted for a period of three years w.e.f. from June 21, 2005:

1. President,
Hon'ble Union Minister for Environment & Forests
Government of India, Ministry of Environment & Forests,
Paryavaran Bhawan, 'B' Block, CGO Complex, Lodi Road,
New Delhi – 110 003
2. Vice-President,
Hon'ble Minister of State for Environment & Forests,
Government of India, Ministry of Environment & Forests,
Paryavaran Bhawan, 'B' Block, CGO Complex, Lodi Road
New Delhi – 110 003
3. Shri Rameshwar Oraon
Member of Parliament
4. Shri Bachi Singh Rawat
Member of Parliament
5. Shri Harish Rawat
Member of Parliament

Members

6 to 18 Minister in charge of the portfolio of Wildlife Conservation in and/or Forests on a regional rotational basis:

- | | | |
|-------------------|---|----------------------------|
| North-East India | - | Mizoram, Manipur, Nagaland |
| Eastern India | - | Orissa, West Bengal |
| Western Region | - | Maharashtra, Rajasthan |
| Southern India | - | Kerala, Tamil Nadu |
| Northern India | - | Himachal Pradesh, J&K |
| Central India | - | Madhya Pradesh |
| Permanent Invitee | - | Uttaranchal |
19. Shri S.K. Patnaik,
Former CCF (Orissa),
81, Fishery Lane, Buddheswari Colony,
Bhubneshwar – 751 006
 20. Shri A.S. Negi,
Former CWLW (Uttaranchal),
300, Model Colony, Araghar,
Dehradun

21. Dr. Erach Bharucha,
Director,
Bharti Vidyapeeth Institute of Environment Education and
Research (Bhartiya Vidyapeeth Deemed University)
Katraj-Dhankawadi,
Pune – 411 043
22. Dr. S.K. Dutta,
Professor, Department of Zoology,
North-Orissa University,
Baripada, Mayur Ganj District (Orissa)
23. Dr. Reena Mathur,
D-279, Todarmal Marg, Bani Park,
Jaipur (Rajasthan)
24. Shri A.P. Dwivedi
Former PCCF, Madhya Pradesh,
B-267 Shahpura,
Bhopal (M.P.)
25. Shri S.K. Chakraborty,
No. 4, Dr. Satyananda Rai Road, Dally Gunj,
Kolkata – 700 029
26. Prof. V.C. Soni,
Department of Biosciences, Saurashtra University,
Rajkot (Gujarat)
27. Prof. P.C. Bhattacharjee,
Head, Department of Zoology,
Guwahati University,
Guwahati (Assam)
28. Prof. Madhav Gadgil,
Centre for Ecological Science, Indian Institute of Science,
Bangalore – 560 012
- 29 to 33 Representative of following organizations: Bombay Natural History
Society, Mumbai, World Wide Fund for Nature-India, New Delhi,
Wildlife Preservation Society of India, Dehradun, Centre for
Environment Education, Ahmedabad, Friends of Doon, Dehradun.

Members (Ex-officio)

34. Secretary to the Govt. of India,
Ministry of Environment & Forests,
Paryavaran Bhavan, 'B' Block, CGO Complex, Lodi Road,
New Delhi - 110 003
35. Secretary to the Government of India,
Ministry of Finance,
New Delhi
36. Secretary to the Government of India,
Ministry of Science and Technology,
New Delhi
37. Secretary to the Government of India,
Ministry of Human Resource Development,
New Delhi
38. Representative of the Planning Commission,
Government of India,
New Delhi

39. A representative of the University Grants Commission,
New Delhi
40. The Chief Secretary,
Government of Uttaranchal, "Sachivalaya"
Dehradun - 248 001
41. Director General of Forests & Special Secretary to the Govt. of India,
Ministry of Environment & Forests,
Paryavaran Bhavan, 'B' Block, CGO Complex, Lodi Road,
New Delhi - 110 003
42. Addl. Director General of Forests (WL) & Director,
Wildlife Preservation, Ministry of Environment & Forests,
Paryavaran Bhavan, 'B' Block, CGO Complex, Lodi Road,
New Delhi - 110 003
43. Financial Advisor,
Ministry of Environment & Forests,
Paryavaran Bhavan, 'B' Block, CGO Complex, Lodi Road,
New Delhi - 110 003
44. Director General,
Indian Council of Forestry Research & Education,
P.O. New Forest,
Dehra Dun – 248 006
45. Director,
Zoological Survey of India,
M-Block, New Alipore,
Kolkata - 700 053
46. Director,
Botanical Survey of India,
CGO Complex, 3 MSO Building, Block F-5th & 6th Floor,
DF Block, Sector-I, Salt Lake City,
Kolkata (W.B.)
(The present membership tenure is valid upto 7.10.2005)

Members

47. Dr. V.B. Mathur,
Dean, Faculty of Wildlife Sciences,
Wildlife Institute of India,
Dehradun
(Faculty Member nominated vide DWII Notification No.DWII/580/2005 dated 25th January, 2006. Membership valid upto 20.06.2008).
48. Shri A.K. Bhardwaj,
Professor and Head of Office,
Wildlife Institute of India,
Dehradun
(Faculty Member nominated vide DWII Notification No.DWII/580/2005 dated 25th January, 2006. Membership valid upto 20.06.2008).

Member-Secretary

49. Director,
Wildlife Institute of India,
Dehradun

Governing Body

The Institute has a Governing Body chaired by The Secretary (Ministry of Environment and Forests, Government of India). The current Governing Body composition includes official and non-official members for a period of three years w.e.f. 10th May, 2005:

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

Members

3. Shri S.K. Patnaik,
Former CCF (Orissa),
81, Fishery Lane, Buddheswari Colony,
Bhubneshwar – 751 006
4. Shri A.S. Negi,
Former CWLW (Uttaranchal),
300, Model Colony, Araghar,
Dehradun – 248 001
5. Dr. Erach Bharucha,
Director,
Bharti Vidyapeeth Institute of Environment Education and Research,
(Bhartiya Vidyapeeth Deemed University),
Katraj-Dhankawadi,
Pune – 411 043
6. Dr. S.K. Dutta,
Professor,
North-Orissa University, Department of Zoology,
Baripada, Mayur Ganj District, Orissa
7. Dr. Reena Mathur,
Department of Zoology, University of Rajasthan,
Jaipur, Rajasthan
8. One non-official member to be nominated
9. Financial Advisor &
Joint Secretary to the Government of India,
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

11-16 Chief Wildlife Warden on a regional rotational basis

Southern Region	-	Andhra Pradesh
North-East Region	-	Arunachal Pradesh
Eastern Region	-	Jharkhand
Northern Region	-	Haryana
Western Region	-	Gujarat
Permanent Invitee	-	Uttarakhand

17. Addl. Director General (WL) &
Director, Wildlife Preservation,
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 Forest,
Dehra Dun - 248 006

19. Chairman,
Training, Research and Academic Council (TRAC), WII,
464, Rasta Peth,
Near Power House,
Pune - 411 011

20. Dr. P.K. Malik
Wildlife Institute of India,
Post Box 18, Chandrabani,
Dehra Dun - 248 001
(Faculty Representative nominated vide DWII Notification No.12-1/
84-WII dated 3rd February, 2004. Membership valid upto 2.2.2007).

Member-Secretary

21. Director,
Wildlife Institute of India,
Post Box 18, Chandrabani,
Dehra Dun - 248 001

Training, Research & Academic Council (TRAC)

Training, Research and Academic Council (TRAC) - Reconstituted vide WII's Notification No.DWII/555/2001 (Part-II), dated February 21, 2005 for a period of three years w.e.f. date of issue of this notification (21.02.2005 to 20.02.2008)

1. Chairman,
Shri V.B. Sawarkar,
Former Director, WII
464, Rasta Peth, Near Power House,
Pune – 411 011 (Maharashtra)

Members

2. Professor R.K. Sinha,
Department of Zoology, Patna University,
Patna - 800 005 (Bihar)
3. Dr. Sher Ali,
Chief, Molecular Genetics Laboratory,
National Institute of Immunology,
Aruna Asaf Ali Marg,
New Delhi - 110 067
4. Dr. P.S. Roy,
Deputy Director, (RS & GIS Application Area)
National Remote Sensing Agency, (Dept. of Space, Govt. of India),
Balanagar,
Hyderabad - 500 037 (Andhra Pradesh)

Two representatives from universities, who are members of WII-Society

5. Dr. P. C. Bhattacharjee,
Professor, Department of Zoology, Guwahati University,
Guwahati - 781 014 (Assam)
6. Dr. V.C. Soni,
Department of Biosciences, Saurashtra University,
University Campus, Kalavad Road,
Rajkot - 360 005 (Gujarat)
7. Shri R.P.S. Katwal, IFS,
Addl. Director General (Wildlife) & Director Wildlife Preservation,
Ministry of Environment & Forests,
Paryavaran Bhavan, B-Block, C.G.O. Complex, Lodi Road
New Delhi – 110 003

Members on Regional - Rotational Basis

8. Dr. C.M. Seth, IFS,
Chief Wildlife Warden, Govt. of Jammu & Kashmir,
Tourist Reception Centre,
Srinagar – 190 001 (Jammu & Kashmir)

9. Chief Wildlife Warden, Government of Haryana,
Van Bhawan, Forest Complex, C-18, Sector-6
Panchkula - 134 109 (Haryana)
10. Chief Conservator of Forests & Chief Wildlife Warden,
Government of Bihar,
4th Manzil, Vishweshraiah, Technology Bhawan, Beli Road,
Patna - 800 014 (Bihar)
11. PCCF (Wildlife) & Chief Wildlife Warden, Govt. Of Orissa ,
5th Floor, B.D.A. Apartment, "Prakruti Bhawan", Nilkantha Nagar,
Bhubaneswar - 751 012 (Orissa)
12. Addl. PCCF (Wildlife) & Chief Wildlife Warden,
Government of Chhattisgarh, Jail Road, Fafadih Chowk,
Raipur - 492 001 (Chhattisgarh)
13. Chief Conservator of Forests (WI) & Chief Wildlife Warden,
Government of Gujarat, Dr. Jivajiraj Mehta Bhavan,
Block No. 14, 1st Floor, Old Sachivalaya,
Gandhinagar - 382 010 (Gujarat)
14. Conservator of Forests & Chief Wildlife Warden,
Forest Department (Wildlife), Secreatariat,
Daman & Diu, (Daman)
15. Chief Wildlife Warden, Government of Tamil Nadu,
6D, Panagal Building, No. 1, Jeenis Road, Saidapet,
Chennai - 600 015 (Tamil Nadu)
16. Chief Conservator of Forests (WI) & Chief Wildlife Warden,
Forest Headquarters, Government of Kerala,
Vazhuthacaud, Thiruvananthapuram - 695 014 (Kerala)
17. Chief Conservator of Forests (WI) & Chief Wildlife Warden,
Government of Assam,
P.O. Rehabari, Guwahati - 781 008 (Assam)
18. Chief Wildlife Warden, Government of Mizoram,
Environment & Forest Department,
Tuikhuahtlang, Aizawl (Mizoram)
19. PCCF (WI) & Chief Wildlife Warden,
Government of Manipur, Sanjenthong,
Imphal (Manipur)
20. Chief Conservator of Forests (WI) & Chief Wildlife Warden,
Government of Uttaranchal, 87-Rajpur Road, Dilaram Bazar,
Dehra Dun -248 001 (Uttaranchal)

Members

21. Dr. M. Sanjappa,
Director, Botanical Survey of India, (MoEF)
CGO Complex, 3 MSO Building, Block F-5th & 6th Floor,
DF Block, Sector-I, Salt Lake City
Kolkata – 700 064 (West Bengal)

22. Dr. J.R.B. Alfred,
Director, Zoological Survey of India,
Prani Vigyan Bhawan, M-Block, New Alipore,
Kolkata - 700 053 (West Bengal)

23. Shri B.R. Sharma, IFS
Member-Secretary, Central Zoo Authority,
Bikaner House, Annexe-Vi, Shahjahan Road,
New Delhi - 110 011

24. A representative Nominated by DG-ICFRE
Dy. Director General (Research)
Indian Council of Forestry Research & Education (ICFRE)
New Forest, Dehra Dun - 248 006

25. Dr. V.B. Mathur
Dean, Faculty of Wildlife Sciences,
Wildlife Institute of India, P.O. Box # 18, Chandrabani,
Dehra Dun - 248 001

Two senior most Head of Departments (in terms of Pay-Scale) – WII

26. Dr. P.K. Mathur
Professor & Head,
Department of Landscape Level Planning & Management
Wildlife Institute of India, P.O. Box # 18, Chandrabani,
Dehra Dun - 248 001

27. Shri A.K. Bhardwaj
Professor & Head of Office,
Wildlife Institute of India, P.O. Box # 18, Chandrabani,
Dehra Dun - 248 001

28. Research Coordinator
Wildlife Institute of India
P.O. Box # 18, Chandrabani
Dehra Dun - 248 001

29. Member Secretary,
Director,
Wildlife Institute of India,
P.O. Box # 18, Chandrabani,
Dehra Dun - 248 001

Special Invitees

30. The Head of Department,
Animal Ecology and Conservation Biology,
Wildlife Institute of India, P.O. Box # 18, Chandrabani,
Dehra Dun - 248 001
31. The Head of Department,
PA Network, Wildlife Management & Conservation Education,
Wildlife Institute of India, P.O. Box # 18, Chandrabani,
Dehra Dun - 248 001
32. The Head of Department,
Landscape Level Planning and Management,
Wildlife Institute of India, P.O. Box # 18, Chandrabani,
Dehra Dun - 248 001
33. The Head of Department,
Endangered Species Management,
Wildlife Institute of India, P.O. Box # 18, Chandrabani,
Dehra Dun - 248 001
34. The Head of Department,
Population Management, Capture & Rehabilitation,
Wildlife Institute of India, P.O. Box # 18, Chandrabani
Dehra Dun - 248 001
35. The Head of Department,
Habitat Ecology,
Wildlife Institute of India, P.O. Box # 18, Chandrabani,
Dehra Dun - 248 001
36. The Head of Department,
Wildlife Health Management,
Wildlife Institute of India, P.O. Box # 18, Chandrabani,
Dehra Dun - 248 001
37. The Head of Department,
Eco-Development Planning and Participatory Management,
Wildlife Institute of India, P.O. Box # 18, Chandrabani,
Dehra Dun - 248 001

Finance Committee

- 1 Shri J.C. Kala, IFS
Director General of Forests (WL)
Ministry of Environment & Forests,
CGO Complex, Paryavaran Bhavan, B-Block, Lodi Road,
New Delhi – 110 003
- 2 Shri V.B. Sawarkar
(Chairman, TRAC, WII)
464, Rasta Peth,
Near Power House,
Pune – 411 011
- 3 Director, Wildlife Preservation
Ministry of Environment & Forests,
CGO Complex, Paryavaran Bhavan, B-Block, Lodi Road,
New Delhi – 110 003
- 4 Shri S.K. Patnaik
(Former CCF, Orissa)
8, Fishery Lane,
Buddheswari Colony,
Bhubneshwar – 751 006
- 5 Joint Secretary & Finance Advisor
Ministry of Environment & Forests,
Paryavaran Bhavan, B-Block, CGO Complex, Lodi Road
New Delhi – 110 003
- 6 Dr. V.B. Mathur,
Dean, Faculty of Wildlife Science,
Wildlife Institute of India,
Dehradun
- 7 Director,
Wildlife Institute of India
Dehradun

Building Committee

- 1 Chairman,
Director General,
Indian Council for Forest Research & Education
P.O. New Forest,
Dehradun
- 2 Chief Engineer, CCU,
Ministry of Environment & Forests,
Paryavaran Bhavan, B-Block
CGO Complex, Lodi Road,
New Delhi – 110 003
- 3 Member-Secretary,
Director,
Wildlife Institute of India,
Dehradun

Publications

Peer Reviewed International Journals

Peer Reviewed National Journals

Book Chapters

Seminar proceedings

Technical Reports

Papers presented

Abstracts Published

Software Development

Popular articles

Publications

Peer Reviewed International Journals

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Prakash, V., R.E. Green, A.R. Rahmani, D.J. Pain, A.A. Khan, H.S. Baral, Y.V. Jhala, R. Naoroji, N. Shah, C.G.R. Bowden, B.C. Choudhury, G. Narayan, P. Gautam (2005): Evidence to support that diclofenac caused catastrophic vulture population decline. *Current Science* 88(10):1533-1534.

Ravan, S., A.M. Dixit and V.B. Mathur (2005): Spatial analysis for identification and evaluation of forested corridors between two Protected Areas in Central India. *Current Science*, Vol. 88, No. 9, 1143-1148.

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Awasthi, A., Uniyal, S.K., Rajvanshi, A. and Rawat, G. S. (2005): **Resource availability and utilization in the forests surrounding the migratory villages of Uttarkashi, Garhwal Himalaya.** In: Wildlife Conservation, Research and Management eds. Jhala, Y.V. *et al.* 152pp.

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Ahmad, K., Sathyakumar, S. and Qureshi, Q. (2005): **Feeding preferences of Hangul (*Cervus elaphus hanglu*) at Dachigam National Park, Kashmir, India.** Final Report of the Department of Wildlife Protection, Jammu & Kashmir Government, Srinagar, and Wildlife Institute of India, Dehradun.

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Adhikari, B.S., M.M. Babu, P.L. Saklani and G.S. Rawat (2006): **Medicinal and Aromatic Plants (MAPs) of Shiwalik hills in Uttaranchal State: Status and Use Patterns**". In "First Annual Seminar on Biodiversity of Uttaranchal State" under the aegis of Special Assistance Programme (SAP) of UGC organized by Deptt. of Zoology & Environmental Sciences, Gurukula Kangri Vishwavidyalaya, Haridwar, Uttaranchal (March 27-28, 2006).

Ahmad, K., S. Sathyakumar and Qureshi, Q. (2005): **Observations on the Asiatic Black Bear at Dachigam National Park, Kashmir, India.** Paper presented at the 16th International Conference on Bear Research and Management, Trentiono, Italy (September 27-October 2, 2005).

Badola, R. (2005): **International forest related initiatives and their implementation in the context of national forest programmes in India.** IUFRO-SPDC training course International forest related-initiatives and agreements and their implementation in the context of national forest programmes – linking research and science with practice. Gympie Training Centre, Australia (August 2–5, 2005).

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Chauhan, N.P.S. (2005): **Human casualties by and livestock depredation by Asiatic black bear in Uttaranchal hills, India.** 16th International Conference on Bear Research and Management held at Trentino, Italy (October 2005).

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Hussain, S.A. (2005): Development of C & I for Sustainable Forest Management in India. Paper presented in IUFRO-SPDC Training course on "Sustainable Forest Management Criteria and Indicators - Their Enhancement through Science". Gympie, Australia (August 2-5, 2005).

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Hussain, S.A. and Ruchi Badola (2005): Valuing nutrient retention function of mangrove forests: perception of agricultural producers from east coast of India. Paper presented in the XXII IUFRO World Congress, Australia (August 8-13, 2005).

Mathur, P.K. (2005): Grasslands in India – Diversity, Management Concerns and Conservation Perspective, Workshop on Grassland Ecology and Gene Pool Conservation, Rajasthan State Forest Department, Jaipur (Rajasthan) (September 26-28, 2005).

Mathur, V.B. (2005): Estimating animal abundance in protected areas: Issues, challenges and way forwards. Paper presented in the meeting of State Empowered Committee. Government of Rajasthan in New Delhi (April 5, 2005).

Mathur, V.B. (2005): Challenges and opportunities highlighted by the management effectiveness project in South Asia. Paper presented in the international workshop on Management Effectiveness, Monitoring for World Heritage Values and Statutory Reporting organized by UNESCO World Heritage Centre, Paris (May 2-5, 2005).

Mathur, V.B. (2005): **Process of identification and listing of natural world heritage properties.** Paper presented in the Regional meeting organized by MoEF in Bhopal (September 16, 2005).

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Rajvanshi, A. (2005): **Quality of biodiversity related information in EIA Reports for environmental decision making: The Indian experience.** Paper presented in the international conference – “Ethics Quality in Impact Assessment,” organized by IAIA’05, at Boston, USA (May 29 – June 3, 2005).

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Rajvanshi, A. (2005): **Substantive research needs in EIA.** Paper presented in the International Workshop on Environmental Impact Assessment: Practice and Potential of Third Indo-American Environment Leadership Program (IAELP), Gwalior (April 20, 2005).

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Sathyakumar, S. (2005): **Status and Management of Himalayan Brown Bear in India – An assessment of changes over 10 years**. Poster presented at the 16th International Conference on Bear Research and Management, Trentiono, Italy (September 27 - October 2, 2005).

Sathyakumar, S., and Choudhry, A. (2005): **Status and Management of Asiatic Black Bear in India – An assessment of changes over 10 years**. Paper presented in the 16th International Conference on Bear Research and Management, Trentiono, Italy (September 27 - October 2, 2005).

Sathyakumar, S., Green, M.J.B., Knowler, D., and Wood, J. (2005): **Harvesting musk from wild deer: Community-based approaches to maintaining biodiversity and supporting livelihoods in Central Asian Mountains**. Paper presented at the Conference of the Society for Conservation Biology, Asia Section, Kathmandu, Nepal (November 17-20, 2005).

Singh, Rina Rani and S.P. Goyal (2005): **Using morphometric and analytical techniques to characterize Asian elephant ivory**. Poster paper presented in the 17th Meeting of International Association of Forensic Scientists (IAFS), Hong Kong, China (September 21-28, 2005).

Uniyal, V.P. (2005): **Assessment of Entofauna in the Ladakh Region of the Indian Trans- Himalayas**. VII National Symposium on Indian Entimology: Productivity & Health (A Silver Jubilee Celebration). The Uttar Pradesh Zoological Society, Muzaffarnagar.

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Adhikari, B.S. and G.S. Rawat (2005): **" Impact of Climate change along altitudinal gradient in Garhwal, west Himalaya, India"**. in diversitas-international.org/docs/diversitas/Abstract-Posters, Poster session 5, Drivers of biodiversity changes.

Akhtar, N. and Chauhan, N.P.S. (2005): **Threat and challenges for sloth bear (*Melursus ursinus*) conservation in Chhattisgarh State, India.** 16th International Conference on Bear Research and Management held at Trentino, Italy, October 2005, Page 69.

Badola, R. and S.A. Hussain (2005): **Environmental benefits of mangrove forests: Perceptions of local people from the Bhitarkanika Conservation Area, India.** International Forestry Review, 7(5).223.

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Chauhan, N.P.S. and Jagdish Singh, R.K. (2005): **Human-sun bear conflicts in Manipur State, India.** 16th International Conference on Bear Research and Management held at Trentino, Italy, October 2005, Page 57.

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Rathore, B.C. and Chauhan, N.P.S. (2005): **Feeding habits of Himalayan brown bear in Kugti Wildlife Sanctuary, Himachal Pradesh, India.** 16th International Conference on Bear Research and Management held at Trentino, Italy, October 2005, Page 76.

Rathore, B.C. and Chauhan, N.P.S. (2005): **Status and distribution of brown bear and black bear in Pir Panjal Himalayan Range, India.** 16th International Conference on Bear Research and Management held at Trentino, Italy, October 2005, Page 77.

Mathur, V.B. (2005): **Mitigation of biodiversity impacts of water resource projects: Pitfalls and lessons learned.** The International Forestry Review. Vol. 7(5). Proceedings of the XXII IUFRO World Congress (8-13 August, 2005, Brisbane, Australia) published by the Commonwealth Forestry Association.

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Uniyal V.P. (2006): **Insect Diversity in the Great Himalayan National Park Conservation Area, Himachal Pradesh, Western Himalaya.** National Congress of Entomology, Punjab University, Patiala, (March 15-17, 2006).

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Software Development

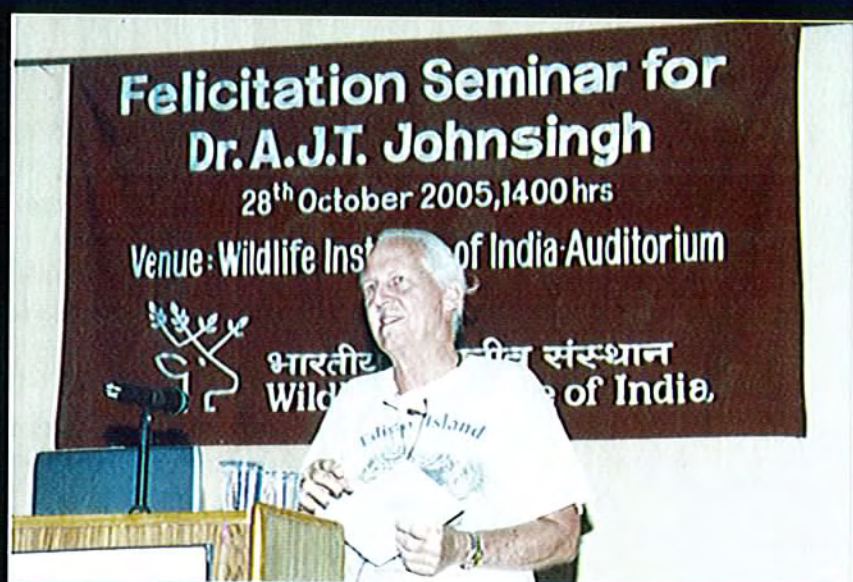
V. Badoni, Y.V. Jhala and Q. Qureshi (2005): **Lion Monitoring System 01**. Wildlife Institute of India. A software in visual basic for data storage, search, and analysis of individually identified lions based on their vibrissae patterns for long-term population monitoring.

Popular Articles

Pandav, B. (2006): **The Mating Tusker**. Sanctuary Asia. Vol. XXVI No. 1, February 2006, pp. 50-53.

G.V. Gopi, A.K. Jena and Bivash Pandav (2006): **Bhitarkanika Wildlife Sanctuary (Orissa), a key congregation area for Indian Skimmer**. Birding Asia. 5. p 78.

Talks



From WII

To WII

Talks

From WII

Dr. (Capt.) Parag Nigam (April 26-27, 2005): Lectures on various aspects of elephant conservation and management for direct utility of elephant reserve. Training workshop on elephant management techniques for frontline staff of Bijnore and Saharanpur forest division of Uttaranchal FD at Kalagarh Training Centre, Corbett Tiger Reserve.

Dr. V.P. Uniyal (April, 27, 2005): Pollination biology and its prospective: Navdanya farm at Ramgarh, Dehradun. The main focus of the lecture was pollination biology and importance of bees and other pollinating agents of Himalayan region.

Dr. Ruchi Badola (May 24, 2005): Concept and issues in stakeholder participation. Two week course on JFM and sustainable development for in service SFS officers at SFS College.

Dr. Y.V. Jhala (June 6, 2005): "Crisis in wild cat population; Need for renewed strategy and initiatives" talk and panel discussion at Indira Gandhi National Forest Academy, Dehradun.

Dr. B.K. Mishra (June 9, 2005): Indian Institute of Remote Sensing, Dehradun. "Ecodevelopment Planning in India" to participants of the UGC Teachers Refresher Course.

Dr. B.K. Mishra (June 24, 2005): Indian Institute of Remote Sensing, Dehradun. "People's participation for Biodiversity Conservation" to participants of the compulsory course for IFS officers.

Dr. (Capt.) Parag Nigam (July 26, 2005): Management of Wild Animals in Distress. A refreshers course in wildlife management for the 1995 IFS Batch organized by the Indira Gandhi National Forest Academy, Dehradun from July 25 - August 12, 2005.

Dr. S. Sathyakumar (August 23, 2005): "Conservation and Management of Wildlife in the Western Himalaya". S.F.S. College, Dehradun for SFS officer trainees.

Dr. Y.V. Jhala (August 24, 2005): Talk on "Modern Technological Advances in Wildlife Research" talk at Indira Gandhi National Forest Academy, Dehradun.

Dr. B.K. Mishra (August 26, 2005): State Forest Service College, Dehradun. "Ecodevelopment and its role in wildlife conservation" to participants of SFS regular course.

Dr. (Capt.) Parag Nigam (September 1, 2005): Advances in Wild Animal Restraint & Immobilization. Two week refresher course for officers of 1983 IFS Batch (21 years of service) organized by the Indira Gandhi National Forest Academy, Dehradun.

Dr. (Capt.) Parag Nigam (September 2, 2005): Health monitoring in PA's. Indira Gandhi National Forest Academy, Dehradun for the 10 week XXVII Professional Skill Up gradation course for IFS officers inducted into IFS from SFS cadre.

Dr. B.K. Mishra (September 6, 2005): Indian Institute of Remote Sensing, Dehradun. "Conflicts and conflict management" to participants of the regular P.G. Diploma Course in Forest Ecology.

Dr. Ruchi Badola (September 7, 2005): Stakeholder and SWOT Analysis. PG Diploma course, Forestry and ecology division at Indian Institute of Remote Sensing, Dehradun.

Dr. Ruchi Badola (September 9, 2005): Community composition and Gender issues. PG Diploma course, Forestry and ecology division at Indian Institute of Remote Sensing, Dehradun.

Dr. B.K. Mishra (September 13, 2005): Indian Institute of Remote Sensing, Dehradun. "Ecodevelopment for resolving natural resource conflicts around protected areas" to participants of the regular P.G. Diploma Course in Forest Ecology.

Dr. V.B. Mathur (September 21, 2005): Resource mapping of protected areas using remote sensing and GIS. Forest Survey of India, Dehradun.

Dr. Y.V. Jhala (October 1, 2005): Talk on "Status and Unique Lineage of Indian Wolves: Need for revised listing" to the IUCN SSC Wolf Specialist Group at Colorado Spring, CO, USA.

Dr. Y.V. Jhala (October 3, 2005): Symposium talk on "Habitat Needs, Predation and Conservation of Indian Wolves", Colorado Spring, CO, USA.

Dr. Y.V. Jhala (October 4, 2005): Screening of BBC film "Desert wolves of India" based on research of WII wolf project at symposium, Frontiers of Wolf Recovery, Colorado Springs. (This film is being screened on a weekly basis at the International Wolf Center, Ely, Minnesota, USA)

Dr. V.B. Mathur (October 6, 2005): Application of remote sensing and GIS in forest and wildlife management. Forest Survey of India. Dehradun.

Dr. Y.V. Jhala (October 9, 2005): Talk on "Research on Indian Wolves, lions & Tigers" at Department of Fisheries and Wildlife Sciences, Virginia Polytechnic Institute & State University, Blacksburg, USA.

Dr. Ruchi Badola (October 10, 2005): Stakeholder Analysis. XVIII Professional skill up gradation course for officers inducted into IFS from SFS cadre at Indira Gandhi National Forest Academy, Dehradun.

Dr. V.B. Mathur (November 11, 2005): Need for establishing biogeographically representative network of protected areas for biodiversity conservation. Indira Gandhi National Forest Academy, Dehradun.

Dr. V.B. Mathur (November 12, 2005): Management effectiveness evaluation of protected area network in India. Indira Gandhi National Forest Academy, Dehradun.

Dr. V.B. Mathur (November 23, 2005): Application of remote sensing and GIS in preparation of management plans of protected areas. Forest Survey of India, Dehradun.

Dr. V.B. Mathur (December 13, 2005): Management effectiveness evaluation of protected area network in India. GEER Foundation, Gandhinagar.

Dr. (Capt.) Parag Nigam (December 15, 2005): Managing wild animals in distress. In two- week Advanced Forest Management course (December 12-23, 2005) for IFS officers of 1986 batch organized by the Indira Gandhi National Forest Academy, Dehradun.

Dr. S. Sathyakumar (December 19, 2005): "Wildlife Population Estimation Techniques". Indira Gandhi National Forest Academy, Dehradun for IFS Probationers (2004 batch).

Dr. V.B. Mathur (December 20, 2005): EIA for biodiversity conservation: Case study from Narmadasagar Project. Indian Institute of Remote Sensing, Dehradun.

Dr. V.B. Mathur (December 21, 2005): Resource mapping of protected areas using remote sensing and GIS. Forest Survey of India, Dehradun.

Dr. Ruchi Badola (January 10, 2006): Gender issues in Forestry. Special Advanced Forest Management Training Course for IFS Officers of 1992, 1993 & 1994 Year of Allotment at Indira Gandhi National Forest Academy, Dehradun.

Dr. V.B. Mathur (January 10, 2006): Protected area network in India: An evaluation. Indira Gandhi National Forest Academy, Dehradun.

Dr. Y.V. Jhala (January 28, 2006): Talk on "Is the Tiger Safe in India" at Nandan Complex, Kolkata, Wildlife Film Festival.

Dr. V.B. Mathur (February, 6, 2006): Biodiversity conservation: Concept and approaches. SFS College. Dehradun.

Dr. Ruchi Badola (February 13 2006): Issues of people's participation in wildlife conservation and management. III Special Advanced Forest Management Training Course for IFS Officers of 1990 & 1991 Year of Allotment at Indira Gandhi National Forest Academy, Dehradun.

To WII

Dr. Vishwas Chavan, Scientist, National Chemical Laboratory (NCL) , Pune & Coordinator, National Centre for Biodiversity Informatics visited the Institute on April 29, 2005 and delivered a talk on 'Biodiversity Informatics: Global and Regional Perspective'.

Dr. Eric Smith, Biologist, Amphibian and Reptile Diversity Research Centre, Department of Biology, Univ. of Texas, USA visited the Institute on June 4, 2005 and delivered a lecture on 'Phylogeny and systematics of coral snakes'.

Dr. Todd Castoe, Biologist, Amphibian and Reptile Diversity Research Centre, Department of Biology, Univ. of Texas, USA visited the Institute on June 4, 2005 and delivered a lecture on 'Bayesian tools in polygenetic analysis'.

Dr. John Seidensticker, Chairman, Save the Tiger Fund Council and Sr. Scientist Natural Zoological Park, Washington, DC, visited WII on October 28, 2005 and delivered a talk titled "Putting science into Indian wildlife conservation: the legacy of Dr. A.J.T. Johnsingh and the Wildlife Institute of India".

Dr. R. Sukumar, Professor, Centre for Ecological Sciences, Indian Institute of Science, Bangalore, visited WII on October 28, 2005 and delivered a talk on "Elephants and humans: what are the prospects for conservation in an increasingly fragmented landscape?"

Mr. Romulus Whitaker, a renowned naturalist and a film-maker visited WII on October 28, 2005 and delivered a talk on "Three Decades of Herpetological Conservation in India".

Dr. Iain R. Taylor, Scientist from Australia delivered a guest lecture in WII on January 10, 2006 on the topic "What determines the density of shore birds on temporary wetlands in Australia?".

Dr. Shyama Pagad from IUCN/SSC's Invasive Species Specialist Group delivered a lecture on February 1, 2006 on "Management of Invasive Species in Natural Ecosystems" in WII.

Dr. Luigi Boitani delivered a talk on February 23, 2006 on "Large Carnivore Conservation in Europe" in the Institute.

Dr. Chris Carbone visited WII and delivered a talk on March 1, 2006 on "Scaling of Predator Prey Relationships in Mammalian Carnivores".

Accounts

Audit Certificate

I have audited the attached Balance Sheet of Wildlife Institute of India (WII), Dehradun as at 31 March 2006 and the Income and Expenditure Account, Receipts and Payments Account for the year ended on that date. Preparation of these financial statements is the responsibility of the WII's management. My responsibility is to express an opinion on these financial statements based on my audit.

I have conducted my audit in accordance with applicable rules and the auditing standards generally accepted in India. These standards require that I plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatements. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. I believe that my audit provides a reasonable basis for my opinion.

Based on our audit, I report that :

1. I have obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purposes of our audit;
2. Subject to the major observations given below and detailed observations in the Audit Report annexed herewith, I report that the Balance Sheet, the Income and Expenditure Account and Receipts and Payments Account dealt with by this report are properly drawn up and are in agreement with the basis of accounts.
 - WII, Dehradun did not charge depreciation on pro-rata basis on assets acquired after September 2005, leading to understatement of assets of Rs. 44.13 lakh.
 - WII, Dehradun did not depict the outstanding TA advances of Rs. 26.06 lakh in Balance Sheet
 - WII, Dehradun did not show Misc. receipts of Rs. 9.07 lakh in Receipts and Payments Account
 - WII, Dehradun depicted non-existent materials and supplies of Rs. 25.43 lakh as fixed assets.
3. In my opinion and to the best of my information and according to the explanations given to me:
 - (i) the accounts give the information required under the prescribed format of accounts;
 - (ii) the said Balance Sheet, Income and Expenditure Account and Receipts and Payments Account read together with the Accounting Policies and Notes thereon, and subject to the significant matters stated above and other matters mentioned in the Audit Report annexed herewith, give a true and fair view.
 - 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 2006; and
 - b. In so far as it relates to the Income and Expenditure Account of the deficit for the year ended on that date.

Place : New Delhi
Date : 21-12-06


PRINCIPAL DIRECTOR OF AUDIT
(SCIENTIFIC DEPARTMENTS)

WILDLIFE INSTITUTE OF INDIA, DEHRADUN
Receipt & Payment Accounts for the Financial Year 2005-06

GRANT-IN-AID			RECEIPTS		PAYMENT		
Particulars	Plan	Non Plan	Total	Particulars	Plan	Non Plan	Total
To Opening Balance	125,530.00		125,530.00	By Salaries & Allowance	16,429,559.00		26,985,158.00
Cash in Hand				By Honorarium	46,080.00		46,080.00
Cash in Bank	34,644,969.23		34,644,969.23	By Fellowship	231,638.00		231,638.00
To EMD Received		240,547.00	240,547.00	By Wages	637,816.00	309,811.00	947,627.00
To Hostel Caution Money		87,160.00	87,160.00	By Travel Expenses	2,999,149.00		2,999,149.00
To M.Sc. Course Fee		71,900.00	71,900.00	By Postage & Telegram	221,484.00		221,484.00
To Sale Tax/ Trade Tax/Prof.Tax. Com. Tax		6,103.00	6,103.00	By Electricity & Water	3,890,482.00		3,890,482.00
To Recovery of Advance for Expenses to Staff		997,691.00	997,691.00	By Entertainment Charges	177,452.00		177,452.00
To Recovery of Loans & Advance paid to Staff		950,355.00	950,355.00	By Conveyance Charges	7,772.00		7,772.00
To Bus Charges		100,684.00	100,684.00	By Medical Expenses	3,137,135.00		3,137,135.00
To Consultancy Refund		8,711.00	8,711.00	By Newspaper & magazine	41,676.00		41,676.00
To Grant -In-Aid From MoEF for 2005-06							
89000000 less outstanding 98,00,000 =				By Operational Expenditure	3,911,706.00	22,049.00	3,933,755.00
7,92,00,000		9,654,000.00	88,854,000.00	By OTA	538,258.00		538,258.00
To House Licence Fee		228,627.00	228,627.00	By POL for Vehicle	2,009,765.00		2,009,765.00
To Int. On Bank Deposited		390,515.00	390,515.00	By Repair and maintenance of Veh	1,160,962.00		1,160,962.00
To Lab Testing Charges		41,200.00	41,200.00	By Publication	287,480.00		287,480.00
To Rent		254,137.00	254,137.00	By Publicity & Advertisement	556,437.00		556,437.00
To WII Products		163,133.00	163,133.00	By Stationery	2,485,134.00		2,485,134.00
To Misc. Receipts (Penal Interest on Adv.)		3,243.00	3,243.00	By Employee Contribution (EPF)		6,515.00	6,515.00
To Workshop / Seminar Fee		530,000.00	530,000.00	By Security Deposit	257,928.00		257,928.00
Closing of WII publication	1,086,471.00		1,086,471.00	By TDS	847.00		847.00
				By AC Plant	16,530.00		16,530.00
				By Computer & Accessories	1,665,074.00		1,665,074.00
				By Furniture & Fixtures	467,060.00		467,060.00
				By Journals & Periodicals	4,677,121.00		4,677,121.00
				By Lab Equipment	10,018,332.00		10,018,332.00
				By Library Books	1,837,645.00		1,837,645.00
				By Office Equipment	73,726.00		73,726.00
				By Training Equipment	1,494,252.00		1,494,252.00
				By AMC of Computers	2,109,366.00		2,109,366.00
				By Annual Research Seminar	456,813.00		456,813.00
				By Bonus	308,278.00		308,278.00
				By EPF Contribution	76,787.00		76,787.00
				By Estate Maintenance	1,926,241.00		1,926,241.00
				By Estate Security	4,102,757.00		4,102,757.00
				Closing balance of WII publication	1,086,471.00		1,086,471.00
				By Misc/Cont payment			
				Rs. 3961938			
				outstanding Rs. 3961938			

[illegible]

Research Projects

RECEIPTS				PAYMENT			
Particulars	Plan	Non Plan	Total	Particulars	Plan	Non Plan	Total
To Opening Balance		17,655.00	17,655.00	By Advance for Expenses (Research Project)		796,787.00	796,787.00
	Cash in hand	7,221,482.50	7,221,482.50	By Office Equipment (Research Project)		3,198,416.00	3,198,416.00
To Misc. Receipts for Research Project	Cash in Bank			By Camp Expenses (Research Project)			
		9,128,274.00	9,128,274.00	Rs 613053 less outstanding Rs. 219331		393,722.00	393,722.00
				By Contingencies/ Misc. (Research Project)		1,588,241.00	1,588,241.00
				By Fellowshipship & Wages (Research Project)		4,254,007.00	4,254,007.00
				By POL & Maintenance of Vehicle (Research Project)		1,291,602.00	1,291,602.00
				By Travel Expenses (Research Project)		829,164.00	829,164.00
				By Camp Equipment		2,196,992.00	2,196,992.00
				By Closing Balance			
			Cash in Bank		1,814,920.50	1,814,920.50	
				Cash in Hand		3,560.00	3,560.00
B' Total	0.00	16,367,411.50	16,367,411.50	B' Total	0.00	16,367,411.50	16,367,411.50

Training Account

RECEIPTS			PAYMENT		
Particulars	Plan	Non Plan	Total	Particulars	Total
To Opening in Bank		4,803,383.99	4,803,383.99	By EPF Contribution (Training A/c)	10,000.00
To Interest for 2005-06 :					
To Receipt for Training Exp		1,572,867.00	1,572,867.00	By Advance for Training Expenses	583,573.00
To Misc. Receipts (Training A/c)		7,000,000.00	7,000,000.00	By Training Equipment	41,240.00
To Receipt for Workshop/ Course		73,437.00	73,437.00	By Contingent & Misc. Expenses	3,128,057.00
Fee:		3,636,314.00	3,636,314.00	By Honorarium (Training A/c)	46,700.00
4160714				By Salary & Allowance	98,150.00
				By Stationary Gross : Rs. 1110885 less outstanding	
				Rs 268682	842,203.00
				By Training Allowance	846,810.00
				By Travelling Allowance	2,078,668.00
				By Investment in FDRs	1,485,149.00
				By Closing in Bank	7,925,451.99
C' Total		17,086,001.99	17,086,001.99	C' Total	17,086,001.99

Pension

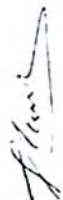
RECEIPTS			PAYMENT		
Particulars	Plan	Non Plan	Total	Particulars	Total
To Opening Balance					
To Interest on FDR		201,990.03	201,990.03	By RBI Bonds	19,308,000.00
To Interest on Saving Account		9,585,551.00	9,585,551.00	By Commuted Value of Pension	593,402.00
To WII Contribution		26,893.00	26,893.00	By Pension/ Family Pension	835,056.00
To encashment of FDR		6,784,059.00	6,784,059.00	By Closing Balance	5,927,418.03
		10,065,383.00	10,065,383.00	Cash in Bank	
D' Total	0.00	26,663,876.03	26,663,876.03	D' Total	26,663,876.03

Consultancy Project

RECEIPTS			PAYMENT		
Particulars	Plan	Non Plan	Total	Particulars	Total
To Opening Balance					
Cash in Bank		11,792,611.00	11,792,611.00	By Camp Equipment	14,405,334.00
To Misc. Receipts		679,802.00	679,802.00	By Camp Expenses	8,240,943.00
To Receipts for Project during 2005-06				By Cont. / Misc. Rs 5438999 less outstanding Rs	
Rs 36102112 less outstanding Rs 18298000		17,804,112.00	17,804,112.00	4012945	1,426,054.00
				By Fellowship & Wages	1,353,864.00
				By Travel Expenses	1,568,246.00
				By Closing Balance	
				Cash in Bank	2,920,150.00
				Cash in Hand	361,934.00
E' Total	0.00	30,276,525.00	30,276,525.00	E' Total	30,276,525.00

GPF

RECEIPTS			PAYMENT		
Particulars	Plan	Non Plan	Total	Particulars	Total
To Opening Balance					
To GP Fund Contribution		1,207,236.26	1,207,236.26	By Advance/ Withdrawal	3,754,266.00
To Interest on Bank Deposit		3,885,637.00	3,885,637.00	By Final Payment	539,067.00
To Encashment of FDR		4,260,071.00	4,260,071.00	By Closing Balance	938,852.26
		3,295,241.00	3,295,241.00	By Investment in RBI Bonds	7,416,000.00
				F' Total	12,648,185.26
F' Total	0.00	12,648,185.26	12,648,185.26		
A+B+C+D+E+F Grand Total	115,056,970.23	116,770,005.78	231,826,976.01	A+B+C+D+E+F Grand Total	231,826,976.01



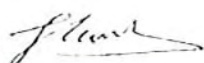
(S.S. Lamba)
Finance Officer



(P.R. Sinha)
Director

FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
Wildlife Institute of India, Dehradun
BALANCE SHEET AS ON 31 MARCH 2006

	Schedule	Amount (Rs.)	
		Current Year	Previous Year
CORPUS /CAPITAL FUND AND LIABILITIES			
CORPUS /CAPITAL FUND	1	263,285,645.55	267,583,923.79
RESERVE AND SURPLUS	2	0.00	0.00
EARMARKED/ENDOWMENT FUND	3	0.00	0.00
SECURED LOAN AND BORROWINGS	4	0.00	0.00
UNSECURED LOAN AND BORROWINGS	5	415,356.00	673,284.00
DEFERRED CREDIT LIABILITIES	6	0.00	0.00
CURRENT LIABILITIES AND PROVISION	7	90,105,729.08	62,495,965.08
TOTAL (A)		353,806,730.63	330,753,172.87
ASSETS			
FIXED ASSETS	8	199,503,217.56	195,505,736.79
INVESTMENTS- FROM EARMARKED / ENDOWMENT FUNDS	9	0.00	0.00
INVESTMENTS- OTHERS	10	83,082,809.79	68,234,284.79
CURRENT ASSETS, LOANS, ADVANCES ETC.	11	71,220,703.28	67,013,151.28
MISCELLANEOUS EXPENDITURE (to the extent not written off or adjusted)			
TOTAL (B)		353,806,730.63	330,753,172.86



(S.S. Lamba)
Finance Officer



(P.R. Sinha)
Director

Financial Statement (Non-Profit Organization)
Wildlife Institute of India, Dehradun
Schedules forming part of Balance Sheet as on 31st March, 2006

	Amount (Rs.)	
	Current Year	Previous Year
SCHEDULE 1: CORPUS/ CAPITAL FUND		
Balance as at the begining of the year	267,583,923.79	303,617,602.67
Add: Contribution towards Corpus/ Capital fund	46,254,721.00	38,378,275.00
Add/(Deduct) : Balance of net income (expenditure) transferred from	-54,252,999.24	-74,411,953.88
Total A	259,585,645.55	267,583,923.79
Corpus Fund	3,700,000.00	0.00
Total B		
Total A+B	263,285,645.55	267,583,923.79
SCHEDULE 4: SECURED LOANS AND BORROWINGS		
(1) Central Government		
(2) State Government (specify)		
(3) Financial Institutions		
(1) Term Loans		
(2) Interest accrued and due		
(4) Banks		
(1) Term Loans- Interest accrued and due		
(2) Others Loans (Specify)- Interest accrued and due		
(5) Other Institutions and Agencies		
(6) Debentures and Bonds		
(7) Others (Specify)		
Interest transfer of Pension Fund for 2003-04	0.00	-3,198,285.78
Interest transfer of GPF for 2003-04	0.00	-2,997,941.05
Insterest transfer of EPF/Pension Fund for 2003-04	0.00	6,196,226.83
TOTAL	0.00	0.00
SCHEDULE 5 : UNSECURED LOANS AND BORROWINGS		
(1) Central Govt.		
(2) State Govt.(Specify)		
(3) Financial Instittions		
(4) Banks		
(i) Term Loans		
(ii) Others (specify)		
(5) Other Institutions and Agencies		
(6) Debentures and Bonds		
(7) Fixed Deposits		
(8) Others (Specify)		
Security Deposit	377,235.00	635,163.00
Loans	38,121.00	38,121.00
TOTAL	415,356.00	673,284.00

SCHEDULE 7 : CURRENT LIABILITIES AND PROVISION		
(A) CURRENT LIABILITIES		
(1) Acceptances		
(2) Sundry Creditors		
(1) For Goods		
(2) For Others		
(2.1) Payment outstanding for Research Project	219331.00	8,462,896.00
(2.2) Payment outstanding for Training A/C	268682.00	
(2.3) Payment outstanding for Cons. Project	4012945.00	
(2.4) Payment outstanding for Supply of items	3961938.00	
(3) Advances Received		
Hostel Caution Money	154,660.00	67,500.00
(4) Interest accrued but not due on		
(1) Secured Loans/Borrowings		
(2) Unsecured Loans/Borrowings		
(5) Statutory Liabilities		
(1) Overdue		
(2) Others (Specify)		
Pension Fund	56,276,356.03	41,308,311.03
GP Fund	24,687,575.05	20,835,200.05
(6) Others (Specify)		
EMD Received	515,068.00	274,521.00
TDS (Consultancy Project)		
EPF, House Licence Fee, Bus Charges & Other recoveries		
TOTAL (A)	90,096,555.08	62,485,532.08
(B) Provisions		
(1) For Taxation		
Income Tax Salary	2,767.00	3,614.00
TDS		
TDS (Training A/c)	304.00	304.00
(2) Gratuity		
(3) Superannuation/ Pension		
(4) Accumulated Leave Encashment		
(5) Trade Warranties/ Claims		
(6) Others (Specify)		
Income Tax from Pensioners		
Employee Contribution EPF		6,515.00
CM Relief Fund		
CGEGIS		
Cable		
HDFC		
GPF		
SP & FB Fund		
Car/Scooter Adv. (Transferrable)		
Sale Tax/Trade Tax/Prof.Tax/ Com. Tax	6,103.00	
EPF Contribution (Training A/c)		
House Licence Fee (Consultancy A/c)		
EPF Subscription		
TOTAL (B)	9,174.00	10,433.00
TOTAL (A+ B)	90,105,729.08	62,495,965.08

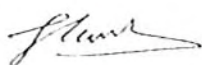
SCHEDULE 8 : FIXED ASSETS

SCHEDULE 8 : FIXED ASSETS										
Particulars	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	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	3,438,280.15	0.00	0.00	0.00	3,438,280.15	0.00	0.00	0.00	3,438,280.15	3,438,280.15
Land	6,607,214.58	0.00	0.00	0.00	6,607,214.58	0.00	0.00	0.00	6,607,214.58	6,607,214.58
Trees	2,432,709.00	0.00	0.00	0.00	2,432,709.00	0.00	0.00	0.00	2,432,709.00	2,432,709.00
TOTAL	12,478,203.73	0.00	0.00	0.00	12,478,203.73	0.00	0.00	0.00	12,478,203.73	12,478,203.73
BUILDINGS										
BLOCK: 10%										
Architectural & Supervision Fee	6,534,009.96	0.00	0.00	0.00	6,534,009.96	726,001.11	653,401.00	653,401.00	5,880,608.96	6,534,009.96
Auditorium	9,784,483.56	0.00	0.00	0.00	9,784,483.56	1,087,164.84	978,448.36	978,448.36	8,806,035.20	9,784,483.56
Boundary Fencing	596,274.96	0.00	0.00	0.00	596,274.96	66,252.77	59,627.50	59,627.50	536,647.47	596,274.96
Boundary Wall	1,054,280.28	0.00	0.00	0.00	1,054,280.28	117,142.25	105,428.03	105,428.03	948,852.25	1,054,280.28
Building Camous	99,333,075.63	0.00	0.00	0.00	99,333,075.63	11,037,008.40	9,933,307.56	9,933,307.56	89,399,768.06	99,333,075.63
Campus Development	7,953,808.69	0.00	0.00	0.00	7,953,808.69	914,586.32	795,380.86	795,380.86	7,158,427.83	7,953,808.69
Materials and Supplies	2,825,891.51	0.00	0.00	0.00	2,825,891.51	313,987.95	282,589.15	282,589.15	2,543,302.36	2,825,891.51
Tennis Court	386,991.27	0.00	0.00	0.00	386,991.27	42,999.03	38,699.13	38,699.13	348,292.14	386,991.27
Sports Complex	245,215.80	0.00	0.00	0.00	245,215.80	27,246.20	24,521.58	24,521.58	220,694.22	245,215.80
BLOCK: 20%										
Road & Culvert	1,170,902.56	0.00	0.00	0.00	1,170,902.56	292,725.64	234,180.51	234,180.51	936,722.05	1,170,902.56
Staff Quarters	1,625,866.24	0.00	0.00	0.00	1,625,866.24	406,466.56	325,173.25	325,173.25	1,300,692.99	1,625,866.24
TOTAL	131,510,800.45	0.00	0.00	0.00	131,510,800.45	15,031,581.07	13,430,756.93	13,430,756.93	118,080,043.53	131,510,800.46
PLANT MACHINERY & EQUIPMENT										
BLOCK: 20%										
Vehicle	2,906,727.55	0.00	0.00	0.00	2,906,727.55	726,681.89	581,345.51	581,345.51	2,325,382.04	2,906,727.55
Vehicle (Project)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Development of Forensic Laboratory	385,310.40	6,162,999.00	0.00	0.00	6,548,309.40	96,327.60	1,309,661.88	1,309,661.88	5,238,647.52	385,310.40
Training Equipment	1,221,484.80	41,240.00	0.00	0.00	1,262,724.80	305,371.20	252,544.96	252,544.96	1,010,179.84	1,221,484.80
Vehicle (Research Project)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BLOCK: 25%										
AC Plant	3,671,432.72	16,530.00	0.00	0.00	3,687,962.72	1,223,810.91	921,990.68	921,990.68	2,765,972.04	3,671,432.72
Camp Equipment (project)	1,002,612.80	0.00	0.00	0.00	1,002,612.80	334,204.27	250,653.20	250,653.20	751,959.60	1,002,612.80
DG Set	831,231.28	0.00	0.00	0.00	831,231.28	277,077.09	207,807.82	207,807.82	623,423.46	831,231.28
EPABX	432,843.75	0.00	0.00	0.00	432,843.75	144,281.25	108,210.94	108,210.94	324,632.81	432,843.75
Lab Equipment	386,753.70	10,068,548.00	0.00	0.00	10,405,085.70	128,917.90	2,601,271.43	2,601,271.43	7,803,814.27	386,753.70
Office Equipment	7,782,695.49	73,726.00	0.00	0.00	7,856,421.49	2,594,231.83	1,964,105.37	1,964,105.37	5,892,316.12	7,782,695.49
Training Equipment	13,524,955.41	1,494,252.00	0.00	0.00	15,019,207.41	4,842,074.47	3,754,801.85	3,754,801.85	11,264,405.56	13,524,955.41
Office Equipment (Project)	48,960.00	0.00	0.00	0.00	48,960.00	16,320.00	12,240.00	12,240.00	36,720.00	48,960.00
Camp Equipment (Const. Project)	404,835.75	16,525,595.00	0.00	0.00	14,810,169.75	134,945.25	3,702,542.44	3,702,542.44	11,107,627.31	404,835.75
Office Equipment (Research Project)	489,251.81	3,198,416.00	0.00	0.00	3,687,667.81	163,083.94	921,916.95	921,916.95	2,765,750.86	489,251.81
Camp Equipment (Research Project)	937,278.38	2,196,992.00	0.00	0.00	3,134,270.38	312,426.13	783,567.59	783,567.59	2,350,702.78	937,278.38
TOTAL	34,026,373.85	39,778,298.00	0.00	0.00	71,634,194.84	11,299,753.73	17,372,660.62	17,372,660.62	54,261,534.21	34,026,373.84

Particulars	Gross Block				DEPRECIATION			NET BLOCK	
	Cost as at the beginning of the year	Addition during the year		Cost as at the end of the year	As at the beginning of the year	For 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						
VEHICLES									
BLOCK : 20%									
Vehicle (Conslt. Project)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FURNITURE, FIXTURES									
BLOCK : 15%									
Furniture & Fixtures	11,863,935.75	467,060.00	0.00	12,330,995.75	2,093,635.72	1,849,649.36	1,849,649.36	10,481,346.39	11,863,935.75
Furniture & Fixture	13,557.50	0.00	0.00	13,557.50	2,392.50	2,033.63	2,033.63	11,523.88	13,557.50
TOTAL	11,877,493.25	467,060.00	0.00	12,344,553.25	2,096,028.22	1,851,682.99	1,851,682.99	10,492,870.27	11,877,493.25
OFFICE EQUIPMENT									
BLOCK : 20%									
Office Equipment (Training A/c)	14,784.00	0.00	0.00	14,784.00	3,696.00	2,956.80	2,956.80	11,827.20	14,784.00
BLOCK 25%									
Office Equipment (Conslt. Project)	216,891.75	0.00	0.00	216,891.75	72,297.25	54,222.94	54,222.94	162,668.81	216,891.75
TOTAL	231,675.75	0.00	0.00	231,675.75	75,993.25	57,179.74	57,179.74	174,496.01	231,675.75
COMPUTER/PERIPHERALS									
BLOCK : 20%									
Computer and Peripherals	2,993,910.72	0.00	0.00	2,993,910.72	748,477.68	598,782.14	598,782.14	2,395,128.58	2,993,910.72
BLOCK : 60%									
Computer & Accessories	2,387,279.04	1,665,074.00	0.00	4,052,353.04	3,580,918.56	2,431,411.82	2,431,411.82	1,620,941.22	2,387,279.04
TOTAL	5,381,189.76	1,665,074.00	0.00	7,046,263.76	4,329,396.24	3,030,193.96	3,030,193.96	4,016,069.80	5,381,189.76
LIBRARY BOOKS									
BLOCK : 100%									
Educational Films	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Journals & Periodicals	0.00	4,677,121.00	0.00	4,677,121.00	5,095,136.50	4,677,121.00	4,677,121.00	0.00	0.00
Library Books	0.00	1,839,645.00	0.00	1,839,645.00	2,627,551.00	1,837,645.00	1,837,645.00	0.00	0.00
Photographs and Equipment	0.00	0.00	0.00	0.00	92,380.00	0.00	0.00	0.00	0.00
Library Books (Training A/c)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.00	6,516,766.00	0.00	6,516,766.00	7,815,067.50	6,514,766.00	6,514,766.00	0.00	0.00
GRAND TOTAL	195,505,736.79	48,427,198.00	0.00	243,932,934.79	40,647,820.01	42,257,240.24	42,257,240.24	199,503,217.55	195,505,736.79

SCHEDULE :10 INVESTMENT - OTHERS		
(1) In the Govt. Securities		
(2) Other approved Securities		
(3) Shares		
(4) Debentures and Bonds		
Investment in RBI Bond (GPF)	7,416,000.00	
Investment in RBI Bond (Pension)	19,308,000.00	
(5) Subsidiaries and Joint Ventures		
(6) Others (Specify)		
Investment in FDR (Pension Fund)	31,040,938.00	41,106,321.00
FDR (GPF)	16,332,722.79	19,627,963.79
Account No. 1 FDR		
Training FDR	8,985,149.00	7,500,000.00
ICICI		
TOTAL	83,082,809.79	68,234,284.79
SCHEDULE :11 CURRENT ASSETS, LOANS, ADVANCES ETC.		
(A) CURRENT ASSETS		
(1) Inventories		
Closing Stock of Steel & Cement	131,274.90	131,274.90
Advance for Research Projects		
Grant-in-Aid accrued but not received	9,800,000.00	
Closing Balance of WII Publication	1,086,471.00	
(2) Sundry Debtors		
(1) Debts Outstanding for a period exceeding six months		
(2) Others (Specify)		
(3) Cash balances in hand (including cheques/drafts and imprest)		
Grant-in-Aid A/c	144,908.00	125,530.00
Research Project A/c	3,560.00	17,655.00
Training A/c		
Consultancy A/c	361,934.00	
Pension Fund A/c		
GPF A/c		
(4) Bank Balances		
(1) With Scheduled Banks		
Grant-in-Aid A/c	2,344,030.23	34,644,969.23
Research Project A/c	1,814,920.50	7,221,482.50
Training A/c	7,925,451.36	4,803,383.36
Consultancy A/c	2,920,150.00	11,792,611.00
Pension Fund A/c	5,927,418.03	201,990.03
GPF A/c	938,852.26	1,207,236.26
Corpus fund No 4032	3,700,000.00	0.00
(2) With Non-Scheduled Banks		
(5) Post Office-Savings Accounts		
TOTAL (A)	37,098,970.28	60,146,132.28

(B) LOANS, ADVANCES AND OTHER ASSETS		
(1) Loans		
(1) Staff		
Loan & Advances to Staff	1,733,843.00	2,684,198.00
Advance for expenses to Staff	1,162,258.00	2,159,949.00
Advance for expenses (Research Projects)	1,432,087.00	635,300.00
(2) Other entities engaged in activities /objectives similar to		
(3) Others (Specify)		
Adv for civil work to CPWD	9,000,000.00	
Loan to Other A/c		
(2) Advances and other amounts recoverable in cash or in kind or		
(1) On Capital Accounts		
(2) Prepayments		
(3) Others (Specify)		
Advance for Training Expenses	1,567,170.00	983,597.00
(3) Income Accrued		
(1) On Investments from Earmarked / Endowment Funds		
(2) On Investments -Others		
(3) On Loans and Advances		
(4) Others (Specify)		
Training Cost Accrued But not Received	928,375.00	403,975.00
Amount sanctioned but not received(Consultancy project)	18,298,000.00	
(4) Claims Receivable		
TOTAL (B)		
	34,121,733.00	6,867,019.00
TOTAL (A+B)		
	71,220,703.28	67,013,151.28



(S.S. Lamba)
Finance Officer



(P.R. Sinha)
Director

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2005-06

		(Amount (Rs.))	
	Schedule	Current Year	Previous Year
INCOME			
Income from Sales/Services	12	0.00	0.00
Grants/Subsidies	13	52,399,279.00	37,621,725.00
Fees/Subscriptions	14	11,844,762.00	12,038,092.00
Income from Investments (Income on Invest from earmarked/endow. Funds transferred to Funds)	15	0.00	0.00
Income from Royalty, Publication etc.	16	-2,422,671.00	578,017.00
Interest Earned	17	1,963,382.00	1,970,048.15
Other Income	18	46,330,701.00	20,166,907.00
Increase/decrease in stock of finished goods and works-in-progress	19	1,086,471.00	0.00
TOTAL (A)		111,201,924.00	72,374,789.15
EXPENDITURE			
Establishment Expenses	20	61,940,620.00	52,526,299.00
Other Administrative Expenses	21	61,257,063.00	46,445,959.00
Expenditure on Grants, Subsidies etc.	22	0.00	6,196,226.83
Interest	23	0.00	0.00
Depreciation (Net Total at the year end - corresponding to Schedule 8)		42,257,240.24	41,618,258.20
Total (B)		165,454,923.24	146,786,743.03
Balance being excess of Income over Expenditure (A-B)		-54,252,999.24	-74,411,953.88
BALANCE BEING SURPLUS (DEFICIT) CARRIED TO CORPUS/CAPITAL FUND		-54,252,999.24	-74,411,953.88


(S.S. Lamba)
Finance Officer


(P.R. Sinha)
Director

Financial Statement (Non-Profit Organization)
Wildlife Institute of India, Dehradun
SCHEDULE FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR 2005-2006

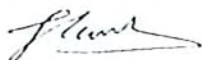
	Amount (Rs.)	
	Current Year	Previous Year
SCHEDULE :13 GRANTS/SUBSIDIES		
(1) Central Government		
Grant -in- Aid from MoEF	98,654,000.00	
Amt capitalized (-)	46,254,721.00	
(2) State Government (s)		
(3) Government Agencies		
(4) Institutions/Welfare Bodies		
(5) International Organisations		
(6) Others (Specify)		
WII Contribution (Pension A/c)		
TOTAL	52,399,279.00	37,621,725.00
SCHEDULE :14 FEES/ SUBSCRIPTIONS		
(1) Entrance Fees		
M.Sc.Course Fee	71,900.00	
(2) Annual Fees/ Subscriptions		
(3) Seminar/ Program Fees		
Seminar/ Workshop Fees	530,000.00	
(4) Consultancy Fees		
Consultancy refund	8,711.00	54,840.00
(5) Others (Specify)		
Other Receipt (Training)		
Receipt for Workshop/Courses(Training Account)	4,160,714.00	11,788,733.00
Receipt during the year	3,636,314.00	
Less Receipt for previous year	135,600.00	
Total	3,500,714.00	
Add outstanding for the year	660,000.00	
Grand Total	4,160,714.00	
Misc. Receipts (Training A/c)	73,437.00	194,519.00
Receipt for Training Cost	7,000,000.00	
TOTAL	11,844,762.00	12,038,092.00
SCHEDULE :16 INCOME FROM ROYALTY, PUBLICATION ETC.		
(1) Income from Royalty		
(2) Income from Publications		
(3) Others (Specify)		
Misc. Receipts	-2,793,182.00	146,970.00
Instt. Charges (WII Receipts)		77,850.00
House Licence Fee	228,627.00	224,097.00
Bus Charges	100,684.00	
Lab Testing Charges	41,200.00	129,100.00
TOTAL	-2,422,671.00	578,017.00

SCHEDULE :17 INTEREST EARNED		
(1) On Term Deposits		
(1) With Scheduled Banks		
Int. on Bank Deposit	390,515.00	1,970,048.15
Interest on FDR		
Interest on Investment		
(2) With Non-Scheduled Banks		
(3) With Institutions		
(4) Others (Specify)		
Int. on Investment		
Interest (Training)	1,572,867.00	
(2) On Savings Account		
(1) With Scheduled Banks		
Int. on Savings Account		
(2) With Non-Scheduled Banks		
(3) Post Office Savings Account		
(4) Others (Specify)		
(3) On Loans		
(1) Employees/Staff		
(2) Others		
(4) Interest on Debtors and Other Receivables		
TOTAL	1,963,382.00	1,970,048.15
SCHEDULE :18 OTHER INCOME		
(1) Profit on Sale/Disposal of Assets		
(1) Owned Assets		
(2) Assets acquired out of grants, or received free of cost		
(2) Export Incentives realized		
(3) Fees for Misc. Services		
(4) Others (Specify)		
Misc. Receipts		
WII Contribution (GPFA/c)		
Misc. Receipts (GPFA/c)		
Consultancy Project Receipts during the year		
EMD Forfeited		
Research Project		
Rent	254,137.00	287,003.00
WII Products	163,133.00	94,284.00
Misc. Receipts (Penal Int. on Car Advance)	3,243.00	
Training Receipts Income		
EPF Receipts		
Misc. Receipts (Consultancy A/c)	679,802.00	359,316.00
Receipt for Project	36,102,112.00	2,629,857.00
Receipt during the year		
Add outstanding for 2005-06	17,804,112.00	
Saving of Project Cost	18,298,000.00	
Misc. Receipts for Research Project	9,128,274.00	16,796,447.00
Interest on Bank Deposit		
TOTAL	46,330,701.00	20,166,907.00

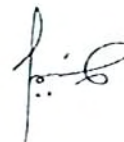
SCHEDULE :19 INCREASE/DECREASE IN STOCK OF FINISHED GOODS		
(1) Closing Stock		
(1) Finished Goods		
Closing Balance of WII Publication	1,086,471.00	
(2) Work-in-progress		
(2) Less : Opening Stock		
(1) Finished Goods		
(2) Work-in-progress		
TOTAL	1,086,471.00	0.00
SCHEDULE :20 ESTABLISHMENT EXPENSES		
(1) Salaries and Wages		
Fellowship	231,638.00	474,066.00
Honorarium	46,080.00	47,863.00
Medical	3,137,135.00	2,016,863.00
Salaries & Allowances	26,985,158.00	23,385,561.00
Stipend	103,704.00	103,800.00
Fellowship & Wages (Project)		
Travel Exp. (Research Project)		
Wages	947,627.00	961,504.00
Salary & Allowances	98,150.00	106,395.00
Fellowship & Wages (Consl. Project)	1,353,864.00	562,136.00
Travel Exp. (Consl. Project)	1,568,246.00	181,871.00
Travel Exp. (Research Project)	829,164.00	692,981.00
Fellowship & Wages (Research Project)	4,254,007.00	3,180,716.00
Salary & Wages		
(2) Allowances and Bonus		
Bonus		
OTA	308,278.00	288,898.00
LTC	538,258.00	478,403.00
Travelling Allowances	458,800.00	329,285.00
Honorarium (Training A/c)	2,078,668.00	2,112,222.00
Training Allowances	46,700.00	53,850.00
(3) Others (Specify)	846,810.00	948,155.00
Trans. to Project A/C	8,000,000.00	15,894,885.00
(4) Contribution to Other Fund (Specify)		
Leave Salary and Pension Contr. To LIC		
(5) Staff Welfare Expenses		
Uniforms	97,916.00	82,068.00
Employer Contribution to EPF(Training)	10,000.00	8,922.00
(6) Expenses on Employees Retirement and Terminal Benefits		
Final Payment	729,340.00	
Leave Encashment	417,081.00	374,119.00
Leave Salary and Pension Contribution		
(7) Others (Specify)		
Commuted Value of Pension		
Misc./Cont.		
Pension/Family Pension		
Camp Expenses (Project)		
Advance/ Withdrawal		
Camp Expenses (Consl. Project)	8,240,943.00	75,304.00
Camp Expenses (Research Project)	613,053.00	166,432.00
TOTAL	61,940,620.00	52,526,299.00

SCHEDULE :21 OTHER ADMINISTRATIVE EXPENSES		
AMC of Computers	2,109,366.00	538,462.00
Annual Research Seminar	456,813.00	116,479.00
Auditors Remuneration		
Consultancy Charges		
Consultancy project Exp.		
Cont./Misc. (Conslt. Project)	5,438,999.00	258,914.00
Contingencies/Misc. (Project)		240,123.00
Contingencies/Misc. (Research Project)	1,588,241.00	2,481,505.00
Contingencies & Misc.Exp.	3,128,057.00	3,007,750.00
Conveyance Charges	7,772.00	9,073.00
Electricity and Water Charges	3,890,482.00	3,845,375.00
Entertainment Charges	177,452.00	103,825.00
EPF Contribution	76,787.00	79,142.00
Estate Maintenance	1,926,241.00	918,107.00
Estate Security	4,102,757.00	3,392,223.00
Exhibition & Museum		
Forest Advance		
Govt. Contribution to Pension Fund	5,000,000.00	
IUCN Contribution	70,000.00	
Lab Chemicals	478,700.00	551,085.00
Lab Expenses	507,071.00	418,676.00
Landscaping		
Legal Expenses	384,357.00	639,725.00
Library Expenses	26,482.00	409,778.00
M.Sc. Course Expenditure	689,882.00	534,605.00
Misc./Cont payments o/s	3,961,938.00	
Newspaper & Magazine	41,676.00	39,272.00
Operational Expenses	3,933,755.00	2,794,963.00
Pension & EPF Expenses		5,000,000.00
Pension Contribution	1,267,032.00	1,442,723.00
POL & Maintenance of Vehicle (Project)		
POL & Maintenance of Vehicle (Research Project)	1,291,602.00	890,240.00
POL & Maintenance of Vehicle (Conslt. Project)		12,290.00
POL for Vehicles	2,009,765.00	1,032,189.00
Postage & Telegrams	221,484.00	216,071.00
Printing & Binding	293,163.00	449,567.00
Publication	287,480.00	380,532.00
Publicity & Advertisement	556,437.00	91,693.00
Rent of Buildings		
Repair & Maintenance of Vehicles	1,160,962.00	821,202.00
Repair of Computer		
Saletax (Contractor)		
Sample Testing Charges		
Sharing of cost of Kendriya Vidyalaya	1,055,360.00	1,042,320.00
Sports Goods	171,310.00	140,375.00
Stationary	2,485,134.00	1,267,700.00
Stationary Exp.(Training A/C)	1,110,885.00	629,482.00
Telephone & TC	703,550.00	787,915.00
Training Account Exp.		
Training Cost Expenditure	7,000,000.00	9,000,000.00
Training Receipts		
Travel Exp.	2,999,149.00	2,042,480.00
Workshop/Seminar	646,922.00	820,098.00
TOTAL	61,257,063.00	46,445,959.00

SCHEDULE :22 EXPENDITURE ON GRANTS, SUBSIDIES ETC.		
(1) Grants given to Institutions/Organisations		
(2) Subsidies given to Institutions/Organisation		
(1) Govt. Cont. to Pension Fund		3,198,285.78
(2) GPF Contribution		2,997,941.05
TOTAL	0.00	6,196,226.83



(S.S. Lamba)
Finance Officer



(P.R. Sinha)
Director

