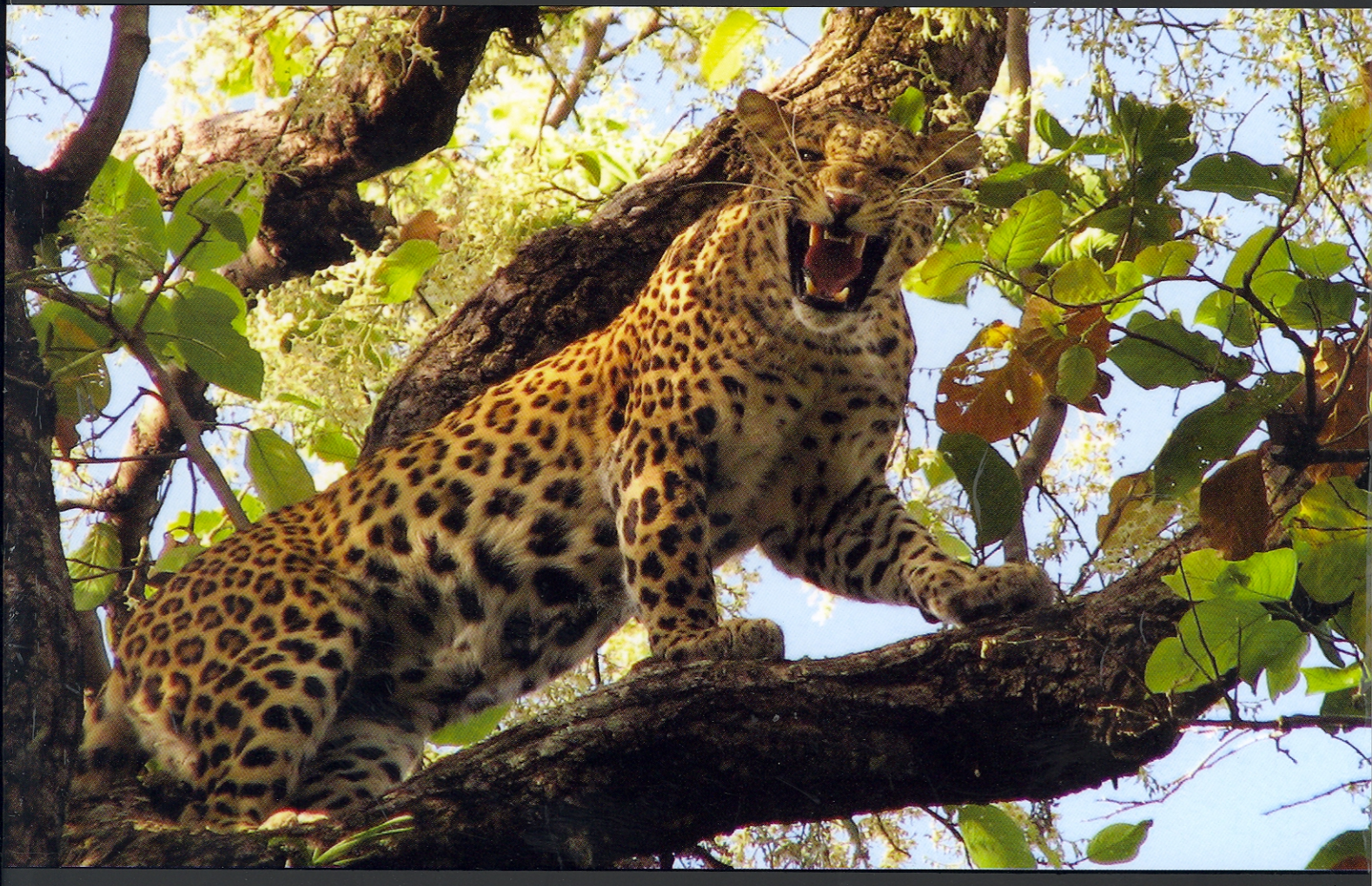
ANNUAL REPORT
2007-08



भारतीय वन्यजीव संस्थान
Wildlife Institute of India

Editors: Bitapi C. Sinha and K.K. Shrivastava
Layout and Designing: Kuldeep Chauhan
Cover Photo Credit: Joseph Vattakaven
Back Cover Credit: Pankaj Kumar
Printer: Print Vision, Rajpur Road, Dehradun

Contents

Director's Note

I am pleased to present the Annual Report of Wildlife Institute of India for the year 2007-08. During the period under report, Institute continued to pursue the mandated academic, training and research activities as approved by the Governing Body. The highlight of the activities was the launch of Report on 'Status of Tiger, Co-predator, Prey in India' at Lakshmipat Singhania Auditorium, New Delhi by Hon'ble Minister of State for Environment & Forests Thiru S. Regupathy. The report is culmination of untiring efforts of large number of young researchers, faculty members and forest departments' officials and staff which began in 2005. The report is much more than just tiger estimation. It is second time in the history of Wildlife Institute of India, that collaborative effort on such a large scale has been accomplished, the first one being preparation of the document entitled 'Planning a Wildlife Protected Area Network in India.' Twenty-one layers of information have been put together in GIS domain. The information thus collated provides excellent basis for landscape level planning not only for Tiger Conservation but also for evaluating impact of development projects on forests and protected areas, developing appropriate land-use plans for sustainable development of natural resources and addressing livelihood issues of local people *vis-à-vis* conservation of wildlife. It is thus a document of transcendental value.

Apart from above, the Institute successfully conducted the Post Graduate Diploma in Wildlife Management, the Certificate Course, the M.Sc. Wildlife Science and organized 16 short term courses, workshops, meetings and seminars. The Wildlife Forensic Cell, the EIA Cell, the ENVIS Cell and the Computer and GIS Cell made significant progress during the period under report. All our

faculty members, technical staff, and the administrative staff lived upto the expectations of the management and deserve to be complimented for their unstinted and willing cooperation for making the year a fruitful and satisfying one.

(P.R. Sinha)
Director

Role & Mandate


Satyaranjan Behera

Introduction

Our Mission

Aims & Objectives

Role & Mandate

Introduction

The Wildlife Institute of India (WII) established in 1982 has emerged as a premier training and research institution in the field of wildlife and protected area management in South Asia. Since its inception, WII has had the benefit of collaboration with international organizations such as UNDP, FAO, USFWS, IUCN, UNESCO. These collaborations have 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 science and promote its application in the field in a manner that accord with our economic and socio-cultural milieu".

Aims and Objectives

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

Research reports

Completed
Ongoing
New Initiatives

Sajan John

All India monitoring of tigers, co-predators, prey and their habitat

Collaborative Project between National Tiger Conservation Authority, State Forest Departments and the Wildlife Institute of India

Funding source: National Tiger Conservation Authority, Govt. of India

Investigators: Dr. Y.V. Jhala, Shri Q. Qureshi and Dr. R. Gopal

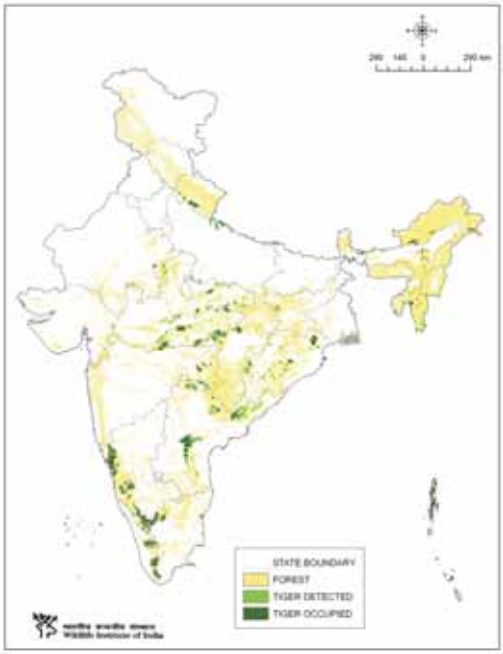
Researchers: Agni Mitra, Aishwarya Maheshwari, Amit Kotia, Aniruddha Majumdar, Asheem Rahul Singh, Ashish K. Gharai, Ashish Kumar Bais, Bhaskar Acharya, Chandrima Home, Durg Singh Rajpurohit, Harshad Mangave, Hem Singh Gahlot, Indrani Sasmal, J.Peter Prem Chakravarthi, Janmajay Setty, Jayasooryan K.K., Jimmy Borah, John C.E., Joseph Vattakaven, Jyoti Singh, Jyotirmay Jena, Kamal Singh Negi, Karabi Deka, Kuladeep Roy, Kunwar Sain, M. Selvan, Manish Bharadwaj, Mohit Bodyal, N.Sridharan, Navonil Das, Parabita Basu, Peer Muzamil Shams, Pridhuvi Raj, Purnima Manar, R.K. Jagdish Singh, Rajarshi Chakraborti, Rajendra P. Gupta, Rajiv Pillai, Rajni Sharma, Raju Lal Gurjar, Ramachandran. K, Rashid Raja, Rinima Hazarika, Rishi Kumar Sharma, Satyaranjan Behra, Shalini Bharadwaj, Shantanu Basu, Shilpi Gupta, Shirish Kayatham, Shubhadeep B., Shubham Dutta, Sumit Dhokia, T. Ramesh, Tamo Dadda, Tana Mewada, Tripti Negi, Tripti Shah, Udaya Kumar Das, Umesh Kumar Tiwari, Ved Prakash Ola, Vibhav Srivastava, Vidyadhar Atkore and Vishal Vasant Patil

Date of initiation: 2005

Date of completion: 2007

Objectives: The National Tiger Conservation Authority, Ministry of Environment & Forests, Govt. of India, entrusted the Wildlife Institute of India the responsibility 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 modelling, 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: A three-phase approach was used to sample all forested habitats in tiger states. A double sampling approach was used to first estimate occupancy and relative abundance of tigers, co-predators, and prey through sign and encounter rates in all forested areas. Tiger numbers were obtained for contiguous



patches of occupied forests by using average densities for that population block. Numbers and densities are reported as adult tigers with a standard error range.

Occupancy of a forest patch by tigers was negatively correlated with human disturbance indices and positively correlated with prey availability, forest patch and core sizes. For establishing and maintaining high density source populations of tigers, it is essential to set aside inviolate areas devoid of human presence within each landscape. These source populations should be connected through multiple use forests (buffers and corridors), where human land uses conducive to maintaining low density tiger occupancy are permitted and fostered by providing appropriate incentives to local communities.

The Shivalik-Gangetic plain landscape complex is composed of two landscape units: (a) Kalesar to Kishanpur; and (b) Dudhwa to Valmiki. The landscape complex had about 20,800 km^2 of potential tiger habitat on the Indian side. The Dudhwa-Valmiki landscape is now connected only via Nepal forests, and needs to be managed through international cooperation with Nepal. Currently the tiger occupies 5,080 km^2 of forested habitats with an estimated population size of 297 (259 to 335) in six separate populations. The most important tiger population within this landscape is Corbett having tiger presence in 1,524 km^2 with an estimated population of 164 (151-178). The landscape is characterized by having the ability of sustaining high density tiger populations *e.g.* Corbett 19.6 tigers per 100 km^2, Dudhwa, Kishanpur and Katarniaghat tiger density ranging between 4.5 to 6.5 tigers per 100 km^2. Thus, good management and protection of tiger reserves can serve an important role for tiger conservation. Reserves and landscapes that need fostering to achieve their inherent potential are Rajaji (along with Shivalik, and Haridwar Forest Divisions) and Valmiki Tiger Reserve.

Within the forest area of the central Indian landscape, tiger presence is currently reported from 47,122 km^2 (11.6 % of forests) with an estimated tiger population of 451 (347 to 564) distributed in 17 populations. The central Indian landscape complex consists of eleven separate landscapes out of which four have potential to sustain meta-populations of tigers. These are: (a) Kanha-Pench landscape of about 16,000 km^2 with tiger occupancy of 3,880 km^2 with an estimated population of 121 tigers; (b) Satpura-Melghat landscape of 12,700 km^2 with tiger occupancy in 3,331 km^2 and a population estimate of 69 tigers; (c) Sanjay-Palamau landscape of 13,700 km^2; and (d) Navegaon-Indravati landscape of 34,000 km^2. Five other landscapes with single source populations, which could potentially persist due to their reasonable large size and potential for high density tiger population are: (a) Bandhavgarh with tiger occupancy in 1,575 km^2 and a population estimate of 47 tigers; (b) Panna with tiger occupancy in 974 km^2 and a population estimate of 24 tigers; (c) Ranthamore-Kuno-Palpur with tiger occupancy in 3,506 km^2 and a population estimate of 36 tigers; (d) Tadoba with tiger occupancy in 775 km^2 and a population estimate of 34 tigers; (e) Simlipal with tiger occupancy in 2,297 km^2 and a population estimate of 20 tigers.

The Eastern Ghat landscape complex currently has about 15,000 km^2 of potential tiger habitat. Tigers occupy 7,772 km^2 of forested habitats with an estimated population size of 53 (49 to 57) in a single contiguous forest block constituted by the Srisailam-Nagarjuna Sagar Tiger Reserve and adjoining forests in the districts of Kurnool, Parakasam, Cuddapah, Mahbubnagar and Guntur. This landscape is capable of supporting higher densities of tigers than currently reported. Major problems in achieving this potential is insurgency, biotic pressures, and subsistence level poaching of tiger prey.

Currently tigers occupy 21,435 km^2 of forests within the Western Ghat landscape comprising 21% of the forested area. The current potential tiger habitat in the landscape complex is about 51,000 km^2. The population estimate for this landscape was 366 (297-434) tigers. The Western Ghat landscape complex consists of three landscape units: (a) Forested area from the district of Pune to Palghat in Kerala, and eastwards up to Dharmapuri in Tamil Nadu. This landscape has good potential for long-term tiger survival due to its large extent of over 34,000 km^2 of contiguous forest, with several source populations of tigers that likely exist as a meta-population; (b) South of Palghat up to Kodaikanal forest areas having some connectivity with the Periyar landscape; (c) the Periyar-Kalakad landscape unit of about 10,000 km^2 area. The single largest population of tigers in India is within this landscape comprising the landscape of Nagarhole-Mudumalai-Bandipur-Wynad encompassing the States of Karnataka, Tamil-Nadu and Kerala having tiger occupancy in 10,800 km^2 and an estimated tiger population of about 280 tigers.

North-eastern hills and Brahmaputra plains currently reported tiger occupancy in 4,230 km^2 of forests. This landscape was sampled in an expedition mode based on supervised knowledge and not as per the Phase I protocol, thus this occupancy is likely to be an under estimate. North-east hills and Brahmaputra flood plains landscape is also composed of two landscape units; (a) The largest single landscape unit of about 1,36,000 km^2 extending from Pakke Tiger Reserve to Namdapha Tiger Reserve in east, and towards Dampa Tiger Reserve in south. Kaziranga constituting a major source population of tigers is connected through the Karbi Anglong hills. The landscape continues up to Balphakram National Park; (b) the second landscape complex consists of Manas Tiger Reserve, in Assam, along with Buxa Tiger Reserve, Gorumara and Singhalila forests of West Bengal. The landscape is fragmented on the Indian side but has forest contiguity through Bhutan, and currently has about 7,200 km^2 of good tiger habitat. The single most important tiger population in this landscape was that of Kaziranga that formed a part of a forest patch of 1,36,000 km^2, tiger occupancy of Kaziranga was only 766 km^2 but due to its potential for sustaining a high density population and forest contiguity through the Karbi Anglong hills, it serves as a major source for dispersing tigers.

The Sunderbans landscape complex is the smallest isolated landscape that likely has a single population of tigers with tiger occupancy in 1,586 km^2. Population assessment for Sunderbans is ongoing as a separate exercise as the uniqueness of the habitat requires a different approach such as using radio-telemetry for estimating tiger numbers. The Sunderbans tiger population needs to be managed through international cooperation with the Government of Bangladesh.

Output and outcomes: The above assessment has shown that though the tiger has lost much ground due to direct poaching, loss of quality habitat, and loss of its prey there is still hope. Individual tiger populations that have high probability of long-term persistence by themselves are only a few: Nagarhole-Mudumalai-Bandipur-Waynad population, Corbett population, Kanha population, and possibly Sunderban and Kaziranga-Karbi Anglong populations. Tiger populations that exist and can persist in a meta-population framework are Rajaji-Corbett, Dudhwa-Katarniaghat-Kishanpur (along with Bardia and Shuklaphanta in Nepal), Satpura-Melghat, Pench-Kanha, Bhadra-Kudremukh, Parambikulum-Indira Gandhi, and KMTR-Periyar. The landscapes that have potential but are

currently in need of conservation inputs are Sirsailam Nagarjun Sagar, Simlipal, Ranthambore-Kuno Palpur, Indravati–northern Andhra Pradesh, and Bandhavgarh-Sanjay-Palamau. To ensure the long-term survival of tigers in India, it is imperative to offer strict protection to established source populations and manage areas with restorative inputs by involving local communities in buffer and corridor areas by providing them with a direct stake in conservation. Tigers are a conservation dependent species requiring large contiguous forests with fair interspersion of undisturbed breeding areas. This leaves little choice other than to evolve strategies by mainstreaming conservation priorities in regional development policy and planning for managing 'priority areas' identified in the landscape complexes. Such an approach would ensure that breeding tiger populations have a possibility to share genetic material and exist in a meta-population framework, thereby enhancing the possibility of their survival.

Forest occupancy of Tigers, Co-Predators, Prey and population estimates of tigers.

State	Tiger km²	Leopard km²	Dhole km²	Sloth Bear km²	Chital km²	Sambar km²	Wild Pig km²	Nilgai km²	Tiger Numbers		
									No.	Lower limit	Upper limit
Shivalik-Gangetic Plain Landscape Complex											
Uttarakhand	1901	3683	-	853	2161	2756	3214	422	178	161	195
Uttar Pradesh	2766	2936	190	3130	5537	2641	7761	8375	109	91	127
Bihar	510	552	323	532	576	321	570	494	10	7	13
Shivalik-Gangetic	**5177**	**7171**	**513**	**4515**	**8274**	**5718**	**11545**	**9291**	**297**	**259**	**335**
Central Indian Landscape Complex and Eastern Ghats Landscape Complex											
Andhra Pradesh	14126	37609	41093	54673	37814	33159	58336	26526	95	84	107
Chhattisgarh	3609	14939	3794	20951	18540	7604	25058	9250	26	23	28
Madhya Pradesh	15614	34736	28508	40959	41509	33551	599033	41704	300	236	364
Maharashtra	4273	4982	4352	6557	5970	5730	7370	4754	103	76	131
Orissa	9144	25516	8215	43236	6040	6112	21525	711	45	37	53
Rajasthan	356	-	-	-	-	-	-	-	32	30	35
Jharkhand**	1488	131	-	2640	721	721	6226	1108	**Not Assessed**		
Central Indian	**48610**	**131**	**85962**	**2640**	**721**	**721**	**6226**	**1108**	**601**	**486**	**718**
Western Ghats Landscape Complex											
Karnataka	18715	20506	15862	20749	42349	43412	21999	-	290	241	339
Kerala	6168	8363	10801	6904	2931	10469	8809	-	46	39	53
Tamil Nadu	9211	14484	19658	13224	13567	15909	19768	2505	76	56	95
Western Ghats	**34094**	**43353**	**46321**	**40877**	**58847**	**69790**	**50576**	**2505**	**402**	**336**	**487**
North East Hills and Brahmaputra Flood Plains											
Assam*	1164	1500	285	380	-	270	2047	-	70	60	80
Arunachal Pradesh*	1685	670	675	199	-	353	412	-	14	12	18
Mizoram*	785	2324	776	479	-	1700	1489	-	6	4	8
Northern West Bengal *	596	1135	301	-	280	309	491	-	10	8	12
North East Hills, and Brahmaputra	**4230**	**5629**	**2037**	**1058**	**280**	**2632**	**4439**	**-**	**100**	**84**	**118**
Sunderbans	**1586**	**-**	**-**	**-**	**1184**	**-**	**1591**	**-**	**Not Assessed**		
							Total Tiger Population		**1411**	**1165**	**1657**

* *Population estimates are based on possible density of tiger occupied landscape in the area, not assessed by double sampling.*

** *Data was not amenable to population estimation of tiger. However, available information about the landscape indicates low densities of tiger in the area ranging from 0.5 to 1.5 per 100 km².*

Ecological study on tiger beetles as indicator for biodiversity monitoring in the Shivalik Landscape

Funding source: Department of Science and Technology
Investigators: Dr. V.P. Uniyal and Dr. K. Sivakumar
Researchers: Manish Bhardwaj and Rashmi Dobal
Date of initiation: September, 2004
Date of completion: August, 2007

Objectives: The objectives of the project were to: (i) Assess species richness, distribution and abundance of tiger beetles, birds, and butterflies in different vegetation types; and (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: Thirty transects were monitored in different habitat types of the study area (Shivaliks of Himachal Pradesh and Rajaji National Park of Uttarakhand) for birds, butterflies and tiger beetles, vegetation and human disturbance. A comprehensive taxonomic identification of the tiger beetle and butterflies species were also made.

Outputs and outcomes: A total of 161 birds, 116 butterflies and 25 tiger beetles' species were documented. Simbalbara Wildlife Sanctuary was found to have the highest number of tiger beetles followed by Chilla in Rajaji National Park. The open mixed scrub jungle around Pong Dam Wildlife Sanctuary had higher species richness in comparison with mixed forests of Naina Devi Wildlife Sanctuary. The mixed scrub jungle around Pong Dam Wildlife Sanctuary was found to have an overall high species richness of birds. It also has a higher number of species that were seen per transect. Butterflies were found sensitive to habitat changes and also showed changes in species composition along a gradient of vegetation structure from forests to scrub vegetation. Since butterflies also visit open areas, it did not show much difference in richness across a disturbance gradient. Tiger beetle species showed a high degree of habitat specialization and were found in one or few micro-habitats owing to unique climatic and tropic characteristics and resource partitioning. These in turn form the prime character for a bio-indicator taxon for which tiger beetles are well known. Thus, monitoring these species in future will give precise idea about changes in micro-climatic conditions, if the anthropogenic disturbance increases. Only bird species richness showed a significant difference between disturbed and undisturbed areas. A significant correlation between butterfly and bird species richness at the habitat level while pooled species richness for sites showed significant correlation between tiger beetles, butterflies and birds; which in turn forms the established criterion for biodiversity indicator and subsequent monitoring.

The use of indicators for assessing biodiversity is valid only if the species richness of the indicator correlates with the diversity of other taxa. Bird and butterfly species richness showed a significant correlation across all habitat types. Tiger beetles, butterflies and birds also showed significant correlations when the data was pooled for study sites. The data suggests that each of the three groups could act as surrogates for species richness in the study area. Tiger beetle richness could be a good indicator to predict the richness of butterflies and birds. Biodiversity is complex and to assess it, such surrogates as sub-sets of species, species assemblages and habitat types have to be used as measures of biodiversity. Identifying such surrogates would be the first step for systematic conservation planning.

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: August, 2007

Objectives: The objectives of the project were: (i) To examine the kind of inputs provided to local communities (Eco-development Committees) through ecodevelopment programme. (ii) To examine the impacts of such ecodevelopment programme with respect to following parameters: (a) change in socio-economic conditions of local communities (EDC members) prior to and after the initiation of ecodevelopment 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 ecodevelopment; and (f) programme with respect to: (a) structure and membership; (b) economic status (funds received/generated/ invested/spent and audit system); (c) capacity building of members; (d) level of participation and empowerment of women and marginal groups; and (e) decision making and conflict resolution mechanism adopted; and (iii) on the basis of above findings critically examine the factors responsible for the success and failure of ecodevelopment initiatives with respect to Periyar Tiger Reserve and suggest measures for effective implementation of the future programme.

Progress: The major findings of the study are: (i) Eco-development project has brought about significant improvement in the protection of Periyar Tiger Reserve; (ii) the resource use in the form of fuelwood, fodder and non-wood forest products (NWFP) have drastically reduced; (iii) the participation of local people in the management of Periyar has gone up in the form of contributions for protection, fire detection and control, cleaning of the area in pilgrimage and tourism zones, giving information of offenders and joining hand with staff for patrolling; (iv) there has been rising trend of crop damage with respect to Wild pig and Sambar; and (v) the major drivers of this change are the well-being of community in different EDCs, social capital among the local people, the leadership of secretaries of EDCs and the level of performance of self help groups.

Outputs and outcomes: Project Report and guidelines for sustainability of ecodevelopment programme in Periyar and other areas has been finalized.

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, Shri N.K. Vasu and Shri A.K. Bhardwaj

US Science Team: Dr. John F. Lehmkuhl, Dr. Martin Raphael and Dr. Bruce G. Marcot.

Date of Initiation: September, 2004

Date of completion: March, 2008

Objectives: Following were 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: Primarily three activities were performed during the year. These were: (a) preparation of reports for six tasks implemented in the previous year; (b) participation of Indian investigator and coordinator in the International Association of Landscape Ecology (IALE) World Congress 2007 for presenting a research paper titled 'Landscape management approach - vital to conservation in India'; and (c) visit of two counterpart US scientists to India in October, 2008 to finalize project outcomes in consultation with Indian team members, acquaint with emerging challenges in the forestry and wildlife conservation sectors and explore possibilities for continued collaboration. Field visits to Kaziranga National Park in Assam and Periyar Tiger Reserve in Kerala were undertaken with a view to identify topics of priority management oriented research and their feasibility. The visiting scientists also shared their experience in managing large landscapes in USA and elsewhere in the world with the participants of the 1-week Course for IFS officers conducted by the Institute.

Outputs and outcomes: The five site level workshops and sharing of findings of Phase I of the project allowed identification of six implementation tasks in four CAs on wide ranging themes: (i) adaptive management of tall grasslands in Terai; (ii) management of livestock grazing in Melghat forests; (iii) assessment of plantations for wildlife values in ACA; (iv) distribution and status of sacred groves in GCA; (v) impact of coal mining and horticulture development on elephant conservation in Garo Hills; and (vi) inventory of Non-Timber Forest Products (NTFPs) in GCA for execution during the currency of the project. Field visits, site level meetings and interactions with field managers resulted in collection of desired field information on six themes. Task reports were finalized.

Milestone

The project provided desired impetus for the development of landscape management approach in India to forest planning and management with ultimate aim on conservation of biodiversity along with sustainable livelihoods for forest dependent communities. Four CAs selected as demonstration sites across the country provided distinct biological, ecological, socio-economic, and management attributes for comparison and better understanding of forest diversity, management and conservation issues. The research team optimally used opportunities to share progress and accomplishments with professional forest officials and others at different stages of the project. The experience gained from the project and the final outputs produced are being meaningfully utilized for capacity building relevant to landscape management approach to conservation.

Ecology of two endemic turtles of Western Ghats

Funding source: Grant-in-Aid
Investigators: Dr. Bivash Pandav and Dr. Karthikeyan Vasudevan
Researcher: V. Deepak
Date of initiation: January, 2006
Date of completion: January, 2010

Objectives: The objectives of the project are to: (i) estimate the population density of Travancore tortoise and cane turtle in a fragmented landscape; (ii) quantify the diet of these two species and describe the feeding ecology with respect to their role in seed dispersal; (iii) identify threats to the turtle population based on their habitat use, ranging pattern and food habits and recommend measures for their conservation; and (iv) 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: Sampling for cane turtles were carried out only in the evergreen forest where they are reported to survive. Time constrained searches were made in the forest floors in different localities within the study area. Ninety seven man hours of searches were carried out from February 2006 to January 2008. The faeces of individual turtles were collected and dried under 40w bulb. The dried material was then separated and examined using a 10X hand-held lens.

Transmitters were attached on the cane turtle. Epoxy adhesive Hysol E-120 HP (Loctite Corp, U.S.A) was used to attach the transmitter on the turtle's carapace. The transmitters were enclosed in waterproof casing with sleeved antenna (G3-1V type), weighing from 5.4 – 6.2 gms (AVM instrument Co, California, U.S.A) and constituted less than 5% of the turtle's body weight (mean = 2.5%; N = 4). In field the turtles were located using portable radio telemetry receiver (Model: LA12Q) and hand held collapsible Yagi antenna (AVM instrument Co, California, U.S.A). Four temperature loggers (Onset Computer Corporation, Bourne, MA) are randomly placed in the study area and one near each individual turtle's. The temperature loggers are launched and programmed to collect temperature data for every hour (BoxCar Pro 4.3 Onset Computer Corporation, Bourne, MA).

Outputs and outcomes: Forty-one Travancore tortoises were sighted and marked in the study area. The data collected from the trails will be used to calculate occupancy, and proportion of the area occupied (PAO) by Travancore tortoise. A multiple season model described was used to calculate site occupancy rates. The Travancore tortoises were reported to feed on grass, fungi, bamboo shoots, fallen fruits, flowers, insects and frogs. The faecal analysis reveals that the tortoise fed on both plant and animal materials.

Conservation of Red Junglefowl (*Gallus gallus*) in India

Funding source: Grant-in-Aid
Investigators: Dr. S. Sathyakumar (WII), Dr. Rahul Kaul (WTI) and Dr. Rajiv S. Kalsi (MLNC)
Researchers: Merwyn Fernandes and Mukesh
Date of initiation: September, 2006
Date of completion: February, 2008

Objectives: The objectives are to: (i) assess the status and distribution of Red Junglefowl (RJF) in India; (ii) identify pure RJF populations by molecular genetic studies; (iii) study social interactions between wild RJF and domestic fowl; and (iv) to prepare conservation action plan for the identified RJF populations.

Progress: Field investigations were carried out in different RJF range States to assess the RJF distribution, trait characters, abundance estimates and threats. The information collected on RJF distribution and status has been compiled and submitted as Phase–I report pertaining to objective at S.No.1. For genetic studies on RJF, blood and feather samples were collected from wild and captive RJF populations in the States of Andhra Pradesh, Assam, Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Jammu & Kashmir, Meghalaya, Mizoram, Nagaland, Orissa, Sikkim, Uttarakhand, and West Bengal. DNA has been extracted from these biological samples and awaiting further analysis. Field investigations on social interactions are proposed for the year 2008-2009.

Outputs and outcomes: Based on surveys carried out during the last two years, it has been found that RJF is currently distributed in 21 range states of India and is reported to be present in 205 districts out of 270 districts that fall within this historical distribution range. RJF is reported to be present in 190 Protected Areas that includes 31 National Parks and 159 Wildlife Sanctuaries. A set of physical trait characters, believed to be indicators of genetic purity (rudimentary comb in females, eclipse plumage, white/pink ear patches, leg colour) were also assessed during field surveys. Results indicate that all males showed trait characters indicative of genetic purity. However, the rudimentary comb in females could be confirmed only in 30% cases.

Preparation of management plan for the Gulf of Mannar Biosphere Reserve

Funding source: Grant-in-Aid
Investigators: Shri B.C. Choudhury and Dr. K. Sivakumar
Researchers: B.M. Praveen Kumar, Kevin Mosses and S. Subburaman
Date of initiation: November 2005
Date of completion: March 2007 extended up to September 2007

Objectives: To prepare the management plan for the Gulf of Mannar Marine National Park (GOMMNP) and Biosphere Reserve. The Plan was to specially address the issues of: (i) Conservation of biodiversity and ecological integrity of the National Park and Biosphere Reserve through protection, restoration and management of the coral reef systems in the Gulf of Mannar region; (ii) Sustainable development in the Biosphere region to ensure the wise use of common ecological goods and services for the benefit of the local community; and (iii) Develop a model plan and mechanism for multi-sectoral involvement in managing a globally important but fragile coastal and marine ecosystem in India.

Output and outcomes: The Gulf of Mannar Biosphere Reserve (GOMBR) Trust has given the Wildlife Institute of India, the responsibility of developing a ten-year Management Plan for the GOMMNP and GOMBR addressing the issues of: (a) conservation of biodiversity and ecological integrity of the GOMMNP and GOMBR through protection, restoration and management of the coral reef systems in the Gulf of Mannar region; (b) sustainable development in the GOMBR region maintaining the ecological integrity of the coastal and marine ecosystems to ensure the wise use of common ecological goods and services for the benefit of the local inhabitants and community; and (c) to develop a model plan and mechanism of multi-sectoral involvement in managing the globally important fragile coastal and marine ecosystem in India.

Since the management plan of a terrestrial Protected Area is different from the Marine Protected Area, a modified management plan development guidelines using the IUCN-Marine Protected Areas Management Plan Guidelines and Management Plan Preparation Guidelines developed by Shri V.B. Sawarkar was adapted. The integrated management plan development exercise inventoried the ecological, socio-economic and developmental settings in the region. Based on this information and several stakeholders meetings, a draft management plan was prepared and shared with the GOMBR and GOMMNP authorities. Analyzing the feedbacks from these two agencies, a management plan sharing exercise with the other stakeholders before finalizing the plan and submitting to the Tamil Nadu Government through the GOMBR and the State Department of Environment & Forests was organized. The final Management Plan was submitted in September 2007.

Evaluation of the functional status and quality of corridors connecting fragmented populations of tiger in the Indian part of Terai Arc Landscape - Phase II

Funding agency: Save the Tiger Fund, National Fish and Wildlife Foundation, USA
Investigators: Dr. S.P. Goyal and Shri Qamar Qureshi
Researcher: Meraj Anwar
Date of initiation: November , 2004
Date of completion: December, 2008

Objectives: : The objectives of this study were:(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 socio-economic issues affecting the corridor existence and its use.

Progress: Prey species were surveyed based on recording the pellet groups and direct sightings. A transect of the length ranging from 0.5 km to 3.0 km was laid. At every 250 m interval a 20×2 m plot was laid across the transect line and number of pellet groups of different prey species were counted in each plot. The quality of the pellet groups was divided into four different categories: (i) Very fresh (fresh wet droppings with mucous layer around it and recorded possibly on the same day), (ii) Fresh (fresh wet droppings without mucous layer), (iii) Old (pellets wet inside but covered by a dry outer layer) and (iv) Very old (pellets fully dried close to degradation or partly degraded). These plots were also used for recording number of livestock dung which is one of the major disturbance factors in the corridor area.

Data on vegetation structure was gathered by laying the nested plots of varying sizes (10 m, 5 m and 1 m for trees, shrubs and ground cover associated variables respectively) at every 250 m interval on the transects used for prey species pellet group counts. Circular plots were laid for trees and shrubs, and quadrat were laid for ground cover estimation. In every 10 m plot, number of tree species, their girth at breast height (GBH: >20cm), lopping and cutting signs were recorded. In every 5 m plot, number of shrub species was recorded. In every 1 m plot, the percent of ground layers, which is divided into six categories: (i) green grass, (ii) dry grass, (iii) herb, (iv) dry leaf litter, (v) fern, and (vi) bare ground, was recorded. The percent of canopy cover in each plot was taken using the densiometer.

Output and outcomes: Data was collected from Laldhang, Kotdwar, Kothri and Dugadda ranges of Lansdowne Forest Division. The area between Chilla range, Rajaji National Park and Kalagarh division of Corbett Tiger Reserve was sampled. 463 plots for trees, shrubs, ground cover variables and for prey species pellet groups were laid on 51 transect. Pellet group data was analysed and compared with the distribution of tiger pugmarks over transects.

Cluster analysis was done in PCORD 4, using Euclidian with Ward's linkage method for vegetation data and ten vegetation communities were identified on the basis of Important Value Index (IVI) using the formula IVI = Relative dominance + Relative density + Relative frequency.

Distribution of pellet groups of wild and domestic animals and no. of pugmark set(s) recorded in forest ranges of Rajaji-Corbett corridor area

Forest Ranges	No. of transects	Total length (km)	Pellet group, nos./ha		No. of Pugmark set(s) observed	
			Wild*	Domestic**	Tiger	Leopard
Laldhang	15	29.00	742.0	287.1	2	5
Kotdwar	16	34.75	316.4	380.5	3	7
Kothri	13	25.75	1200.1	133.3	16	5
Dugadda	7	13.50	964.1	136.0	7	2

Response of tiger population to habitat, wild ungulate prey and human disturbance in Rajaji National Park, Uttarakhand

Funding source: WWF-Nepal & WWF International
Investigator: Dr. S.P. Goyal
Researcher: Abishek Harihar
Date of initiation: August, 2006
Date of completion: December, 2008

Objectives: Following relocation of human settlements from parts of Rajaji National Park (RNP), the habitat and wild animals have shown rapid signs of recovery. Considering the need to document these recoveries the present study was formulated with the following objectives: (i) To record the occurrence patterns of tiger and leopard in the relocated site (ii) to document the densities of wild ungulate prey species (iii) to document the density of tiger, and (iv) to study the food habits of tiger and leopard.

Progress: In order to assess the spatio-temporal patterns in occupancy and abundance of wild ungulate prey and tigers, field sampling was carried out across the four distinct seasons (October-November; post monsoon, January-February; winter, April-May; summer and July-August; monsoon). Repeat sampling for pellet encounters along systematic transects (n=35) within 2 km x 2 km grids was carried out to assess wild ungulate occupancy and repeat sign surveys along dry river beds (n=11) were carried out to assess the occurrence patterns of tigers and leopards. Line transects (n=12) were walked to estimate the density of wild ungulate using standard distance based estimators, while the density of tigers and leopards were estimated using photographic capture-recapture sampling techniques (600 trap nights/season). Scat samples of both tigers (n=56) and leopards (23) have so far been collected to assess predator diet profiles.

Output and outcomes: Data analyzed so far reveals that while prey densities did not vary across four years (2004-08), an increase in proportion of chital fawns was observed. Increase in the density of tigers was also documented from 3 tigers/100km^2 in 2004 to 5 tigers/100km^2 in 2008, primarily owing to high individual turnover possibly due to migrating tigers from Corbett Tiger Reserve. With photographic evidence of breeding tigers in Chilla range, it is believed that this area could serve as a source population from where tigers can disperse and colonize forests along the west bank of the Ganges. It is concluded that securing the connectivity between forests on the east and west bank of the Ganges through the tenuous Chilla-Motichur corridor assumes great importance to ensure the long-term persistence of tigers within this landscape.

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

Funding source: Grant-in-Aid
Investigators: Dr. S.A. Hussain and Dr. Ruchi Badola
Researchers: Kimjahlai Kipgen, Sangeeta Angom, Ngailian Vaiphei and Sanggai Leima Thounaojam
Date of initiation: December 2004
Date of completion: November 2009

Objectives: The major objectives are to: (i) monitor the extent and quality of habitat (*phumdis*) within the Keibul Lamjao National Park, Manipur; (ii) estimate the seasonal availability of browsing biomass for Sangai and associated grazers; (iii) 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) quantify the basic needs of the species in terms of food, space and cover for sustained reproduction; (v) determine the stocking rates of Sangai and associated grazers in the Park; (vi) 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) explore the possibility of establishing a second home for Sangai in wild within Manipur State.

Based on preliminary observations and request from the Manipur Forest Department another objective dealing with quantification of the extent of dependency of local communities on Keibul Lamjao National Park and suggest measures to minimize conflicts arising due to such resource use was added.

Progress: The project has five major components *viz* habitat ecology, population ecology, conservation genetics, foraging ecology and recently added socio-economic study and dependency of local communities. The summary of major findings is outlined below:

In the Park 83 plant species belonging to 21 families were recorded, of these 81 species were recorded in summer and 48 in winter. Poaceae and Cyperaceae form the dominant families. Annual productivity of the nine common species occurring in the Park was analysed. The productivity of these nine species in control plots varied between 3597.22 to 3946. 66 g/m^2. The productivity was highest for *Zizania latifolia* with 13.90 g/m^2 ± 5.01 in winter and 102.96 g/m^2 ± 26.03 in summer, as compared to all other species. In case of enclosures given cut treatment *Zizania latifolia* has shown the highest productivity with 2106.4 g/m^2, at Khodangkhong followed by *Phragmites karka* at Toya with 1712.9 g/m^2. In control enclosures, however *Phragmites karka* maintains the lead with 2435.8 g/m^2 at Toya. The annual productivity of leaves of *Zizania latifolia* has the highest productivity with an annual production at 1091.6 g/m^2, 1284.5 g/m^2 and 938.4 g/m^2 respectively at Khodangkhong, and in all control, cut and burnt enclosures. In case of stem the annual biomass production, in all enclosures given burnt treatment in each region, the *Phragmites karka* has the highest productivity (2655. 6g/m^2) at Toya while the productivity of *Zizania latifolia* varied between 736.4 g/m^2 at Toya to 1679.5 g/m^2 at Khodangkhong.


S. A. Hussain

The population estimation of sangai and hog deer was done during the year 2007 using point count methods. The entire 40 km^2 area of the Park and the adjacent wetlands were divided into 51 grids of 1 km x 1 km. Line transects of 500 m each (n = 75) were laid on these grids depending on the phumdi types and open water. Plots of 50 m x 2 m size (n = 750) were laid on these transects to look for the presence of dung of both the species. The mean density of sangai was 4.06 sangai/km^2. The population structure of sangai consisted of 31.2% adult male, 54.3% female, 7.7% juveniles and 6.9% fawns, whereas, it was 21.7% male, 63% female, 4.3% juvenile and 10.9% fawns for hog deer. Dung of sangai and hog deer was recorded only from 22 km^2 area of the Park indicating that the peripheral areas and northern side of the Park are rarely being used by the sangai. The overall dung density of Sangai varied between 0.85 ±0.06 dung/km^2 and the hog deer 0.32 ±0.03 dung/km^2.

Genetic samples from 30 carcasses and preserved specimens were collected from the Park and the methodology for DNA extraction using Qiagen kit and PCR was refined to amplify the DNA samples. DNA samples obtained were amplified up to the base length of 400-500 bp. DNA extracted from tissue samples such as skin, liver and muscles were usually with 400-500 bp but DNA extracted from faecal samples, hair and degraded tissues were having light bands but likely to give trouble free sequencing. Food habits of sangai were studied in the Park based on faecal analysis.

The food of sangai consisted of 47.7% grasses, 31.6% forbs, 10.5% browse, while 10.5% remained unidentified. Sangai used 17 species during winter and 12 species during summer. The nutritional value of the 16 food plants species consisting of nine grass species, six forbs and one browse was analysed. Among the 16 food species, the levels of CP were higher in summer than in winter for all the species except in *Oenanth javanica.* In both the seasons *Alternanther philoxeroides* has the highest value in summer (23%) and (18%) in winter. *Oenanth javanica* has the lowest NDF value, (28.58%) in summer and 36.79% in winter. The levels of minerals like Ca, P and Na were higher than the minimal acceptable limits in almost all the species.

The Park is surrounded by 40 villages within 5 km radius. Eighteen villages on the periphery of the Park were randomly selected. In each village 10% of the households were surveyed (n=253). Local inhabitants were questioned about their use of the Park using semi-structured questionnaires. The results were analyzed using percentage frequencies. Pressure Value Index (PVI) was derived for each village based on the villagers' activities in the Park and the total population of the village. Most of the communities in the western periphery are engaged in vegetable collection and in fishing, those in the north are engaged in fishing while those in the southern and eastern are engaged in fodder collection. The fishing communities and fish farm owners have better economic status than the vegetables collectors. The extraction of bio-resources from the park is providing an additional income. PVI was highest in Keibul Mayai Leikai (8.63) followed by Nongmaikhong (8.3), Chingmei (7.19) and Komlakhong (5.70) villages.

Evaluating effectiveness of interpretive facilities in enhancing conservation awareness in select Tiger Reserves in India

Funding source: Grant-in-Aid
Investigators: Smt. Bitapi C. Sinha and Dr. V.B. Mathur
Date of initiation: January 15, 2007
Date of Completion: January 14, 2010

Objectives: The objectives of this study are to: (i) make an inventory of the interpretive facilities in the tiger reserves of the country; (ii) determine if the messages are delivered in an interpretive manner; (iii) find out if people are receiving the messages and are they feeling compelled to act differently as a result of it; and (iv) plan on how to make it more effective if the interpretative tools are not effective.

Progress: A questionnaire survey was initiated in order to document the interpretive facilities in the tiger reserves of the country. Rapid survey of the 28 tiger reserves for preparation of inventory was done. The questionnaire sought information on presence or absence of interpretive facilities, inventory of interpretive facilities, cost of each component, visitation, staffing and tourism related offence booked. Of the 28 tiger reserves, reply to the questionnaire was received from 18 tiger reserve (64%).

Outputs and outcomes: Questionnaire results reveal that most of the tiger reserves have some kind of interpretive facilities present but do not have a well structured interpretive programme. Most of them have either Interpretation centre or Visitor centre and brochures. Of the 8 tiger reserves visited during the reconnaissance only three have professionally done interpretation centre, four have locally made exhibits (three of them need renovation) and one has only the building with no exhibits. Publications for the reserves have been made but are not widely disseminated. In most of the reserves the publications are priced and are sold through the souvenir shop. Films have been produced on various themes of the reserves but none of the tiger reserves have orientation film for visitors. Besides, these films are kept in the film library and are screened only on rare occasions and not on a regular basis. In addition to the trained local youths, staff of the tiger reserve also works as nature guides. At reserves where either the visitor numbers are high or there are no guide available, services of the staff are used for taking the visitors around. Also it was found that Interpretation centre/Visitor centre where exhibits have been done by professional agency the cost of exhibits is more than the building cost. Based on the results from the questionnaire survey eight sites were selected for intensive monitoring to find out effectiveness of interpretive facilities using questionnaire survey and direct observation as well as tracking visitor behaviour.

Ecology of Asiatic Black Bear (*Ursus thibetanus*) at Dachigam National Park, Kashmir

Funding source: Grant-in-Aid
Investigator: Dr. S. Sathyakumar
Researchers: Lalit Kumar Sharma and Samina Amin Charoo
Date of initiation: March 2007
Date of completion: February 2011

Objectives: The objectives are to: (i) assess the bear–human conflicts and threats to black bear and its habitats at Dachigam and adjacent Reserved Forests, Protected Areas in the north west Himalayan landscape; (ii) evaluate whether the distribution and relative abundance of Asiatic black bear is influenced by the availability of major food plants found in Dachigam National Park (DNP); and (iii) evaluate whether the activity, habitat utilization, and movement and ranging patterns of Asiatic black bear on a daily, seasonal and annual basis at DNP is influenced by the availability and distribution of major food plants of DNP.

Progress: Following the recruitment of two Junior Research Fellows in March 2007, orientation, reconnaissance of the study area, finalization of study design and standardization of field methods were completed by April 2007. Systematic field investigations on black bear distribution, status and habitat use have been carried out based on direct and indirect evidences in the Intensive Study Area from May 2007 onwards. Field and questionnaire surveys to assess the extent and magnitude of black bear–human conflicts have been carried out in the Central and South Divisions of Kashmir during the reporting period. Standardization of field methods dealing with camera trapping, hair trapping stations and trapping for radio-collaring are currently underway. Intensive camera trapping and GPS collaring of black bears to understand black bear distribution, habitat use, movement and ranging patterns are proposed for 2008-09.

Mapping of National Parks and Sanctuaries – Pilot project

Funding source: MoEF, Government of India and NNRMS
Principal Investigator: Dr. V.B. Mathur
Co-principal Investigators: Dr. P.K. Mathur, WII; Dr. S.P.S. Kushwaha, IIRS; Dr. A. Khan, AMU; Dr. M.S.R. Murthy, NRSA; and Dr. V.K. Srivastava, NRSA
Research Associate: Dr. Hitendra Padalia
Junior Research Fellows: Ambica Paliwal and Neha Midha
Date of initiation: April, 2004
Date of completion: December, 2008

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, so that wildlife managers could use the information directly for conservation and management purposes.

Progress: The five pilot sites of the project are Corbett Tiger Reserve, Uttarakhand; 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 being prepared for the project sites for which topographical data is being provided by the Survey of India.

During the reporting period, field studies were carried out in the five project sites focusing on the preparation of land use/land cover maps and detailed vegetation mapping. Data on animal distribution and abundance was also collected. Project researchers based on their project work made presentations in the Institute's Annual Research Seminar on "Spatial distribution of ungulate populations and vegetation structure in Tadoba-Andhari Tiger Reserve, Maharashtra" and "High resolution data (IRS P6 LISS IV) and its validation for enhanced application in PA management", respectively. The IV Meeting of the Project Steering Committee of WII-MoEF-NNRMS Project 'Mapping of National Parks & Sanctuaries' was held on September 27, 2007 under the chairmanship of Dr. R.B. Lal, IGF (WL), MoEF. It was agreed to grant a 'no-cost extension' to the project up to December 31, 2008. This was mainly because some of the project activities/ outputs could not be accomplished on account of the delay in supply of 1:25,000 scale digital topographic sheets by the Survey of India.


V.B. Mathur

Effect of management practices on Spider diversity in Terai Conservation Area

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

Objectives: The objectives are: (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 and other habitats on the basis of spider diversity.

Progress: Sixteen grassland sites were selected in homogenous stands of tall grassland. Three fire regimes were assessed, each replicated four times in different seasons, for their impact on grassland spider assemblage: (i) single fire, sites currently under management practices, burnt annually early in the dry season (January-February); (ii) repeated fire, sites burnt multiple times before the end of the dry season (January - May); and (iii) unburnt, fire excluded from sites. At each site, ten plots were randomly established. Each plot consisted of a transect containing six sampling points at approximately 10m intervals. These six points along transect were used for both spider sampling and grassland habitat assessment. Spiders were collected using pitfall traps and sweep netting. Adjacent to spider sampling, nine habitat variables of sampled plots were measured for each month (October-August), including litter cover (%), litter depth (cm), bare ground (ground debris > 6 cm, %), grass cover (%), number of grass species, soil pH, soil moisture, soil temperature and ambient humidity. Spiders were identified to family and species using existing identification keys wherever possible. Due to lack of available identification, keys for many families and the time required for conventional taxonomic work, a morpho-species approach was used to classify spiders.

Outputs and outcomes: A total of 8272 individuals were collected during the entire sampling period, representing 198 species belonging to 55 genus. Of all species captured, 96% were found on the unburnt sites, while single fire and repeated fire represented 59% and 19% respectively. Burning, including both single and multiple-burns, caused 75% reduction in spider abundance. Among the species collected, 49 species found unique to the unburnt sites; 20 and 12 species were observed at the single and repeated fire sites. The interaction between season and treatment sites showed that seasons had no significant effect on treatment sites for species abundance, while in contrast, species richness of treatment sites varied across seasons. Percentage grass cover and bare mineral soil were the only statistically significant variables found to have influence on the species composition between unburnt and burnt plots. Other habitat variables made only a minor (and non-significant) contribution to the observed differences in spider species composition. Results of the study indicate that spider assemblages in *Terai* grassland were influenced by fire event, frequency of fire and fire regime.

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: June, 2008

Objectives: The objectives are to: (i) develop a spatial database on the distribution of *Galliformes* species in north-west India; (ii) evaluate the role of existing PA network in *Galliformes* conservation; (iii) delineate key areas of conservation significance for these species in the landscape, and (iv) prepare conservation plans for key areas and species for each State covered under the project, describing necessary management and conservation inputs.

Progress: Much of the fieldwork has been completed and only a portion of lower elevation areas is left to be surveyed, during the reporting period. Efforts were consolidated on secondary data collection, data analysis and planning for future conservation action. This period also included presentations in the International *Galliformes* Symposium at Chengdu, China on the findings of the project, besides conducting a workshop on landscape ecology for *Galliformes* biologists there. Simultaneously, satellite interpretation for vegetation cover and developing spatial data on terrain characteristics were done, and the results in combination, with ground-truthing, revealed high quality information on these required attributes. Specifically, the forest cover could be used for quantifying spatial patterns using specialized software such as FRAGSTATS, and this would provide significant details on the forest condition in terms of long-term opportunity for *Galliformes* conservation. Field data, secondary data and spatial data were combined to analyze and map species distribution as envisaged in the original project proposal. Distribution pattern of Western Tragopan was analyzed and mapped using different techniques and the results provided a basis for preparing distribution maps for all the target species in the future. An outline was drawn for follow-up work related to formulation of proposal for 'Pheasant Reserve'. Efforts are underway to prepare a field guide with details of the species found in northwest India.

Outputs and outcomes: The primary data were used to predict potential habitat for Western Tragopan and Himalayan Quail. The methods used were: (i) Rule based model (Boolean logic), which conditions the species occurrence based on known details; (ii) Presence only model (ENFA), which uses presence data; and (iii) Logistic model (Logistic regression), which uses both presence and absence details. In addition, distribution was analysed using FRAGSTATS software to define the fragmentation status of species distribution. Interestingly, the predicted details were largely in agreement with field condition for the Western Tragopan. The model also predicted several additional sites, from where recent records have been obtained. In case of Himalayan Quail, it appears that substantial area of suitable habitat is available outside the known localities. This provides opportunity to look for the species in more areas and thus expanding the scope for finding the species in the Uttarakhand.

Panthera tigris genome: Implication in wildlife forensics

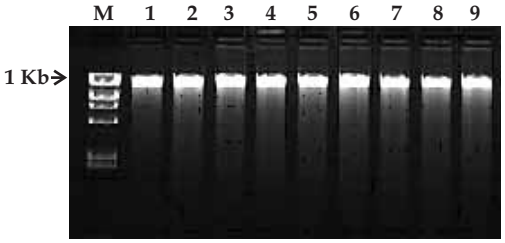


Figure 1. Electrophoretic analysis of DNA extracted from different blood samples (1-9) of tiger on 0.8 % agarose gel. M, MW marker 100bp ladder.

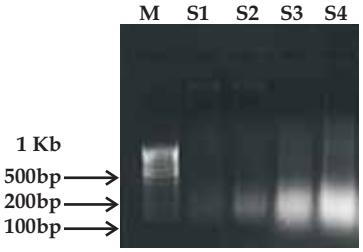


Figure 2. Electrophoretic analysis of DNA extracted from different scat samples (S1-S4) probably of tiger on 0.8% agarose gel. M, MW marker 100bp ladder. S1 to S5, different scats.

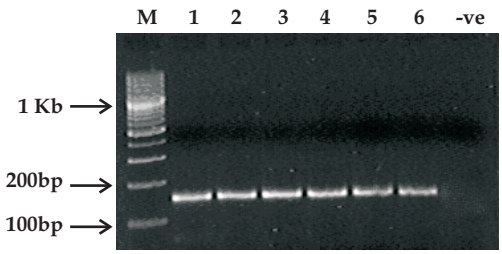


Figure 3. Electrophoretic analysis of PCR products of 170bp fragment from the mt. cyt b gene of different scat DNA sample (1-6) on 2% agarose gel. M, MW marker 100bp ladder. –ve, negative control.

Funding source: Grant-in-aid
Investigator: Dr. S.P. Goyal
Researchers: Sudhanshu Mishra and Imran Khan
Date of initiation: October, 2005
Date of completion: December, 2009

Objectives: The present study is aimed to develop genotype profile 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 offenses; and (iv) to study genetic diversity in different tiger population of India.

Progress: More than 450 probable tiger scat samples were successfully collected from different Tiger Reserves during the reporting period. GPS locations were taken of all the scats collected so far. All scat samples were catalogued after drying in oven at 55°C. Diameter and photographs were taken of all scat samples catalogued so far. Reference DNA was extracted from known blood samples of tiger (*Panthera tigris tigris*) by using EZ1 Blood Kit (QIAGEN, Germany) with BIO ROBOT EZ1 (QIAGN, Germany) respectively (Fig. 1). These DNA samples were prepared to standardize Polymerase Chain Reaction (PCR) conditions for species and sex identification and to standardize PCR conditions for primers of different micro-satellite loci.

Genomic and mitochondrial DNA were extracted (Fig. 2) from fifty scat samples (probably of tiger) from different Tiger Reserves. Extraction was done using QIAamp DNA Stool Mini Kit (Qiagen, Germany). DNA extraction method from scat was optimized.

A partial fragment (170bp) of mitochondrial cytochrome b gene (unpublished) was amplified from scat DNA samples for species identification (Fig. 3). Amplified PCR products and scat DNA samples were purified using QIAquick® PCR Purification Kit (Qiagen, Germany). Cycle sequencing PCR was performed for these purified PCR products with their respective primers following the suggested composition of master mixture from Applied Biosystems 3130 Genetic Analyzer. Cycle sequencing PCR products were purified using "Big dye terminator clean-up" method. These products were then subjected for sequencing match of scat DNA sequences with reference DNA sequences of partial fragments of mitochondrial cytochrome b gene for species identification.

18 micro-satellite loci were amplified and screened with 9 reference tiger blood DNA samples using their respective primers (Fig. 4), which were labeled fluorescently with four different dyes.

The amplified PCR products for 18 micro-satellite loci were then subjected to Applied Biosystems 3130 Genetic Analyzer for fragment analysis with Hi Di

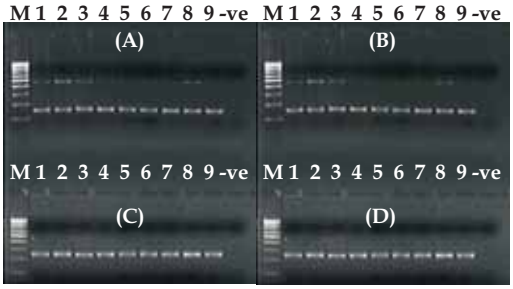


Figure 4. Electrophoretic analysis showing bands of amplified PCR products with different tiger blood DNA templates (1-9) using different primers on 2% agarose gel. M, MW marker 100bp ladder. -ve, negative control.

formamide and LIZ (Fig. 5). These loci were then analyzed for allele size ranges, allele numbers.

Initially 12 micro-satellite loci were selected and screened with tiger scat DNA samples using their primers, which were labeled fluorescently with four different dyes. The amplified PCR products of scat DNA using 12 micro-satellite loci were then subjected to Applied Biosystems 3130 Genetic Analyzer for fragment analysis with Hi Di formamide and LIZ (Fig. 6).

Output and outcomes: DNA was extracted successfully with a success rate of 90% from scat samples collected from different tiger reserves using QIAamp DNA Stool Mini Kit (Qiagen, Germany). DNA was extracted from scats (n=200) collected from Kanha Tiger Reserve, Pench Tiger Reserve, Bandhavgarh Tiger Reserve, Panna Tiger Reserve and Kalakad-Mundanthurai Tiger Reserve. DNA extracted form scats were assigned for species identification using species specific primers (unpublished) for a partial fragment of mitochondrial cytochrome b gene. 65% scats were found of tiger. Conditions were standardized for polymorphism detection using micro-satellite primers with reference DNA. Amplification of 18 micro-satellite loci with reference DNA samples was successfully done. 12 selected micro-satellite loci were successfully amplified with confirmed tiger scat DNA samples and genotyped using Applied Biosystems ABI 3130 Genetic Analyzer.

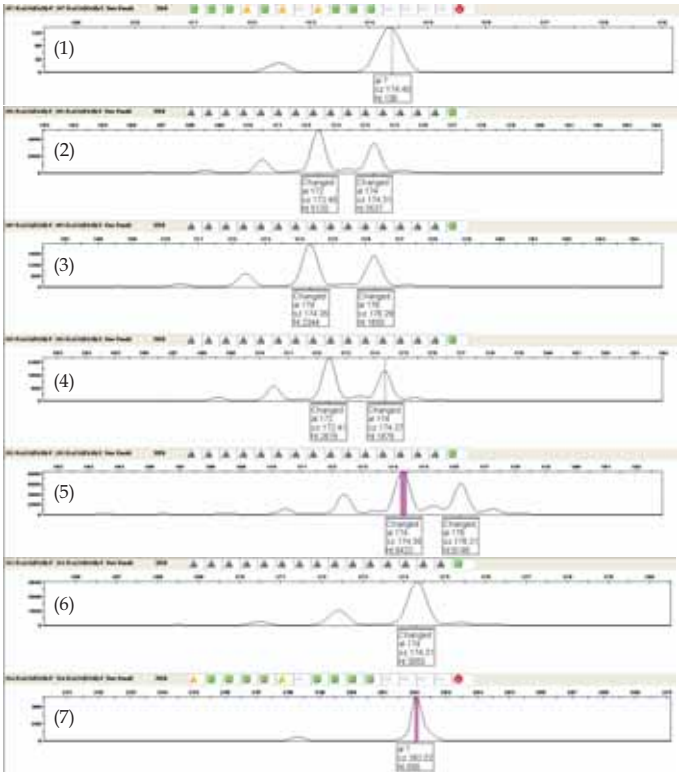


Figure 5. Electropherogram showing some of the alleles at the STR locus 'S18' in different tiger blood DNA samples.

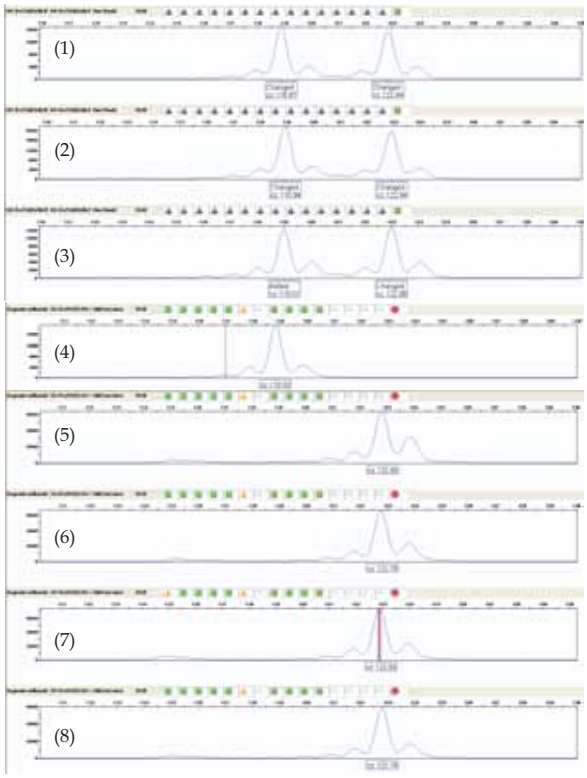


Figure 6. Electropherogram showing some of the alleles at the STR locus 'S8 in different tiger scat DNA samples.

All India coordinated project on the taxonomy (AICOPTAX) of orchids

Funding source: MoEF, Government of India
Investigator: Dr. G.S. Rawat
Researchers: Dr. Jeewan S. Jalal and Pankaj Kumar
Date of initiation: June, 2003
Date of completion: December, 2008

Objectives: The objectives are: (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: Two States *viz.*, Uttarakhand and Jharkhand have been assigned to WII for this project. In the State of Uttarakhand, more than 130 species have been located and their populations were studied. *Poneorchis nana* was collected and reported for the first time in Uttarakhand. *Androcorys pugioniformis* (Lindl. ex Hook. f.) K.Y. Lang has been rediscovered since its first report. In Jharkhand, a total of 70 species have been collected so far. 31 species of orchids have been collected for the first time from Jharkhand. These species have very sparse and sporadic distribution in eastern India. Some of these species were reported from the State by the earlier authors without any definite locality. Apart from the taxonomic work, ecological studies were also undertaken on the orchids in both the States.

Outputs and outcomes: Findings of the study were shared with the field staff of State Forest Departments during a workshop held at Botanical Survey of India (March 22- 23, 2007). Field level workshops to train and educate the local people about the significance of orchids were held in Gori Valley, Uttarakhand. Detailed manuals for the field identification of orchids for both the States are under preparation. Orchid rich localities in both the States have been identified and appropriate actions for *in–situ* conservation have been suggested to the respective Forest Departments. Four papers have been published in the peer reviewed journals and five are under preparation.

Milestone

Geodorum attenuatum Griff. (*Orchidaceae*) has been added to the flora of India from Jharkhand.

Geospatial phyto-resource inventory in the outer fringe of Kedarnath Wildlife Sanctuary, Garhwal Himalaya

Funding source: Department of Biotechnology, Govt. of India
Project coordinator: Dr. P.S. Roy, NRSA, Hyderabad
Investigator: Dr. G.S. Rawat
Researcher: Gajendra Singh
Date of initiation: July 2005
Date of completion: December 2008

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

Progress: Fieldwork pertaining to vegetation quantification and resource use pattern by the local communities was completed in August 2007. During the reporting period, data analysis and report writing were in progress. The plant communities have been classified based on PC-ORD with the help of TURBOVEG software. Species diversity, density, evenness and richness for shrub and tree layers for different strata have been computed. Regeneration status of oak (*Quercus* species) in three altitudinal zones have been ascertained. It was found that regeneration of high altitude oak (*Q. semecarpifolia*) was poor due to excessive pressure by migratory livestock and tourism during summer months. General profile and resource use maps for the study villages were prepared which show that most of the villages are spread between an altitude gradient of 1500-2100m. The villages were surrounded by different types of forests such as *Alnus nepalensis* and *Quercus leucotrichophora* in the valley bottom and by the *Rhododendron arboreum* and *Quercus floribunda* on the hill slopes especially in the south-west facing slopes. Distance to nearest forest from the village varies from less than 0.5 km to 1.5 km whereas distance to nearest motor road varies from less than 0.5 km to 3 km. Quantitative information on the fuel wood, leaf and grass fodder requirement for various villages have been collected. The detailed information on the resource availability and use pattern would be presented to the villagers in a workshop proposed in April 2008 in order to discuss the modalities of participatory resource management plans for the clusters of villages.

Social organization and dispersal of Asiatic lions

Funding source: Grant-in-Aid
Investigators: Dr. Y.V. Jhala and Shri B.J. Pathak, IFS, CF (Wildlife) Junagadh Circle, Gujarat
Researchers: V. Meena and Kausik Banerjee
Date of initiation: March 2002
Date of completion: March 2009

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: In order to study the ranging pattern and habitat use of lions, the Union Ministry of Environment and Forests, New Delhi had granted approval to radio-collar 20 lions. During the second phase two male lions (from two coalitions) were radio-collared in the eastern peripheral satellite belt in March 2008. Satellite GPS collar and GPS/VHF collars were used for the first time on Asiatic lions. Data is being collected on ranging patterns, dispersal, habitat and resource utilization from these lions. Additional lions within the GGCA are to be collared to evaluate the existence of a "Meta-population" structure amongst the peripheral lion populations and that of Gir Protected Area.

Adult lion densities (SE) per 100 km^2 were 16 (3) in Gir-East, 12 (2) in Gir-West, 8 (3) in Central Gir (National Park) and 6 (2) in Girnar Wildlife Sanctuary, Junagadh. Demographic changes in the Gir lion population were monitored using individual identification profiles of 112 individuals. Average group size of males was 1.4±0.50 (1–3, n=283 sightings) while average female group size was 1.3±0.53 (1–4, n=291). Prime adult females (Mean±SE), (31.6% ±1.6) and prime adult males (24.6%±4.4) comprised the majority of the population. Adult sex ratio was 76.4 males to 100 females while ratio of cubs to adult female was 50:100 females. The average litter size was 2.13±0.83 (n=32). Bonding between the sexes was weak with only 13% out of the total singleton and group sightings (n=527) being male-female associations. The average litter size was 2.13±0.83 (n=32). Cub survival from one-month to sub adult stage was 56% (42-77) and infanticide accounted for 27% (12–42) mortality while other causes of mortality accounted for 16% (3–29). Adult survival was 0.922±0.07 based on five year monitoring of twenty known adult lions. Group sizes of lions were smaller in central and western Gir compared to Gir east. In eastern Gir, contribution by livestock to the lion's diet was high resulting in higher densities and larger group sizes.

The average (±SE) home range (95% kernel) of territorial males (n=4) was 89.3±48.6 km^2 and females was 21.8±7.1 km^2 (n=8). Sub-adult and ousted dispersing males (n=3) covered an average range of 413.1±228.0 km^2. Male home ranges showed maximum overlap (up to 67%) in core areas of female ranges suggesting lack of spatial territoriality in the strictest sense. GPS telemetry data from a pair of dispersing young lions (coalition of 3 year olds) in Gir Protected Area showed that they covered a very large area of 174 km^2 before settling down in a smaller home range. Average dispersal distance was estimated to be 23km

indicating that lion movement may be restricted by the size of the protected area. Similarly, GPS telemetry data from an ousted old adult male of the eastern satellitic pocket showed the regular movement of the individual between the revenue areas of Greater Gir Conservation Area to the Gir Protected Area covering a very large range of 866 km².

Analysis of more than four thousand radio locations spaced throughout the Gir Protected Area dispelled the myth of Asiatic lions being an 'open savannah' specialist. Lions were found to show preference for denser habitats in Gir. In the satellite areas of GGCA, lions required refuge patches during the day but not for night-time. They were observed to venture into nearby habitations at night. The role of habitat patches as refugia for lions, especially breeding lionesses, is crucial to permit continued persistence of lion occupancy in human dominated landscapes outside the Protected Area.


Kausik Banerjee

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

Funding source: Grant-in-Aid
Investigators: Dr. Y.V. Jhala, Dr. A. Rahmani, Director, BNHS, Dr. Ravi Sankaran, SACON
Researchers: Bopanna I.P., Kamlesh Maurya and Sutirtha Dutta
Date of initiation: December, 2004
Date of completion: December, 2009

Objectives: The objectives of the project are: (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 study on great Indian bustard *Ardeotis nigriceps* addressing spatio-temporal population dynamics, habitat requirements and effects of pastoralism commenced during 2007-08. Great Indian bustard population was seasonally monitored in fragmented landscape in Abdasa, Lakhpat and Mandvi provinces. The arid landscape was classified into undulating coastal scrub, inland scrub, inland grassland and coastal grass-crop mix habitats. Species occupancy was higher in inland grassland (psi 0.73 ± 0.18) than other habitats, indicating clumped distribution of species in this ~150 sq km patch. Greater spatial dispersion of 'animal presence' in winter suggested a post breeding southward movement of the species towards the coastal grass-crop mix. The intensive study area was seasonally sampled through ten fixed 4-5 km transects, random trails and systematic complete searches (n=140 visits, 1017 km search). Density was estimated at 25/100 sq km (34% CV, detection probability 0.42, n=350 km) and encounter rates increased from winter to monsoon through summer. Typical flock size was 1.33±0.06 (range 1-6, n=209 sightings) with greater propensity of flocking during resting or roosting (U test Z=1.48, p=0.07) probably to improve anti-predatory vigilance. Spatial use of the intensive study area shifted seasonally, and breeding usage varied between years in response to local precipitation conditions. Ecological variables were randomly collected from 1 sq km grids in the intensive study area through 10m radius circular Releves, and also corresponding to sighting/sign of the animal. Habitat selection analyzed through 'random versus use' binary logistic regression revealed that the probability of Great Indian bustard occurrence in a patch was enhanced by the presence of grasslands, availability of vegetative resources, grazing and distance from edge,

whereas reduced by higher vegetation (shrub), human disturbance (settlements and roads) and direct presence of livestock.

Spatial distribution of breeding dens, ranging pattern and pup survival of Indian fox *Vulpes bengalensis* were studied through survey and telemetry (n=5 individuals). Home range size estimated through 95% fixed Kernel method was 1.88±0.65 sq km, and the same through 100% minimum convex polygon was 3.66±0.66 sq km. 95% fixed kernel contour of non breeding spatial use (3.11 sq km) was larger than that of breeding usage (1.32 sq km). Breeding density in 2008 was estimated at 28±2 pairs/100 sq km, recording a three fold increase from 2005. Density estimation from inter den distance was coherent with the 'true density' obtained from radio telemetry. Foxes foraged separately and both sexes participated in pup rearing that lasted for 3 months. Pups were born in winter, used the natal area during December–April and dispersed in May. Pup survival estimated using MICROMORT was 87% (n=8 individuals) in 2007 and 62% (n=18) in 2008. Estimated recruitment varied from 23.2/100 sq km in 2007 to 64. 6/100 sq km in 2008.

Radio-tracking of striped hyaena *Hyaena hyaena* established that individuals emerged after dark socialized around the den and executed nocturnal, solitary foraging bouts, often at carcass dumping sites near villages. Adult female confined her range near the den during the breeding season, and with the cooperation from sub-adults, reared the cubs between February and July. Den shifting was occasional during this period though the reason (geological/ ecological/disturbance factors) could not be discerned. Scat analysis (n=74 scats) revealed that cattle (37% frequency of occurrence), dog (28%), goat (15%), sheep (12%), buffalo (7%) and hare (4%) constituted the hyaena diet.

Developing management capabilities for wild pigs damage control in agro-ecosystems in and around protected areas of India. Task: Ecology and Management of wild pigs in Ranthambore Tiger Reserve

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

Objectives: The objectives of the project are: (i) to prepare habitat maps of Ranthambore NP and peripheral areas in relation to wild pig occurrence, and quantify vegetation composition and structure within each habitat; (ii) to study the spatial and temporal distribution of wild pigs; (iii) population status and socio-biology of pigs; (iv) to develop capture techniques; (v) to quantify habitat use and ranging patterns and study the diurnal activity on seasonal basis; (vi) feeding habits and reproductive biology; (vii) to study health parameters of pigs; (viii) to assess the human-wild pigs conflict; and (ix) to evaluate the use and efficacy of power fence in controlling crop damage; and (x) to suggest cost-effective methods to control wild pigs and mitigate agricultural crop damage.

Progress: For vegetation mapping in Ranthambore National Park, 40 transects, 1 km length each, in different habitat types within the park were laid. Information of tree, shrub and herb species and cover, direct and indirect evidences of wild pigs, biotic pressure was collected and analysed. Community classification for trees has been done using TWINSPAN analysis.

Based on direct and indirect sightings, the spatial and temporal distribution of wild pigs is being studied. The group size of 1-4 individuals was sighted, maximum (n=170), followed by group size of 5-8 (n=45), 9-12 (n=30), 13-16 (n=9) and 17-20 (n=2) individuals. Lone pigs mainly males were sighted maximum times (24.7%). The mean group size of wild pigs varied from 2 to 8 individuals in different months. During monsoon, the mean group size was higher (6±1.79), followed by winter (5.75±0.64) and summer (3.98±0.28). During monsoon the mean male: female ratio of wild pigs was 1:1.37, whereas it was 1:0.77 and 1:0.6 during summer and winter respectively. They were found to use 8 habitat categories.

One male and two females were radio-collared during the reporting period to study ranging pattern. Wire mesh panel traps with squeeze partition were used at Rajbagh and Guda areas for capturing pigs. Specially designed harnesses were attached to collars so that it remained around the neck firmly. To study the seasonal changes in the dietary intake and feeding habits of wild pigs, direct feeding observations were made, and around 300 faecal matter samples were collected. Out of these, 120 samples have been washed and analysed at macro-level.

Village survey to assess the human-wild pig conflict is in progress. Out of 90 villages situated in the periphery of the Park, 20 villages with severe crop damage problem were surveyed. The main crops grown during *rabi* season are wheat,

mustard and gram. *Chillies* are also sown during monsoon and harvested during February and March. Crop fields, which are in the vicinity of forests, are badly affected. Wild pigs and nilgai are the main crop depredating species. But wild pigs cause extensive damage by uprooting plants with their snout and trampling. Crops most affected were gram and wheat.

Based on control and un-controlled plots laid in crop fields in different villages, an assessment of damage to '*rabi*' and '*kharif*' crops was done. The data collected from both controlled and uncontrolled plots from different villages is being analyzed.

The main fence line of about 1 km was constructed along the eastern boundary of crop fields. This fence provides effective protection against wild pigs and large ungulates like Sambar. Fence is 8.5 ft high with 8 strands. Average output voltage of the main fence ranged from 5.5 to 6.5 KV. The voltage of small pig-proof fence has been slightly on the lower side *i.e.* 5.2 to 6 KV. This voltage was found to be enough in controlling the movement of large ungulates and proved cost-effective. However, the power fence lines faced following maintenance problems: (i) some of the major faults occurred due to wires getting entangled at some sections. This problem occurred because of people passing by who wanted to make a way out. Since during day time, fence current is switched off, people could easily twist the wires together. Other most common problem was that wires used for tying 'polypropylene reel insulator' to the poles were getting corroded and breaking. (ii) The other problems were less technical and more of the social types. Vegetation tripping due to not clearing vegetation along sides of the fence line was also frequent.

Comparative study of human-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
Researcher: Devendra Kumar
Date of initiation: December, 2005
Date of completion: December, 2008

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

Progress: The study area was stratified into different habitat types on the basis of topography and vegetation using Landsat data. A total number of 62 transects of 1km each were laid. Data on tree composition, canopy cover, stand height, shrub composition and cover, and herbaceous vegetation were collected. Density, frequency, relative frequency, and cover were recorded for trees, shrubs, grasses and herbs. These transects were monitored throughout the year and the areas outside the transects were also covered for collecting any direct or indirect evidence of leopard. The data is being analysed.

Leopard being solitary, nocturnal and elusive, it is difficult to obtain direct information. Information on leopard distribution was collected through direct and indirect evidences, sites of conflict area and scat collection.

Leopard-human conflict has been reported from all over Himachal Pradesh, but it has attained alarming proportions in villages located in the vicinity of five forest divisions, namely, Mandi, Sunder Nagar, Joginder Nagar, Nachan and Karsog in Mandi district. Information on human-leopard conflict has been collected from these forest divisions. There were 132 human casualties in Mandi district by leopards, out of which 32 casualties were in Mandi Forest Division (FD), 60 in Sunder Nagar FD, 31 in Joginder Nagar FD, 6 in Nachan FD and three in Karsog FD. Human killings and injury cases were very high in Mandi FD. Human killings were 3.1 %, 3.3 %, and 25.8%, and injury cases were 96.9 %, 96.7% and 74.2 % in Mandi, Sunder Nagar and Joginder Nagar FDs respectively. Maximum cases occurred in the vicinity of villages (31.1%), followed by crop field (18.2%), grassland (12.1%), cow shed (6.1%) and forest (5.3%). Human casualties varied in different years.

Output and outcomes: Livestock form the second most important component of traditional subsistence economy in Himachal Pradesh. Livestock killings were mainly by leopard, Asiatic black bear and Himalayan brown bear in these areas. There might be large number of cattle-lifting cases in Himachal Pradesh, which perhaps could not be reported timely. Amongst livestock, sheep, goat, cow, bull, horse and mule were predated upon by leopard, black bear and brown bear. A total of 5114 livestock killings by leopard were reported in Mandi district of Himachal Pradesh.

For the study on food habits of leopard, 289 scats were collected from Mandi and Hamirpur districts, during 2006 to 2008. Prey species were identified by analyzing the remains and through hair characteristics. Portions of other hard parts present in the scats were also identified. 14 prey species were identified, out of which eleven were mammals, one was reptile and others were birds. There was a pre-dominance of goat, sheep, buffalo, cow, ox, dog, langur, wild pig, sambar, hare, rodent, birds and snakes in its diet. In Mandi district, wild prey contributed 53.96% and domestic livestock 60.89% to the diet of leopard. Frequency occurrence of rodents in the diet was 35.15%, followed by birds (6.93%), langur (3.96%), hare (2.48%) and snakes (2.48%). Wild pig and porcupine contributed only 1.49% each. Among domestic prey, sheep contributed 27.23%, followed by goat (16.83%) and cattle (11.88%). Dog and buffalo were also preyed upon and frequency occurrence was 2.48% each in the diet. In Hamirpur district, wild prey contributed 46.15% and domestic livestock 52.88% to the diet of leopard. Among wild prey, rodents contributed 19.23% to the diet, followed by birds (12.50%), hare and wild pig (4.81% each) and porcupine (3.85%). Frequency occurrence of mongoose was only 0.96% in the diet. Whereas among domestic prey, leopard preyed mainly on goat (18.27%), followed by sheep (13.46%), cattle and dog (9.62% each). Buffalo contributed only 1.92% to the diet. The frequency occurrence of these food items was compared with the diets of leopard in the two districts and no significant difference was observed. But there was significant difference in the contribution of prey items in different seasons in Mandi district.

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: Rajkishore Mohanta
Date of initiation: March, 2006
Date of completion: March, 2009

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

Progress: The food habits and habitat use by Himalayan brown bear were studied in Kugti Wildlife Sanctuary, Himachal Pradesh during the reporting period. In total 176 scats were analysed. The food remains and other hard parts present in the scats were identified through reference materials and hair characteristics. The brown bear's diet comprised higher portion of plant matter (79%) than animal matter (21%). During summer, monsoon and fall, frequency occurrence of plant matter was 72.2, 77% and 91% respectively, and frequency occurrence of animal matter was 27.8%, 23% and 9% respectively. 12 food items were recorded in scat analysis of brown bear.

Output and outcomes: Brown bear predation on livestock especially sheep and goat has been a major problem which causes considerable losses to nomadic herders. Annually 25,000 to 30,000 sheep and goat graze in Kugti Wildlife Sanctuary and surrounding areas from May to September. Eighty five percent flocks were found affected by brown bear predation during the study. During five months period, 580 sheep and goat, which constituted 2.75% of total livestock population, were predated by bears. Alpine pastures 'Dhars' especially at 'gots' (resting sites for herders) were highly affected from bear attack. Maximum predation was recorded in August (40.51%), followed by July (23.27%) and September (20.17%). Most of the incidences of sheep and goat depredation (60.51%) occurred during night hours (2200-2400h), 19.48% in early morning (1200-0400h), 11.72% during foggy day and 4.31% between dawn and dusk. Results also suggested that location and aspects of 'Gots' perhaps played an important role behind bear attack on flocks. In 33.3% of encounters, brown bears were not found to be aggressive and stayed for sometime without seeming threatened. Interestingly, in 41.66% of incidences, bears avoided human presence and left the area after detection by grazers, but no cases of direct attack or physical contact were observed.

Ecology, behaviour and interaction of highly dense population of sloth bear (*Melursus ursinus*) and human-sloth bear conflicts in Jessore Wildlife Sanctuary, Gujarat and Mount Abu Wildlife Sanctuary, Rajasthan

Funding source: Grant-in-Aid
Investigator: Dr. N.P.S. Chauhan
Researchers: Vishal K. Parmar and Prakash Mardaraj
Date of initiation: April, 2006
Date of completion: April, 2011

Objectives: There are two phases of the project. The objectives of Phase I of the project are: (i) to assess the human-sloth bear conflicts: nature and extent of problems and circumstances; and (ii) to formulate recommendations for mitigation of human-sloth bear conflict. The objectives of Phase II are: (i) to assess the distribution and population abundance of sloth bear in relation to habitat characteristics (terrain and vegetation) in the two sanctuaries; (ii) to study social organisation: group size, structure, age and sex ratio and intra-specific behaviour; (iii) to quantify habitat use pattern and assess impacts of biotic pressures on bear habitat and develop habitat suitability model, (iv) to assess habitat connectivity (corridor link) between the two sanctuaries and its biological characteristics (vegetation cover, composition and biotic pressure) and functional status (use and intensity) with reference to sloth bear population; (v) to assess ranging and activity patterns and movement of sloth bears between two sanctuaries using telemetry; (vi) to study food habits and seasonal changes in the dietary intake of sloth bear, and (vii) to formulate recommendations for habitat restoration and suggest conservation and management plans for sloth bears in the two sanctuaries.

Progress: Information on human casualties by sloth bear was collected from the records of forest departments and hospitals, and also through interaction with affected people. There were 44 bear attacks on people in and around Mount Abu Sanctuary. Males were attacked more (69%) than females (20%) and children (11%). Thirty incidences (69%) occurred in forests, 5 (11%) in villages and 9 (20%) in crop fields. Most of the attacks were caused by single bear (52%), followed by two bears (27%) and three bears (16%). Maximum casualties occurred in winter 16 (36%) season, followed by monsoon 15 (34%) and summer 13 (30%) cases. Most of the victims were in the age group of 21-30 years (23%), and 31-40 years (20%). Whereas in the vicinity of Jessore wildlife sanctuary, there were 31 bear attacks on people were recorded during this period. Males were attacked more (65%) than females (29%) and children (6%). Most of the attacks were caused by single bear (75%), followed by two bears (19%). Maximum casualties (39%) occurred in summer season, followed by monsoon (32%) and winter (29%). Sixteen cases (52%) occurred in forests, 13 (42%) in crop fields and 2 (6%) in villages. Most of the victims were in the age group of 21-30 years (28%), 10-20 years and 31-40 years (23% each). Damage to agricultural crops by bears was of varying extent. The study using control and un-control plots revealed 14.3 to 54.5% damage to wheat crop in different villages.

Habitat ecology and conservation status of wild ungulates in northern parts of Changthang Wildlife Sanctuary, Ladakh

Funding source: Grant-in-Aid
Investigators: Dr. G.S. Rawat and Dr. K. Sankar
Researcher: Ashwini Kumar Upadhyay
Date of initiation: February, 2007
Date of completion: December, 2010

Objectives: The objectives are to: (i) To study the population status and seasonal movement patterns of Tibetan antelope and associated species in Changchenmo valley (ii) to study the habitat characteristics and habitat use by the ungulates (iii) to identify the threats and management issues of critical importance and (iv) to evolve long-term population and habitat monitoring protocols for these species.

Progress: Distribution and habitat use by wild ungulates (Chiru, Wild yak, Blue Sheep, Kiang and Argali) were quantified using direct (transects and vantage points) and indirect evidences (dung/pellets, hoof marks, bedding sites). At each direct sighting and site of indirect use information on habitat characteristics such as vegetation type, altitude, aspect, slope, GPS coordinates, water and other parameters such as presence of domestic livestock or human beings were recorded. Spatial distribution of Chiru was ascertained by repeat observations along the main valley. It is estimated that there may be 40-50 individuals of Chiru in the intensive study area during early winter. Wild yak were sighted in the high ground near Silung Yogma nullah, Kugrung river and slopes adjacent to Konkala. The wild yaks were always observed between 4,705 and 5,300 m asl well within their established altitudinal range. A total of 45 individuals of wild yak were recorded from Changchenmo valley. Wild yak were generally found on slopes, higher than areas occupied by Chiru in the Changchenmo area. Kiangs were

Preparation of status report of Indian Coastal and Marine Environment and a network of Marine Protected Areas

Funding source: Grant-in-Aid
Investigators: Shri B.C. Choudhury and Dr. K. Sivakumar
Researcher: K.R. Saravanan
Date of initiation: November, 2005
Date of completion: November, 2007 extended up to 2008

Objectives: (i) To survey the coastal and marine areas of the country to answer the following questions: (a) What are the biological values or resources which require conservation along the Indian coast? (b) What is the present Protected Area situation with respect to coverage of those resources? (c) What spatial gaps exist within the present coastal and marine PA network? (d) How can these gaps be filled? and (ii) Prepare a comprehensive report on the state of India's existing coastal and marine Protected Areas.

Progress: A detailed survey of coastal and marine habitats in Indian mainland was conducted during this year. Coastal and marine biodiversity rich habitats such as mangroves, estuaries and backwater, mudflats, sand dunes, sea turtle nesting beaches, lagoons within and outside the Coastal and Marine Protected Areas were taken into consideration for this study.

Following a prescribed methodology, criteria were developed and applied to designate the site as Important Coastal and Marine Biodiversity Areas (ICMBA). A detailed report of ICMBA of Kerala State has been prepared and submitted to the State Government for necessary action. Of the total 76 sites surveyed in Kerala, ten sites have been designated as ICMBA and recommended for either as Conservation Reserves, Community Reserves, and Sanctuaries or as Marine National Parks.

Outputs & outcomes: The study intends to designate possible sites of all the coastal States as priority conservation areas under this ICMBA criterion so as to bring the so far unidentified coastal and marine habitats as potential biodiversity rich habitats for future conservation. Preliminary review on Indian Marine Protected Areas (MPA) revealed that most of the MPAs are not managed with proper management plan, which needs to be prepared for all MPAs of India. This project is one of the ongoing activities of the National Institute for Coastal and Marine Biodiversity (NICMB).

Assessment of current status of threatened and protected Marine flora and fauna in trade in India

Funding source: Grant-in-Aid
Investigators: Shri B.C. Choudhury and Dr. K. Sivakumar
Researchers: Sajan John and B.M. Praveen Kumar
Date of initiation: November, 2005
Date of completion: November 2007 extended up to December, 2008

Objectives: (i) To prepare a checklist and status of protected marine flora and fauna in trade; and (ii) To identify the hotspots and routes of protected marine life trade in India.

Progress: A rapid survey was carried out in all coastal States of India to assess the present status of protected species in trade which are listed in the Schedules of the Indian Wildlife (Protection) Act, 1972. The survey also included the incidental catch of protected sea shells, hard corals, sea horses, marine turtles, marine mammals and elasmobranches in both organized and un-organized fisheries sector. Marine artifact trade dominated the east coast, Tamil Nadu was observed with large number of retail shops (n=174) selling protected marine species curios followed by West Bengal (n=127). Least number of shops were recorded in Gujarat (n=4). A total of 14 species of molluscs and branching corals, listed in the Schedule I of WPA dominated in the illegal marine curio trade. Coastal tourist and pilgrimage centers were found to be the major locations of marine curios trade in the organized fishery sector.

Among crafts, trawlers landed more protected species as by-catch compared to Gill-netters and Seiners. State of Tamil Nadu dominated with landings of more protected species as by-catch in organized fishery sector followed by Kerala. Molluscs, sea cucumber, dolphins, turtles and elasmobranches were the major protected marine groups landed as by-catch. Thus, landed mollusks were processed and traded as marine curios, Elasmobranches were finned and exported, Turtle meat was consumed locally, Sea cucumbers were processed as Beche-de-mer and exported, and Dolphins were either consumed or used as baits in shark fishery.

Output & outcomes: Protected species targeted by the unorganized fishing sector were molluscs, corals, echinoderms and sea horses. While molluscs, echinoderms and sea horses were collected by skin diving and hand picking, corals are being collected by dynamiting the reefs. The Gulf of Kutch, Gujarat; Gulf of Mannar and Palk Bay, Tamil Nadu; 24 Paraganas (South), West Bengal; Andaman & Nicobar and Lakshadweep group of Islands were observed to be the hotspots for such trade practices by the unorganized fishery sector.

While corals and molluscan shells are traded as curios in the domestic market, derivatives of molluscs such as operculum, echinoderms such as sea-cucumbers and sea horses are exported to various south-east Asian countries and also to as far as USA for use in food and pharmaceutical industry. The study reveals that awareness targeted to the organized fishery sector on this illegal trade is low and market demands along with lack of enforcement are the major reasons for the existing and increase of illegal trade of the marine protected species in the Indian coastline. Setting up of coastal trade monitoring or anti-poaching coastal units can bring down the illegal trade.

Determining the offshore distribution and migration pattern of Olive Ridley sea turtles (*Lepidochelys olivacea*) along the east coast of India

Funding source: Director General of Hydrocarbon, Ministry of Petroleum & Natural Gas, Government of India

Investigators: Shri B.C. Choudhury, Dr. K. Sivakumar, Shri Anup K. Nayak and Dr. C.S. Kar

Researchers: Basudev Tripathy, R. Suresh Kumar, Subrata Kumar Behera, Satya Ranjan Behera and Sandeep R. Mishra

Date of initiation: October, 2006

Date of completion: October, 2008

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

Progress: During the reporting period, the geo-morphological changes of the nesting beaches as well as anthropogenic related changes due to developmental activities were monitored. A large number of turtle pairs were observed during December and January, the peak period for mating of turtles in the Bay of Bengal along the Orissa coast. The congregation density was highest in Rushikulya, where mass nesting took place this year and very low in Devi offshore waters.

Due to nesting site fidelity of turtles, all the three mass nesting beaches were also continuously monitored for locating the previous years PTT tagged turtles. This year, mass nesting close to a hundred thousand took place only at Rushikulya rookery during the first week of March. Around 3500-3900 turtles were found dead due to trawler fishing near the shore at Devi, during the congregation period.


K. Sivakumar

Output and outcomes: Oceanographic parameters such as sea depth, sea surface temperature, phytoplankton abundance and water current were used and a Habitat Suitability Model (HSM) of the Olive Ridley sea turtle in the Bay of Bengal based on their migration path to foraging areas was developed. Migration movement of turtle is possibly determined by sea surface temperature and chlorophyll concentration in the marine settings. However, this needs to be further verified by monitoring with more PTTs tagged turtles.

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

Funding source: Grant-in-Aid
Investigators: Dr. K. Sankar, Dr. Y.V. Jhala, Shri Qamar Qureshi, WII and Dr. Rajesh Gopal, National Tiger Conservation Authority, New Delhi
Researchers: Aniruddha Majumder and Santanu Basu
Date of initiation: September, 2005
Date of completion: October, 2009

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

Progress: One sub-adult male tiger was radio-collared on April 4, 2007 and it dropped its collar after 12 days. Subsequently, one sub-adult female tiger was radio-collared in March 2008 to gather information on ranging pattern, habitat use and food habits. To gather information on prey availability of tigers, 31 line transects (62 km walk) were walked during summer (April-June, 2007) and 29 line transects (58 km walk) were walked during winter (October-March, 2007-08). The stalking cover, characteristics of the kill sites and data on killed prey species were collected for 30 kills during summer, 4 during monsoon (July-September) and 20 during winter. 135 km (approximate) distance was walked during summer and 125 km (approximate) was walked during winter for carnivore sign survey. 83 tiger scats were collected during summer 2007, 12 during monsoon 2007, and 202 during winter 2007-08. Minimum home range, habitat use and food habits of a tiger family (mother with two male cubs and two female cubs) were studied opportunistically during summer 2007. Twenty four pairs of camera were deployed during winter 2007-08 to estimate the population of tiger. Vehicle transects of 110.9 km were covered to study the population structure of major prey species. Two hundred vegetation sampling plots were laid (10 m for trees, 5 m for shrubs and 1 m for ground layer) at every 400 m sampling point along 43 line transects to enumerate densities of trees, shrubs and ground layer. Data on anthropogenic pressure was also collected from the vegetation plots.

Output and outcomes: The common langur was found to be the most abundant prey species in the study area (141.2 ±33.2 animals/km² in summer) followed by chital (83.9 ± 29.4 animals/km² in summer), sambar (12±4.7 animals/km² in summer), nilgai (4.2 ±1.9 animals/km² in summer) and wild pig (16.7±8 animals/km² in summer).

In total, 30 kills were found during summer. Analysis of kills revealed that chital was found to be the most preyed species (adult male 33.3%, adult female 16.7% and fawn 16.7% in summer) followed by sambar (adult male 3.3.%, spike male 3.3%, adult female 6.7% and fawn 3.3% in summer), nilgai (adult female 3.3% in

summer), wild pig (adult female 3.3.% in summer) and gaur (brown bull 6.7% in summer). Kill data collected during monsoon and winter 2007-08 are being analysed.

Analysis of scat collected during summer revealed that chital constituted as major prey of tigers in terms of number (65.1%) followed by sambar (24.1%), common langur (3.6%), wild pig (2.4%), nilgai (3.6%) and porcupine (1.2%). Scats collected during monsoon and winter are being analysed.

An adult tigress and her four cubs (ca. 18 months old) were monitored during summer 2007. In total 60 locations of this family were obtained between 6:00 a.m. and 6:00 p.m. The minimum home range of this tigress family was estimated to be 13.06 sq. km.

Monitoring biological diversity after relocation of gujjars in Rajaji-Corbett conservation area

Funding source: Grant-in-Aid
Investigators: Dr. K. Vasudevan, Dr. V.P. Uniyal, Dr. B.S. Adhikari and Dr. K. Sivakumar
Date of initiation: November, 2003
Date of completion: January, 2009

Objective: Monitor the changes in biological diversity after relocation of gujjars in Rajaji-Corbett Conservation Area (RCCA).

Progress: A network of transects was designed to cover each stratum of the study area based on terrain and vegetation compositions. A total of twelve transects were laid, seven in the hills and five in the plains. The transects in the plains were around 2 km in length, while in the hills, the length varied between 1-1.9 km. The total distance covered by one phase of sampling of transects was 19 km. The total sampling effort for the study period amounts to 157.7 km. In all, there were 99 transect walks spread over 72 days of sampling.

Pellet/dung counts on each transect were used as an indirect measure of habitat occupancy by ungulates plus the cattle presence, across the four ranges of the study area *viz.* Chillawali, Dholkhand, Beribada and Ranipur. Plots were marked every 100 m on all transects. The area under each plot was 20x2m. Eleven *raus* were chosen for sampling for the carnivore sign survey. Three *raus* were selected in each range to look for indirect evidences of use of the area by tigers and leopards.

The method of butterfly monitoring involved counting numbers of individuals within each of the butterfly groups described above along permanent, linear transects of 300-500 m in length. Transects were laid in different habitat types of the sanctuary and in the relocated areas to compare the diversity of butterflies in these areas. Butterflies were also recorded in each season to record the seasonal variations.

Outputs and outcomes: The overall density of sambar in the study area was 27.8 individuals/km². This is the highest recorded density of sambar throughout its range of distribution. The previous highest recorded density (24.25 individuals/km²) was from Chilla range of Rajaji National Park. Sambar densities show similar results (25.3 individuals/km^2). Chital densities in Chilla range was found to be 56.2 individuals/km^2. Thus, Rajaji National Park, harbours a very high density of sambar and chital. Both these species form important prey for tigers. Fifty five species of butterflies belonging to five families were recorded in the Rajaji National Park. Rau and mixed forest under-storey were preferred habitats for many butterfly species. Majority of the butterfly species were abundant and only one species was uncommon.


Chandan Jani

Barcoding Anurans of India

Funding Source: Department of Biotechnology, Ministry of Science and Technology, GoI

Investigators: Dr. Karthikeyan Vasudevan, Dr. Ramesh K. Aggarwal and Dr. Sushil K. Dutta

Researcher: Prudhvi Raj

Date of initiation: January, 2008

Date of completion: January, 2011

Objective: (i) To document anuran diversity in 'hotspots' and in biogeographically important areas in India; (ii) To create an interactive digital library of photographs, calls and DNA barcode of known amphibian species in India; (iii) To check barcoding gaps and describe cryptic anuran species; and (iv) To develop a web-enabled database providing the above information resource on frog taxa of India with retrievable DNA based/other descriptors.

Progress: Field trips were made to Har-ki-Doon in Govind Wildlife Sanctuary, Western Himalayas and Narsipatnam Forest Division in Andhra Pradesh to document anuran diversity. The ongoing work targets the genus *Fejervarya* with many cryptic species in India. A large number of samples have been processed to isolate genomic DNA. Many of these have been used to amplify 12S and 16S rDNA domains of mitochondrial genome. Amplified sequences are being sequenced. Also, we have designed/synthesized a number of primer pairs for amplifying target domains of genes from the nuclear genome (like tyrosine, rhodopsin, ND-1 etc.) that have been used for barcoding/typing of frogs elsewhere; and the conditions are being standardized for their use on samples in the present study.

Outputs and Outcomes: Documentation of anuran diversity in Western Himalayas and Eastern Ghats is in progress. Digital archiving of photographs, calls and DNA barcode are in progress. Based on the second objective description of cryptic species of ranids is in progress using collections in North Orissa University. The work related to third objective has not been taken up so far.

Developing spatial database on the mammal distributions and monitoring programme for large Carnivores, Prey populations and their Habitats in Khangchendzonga Biosphere Reserve

Funding source: Grant-in-Aid
Investigator: Dr. S. Sathyakumar
Researchers: Tapajit Bhattacharya and Tawqir Bashir
Date of initiation: January 2008
Date of completion: December 2011

Objectives: The objectives are to: (i) develop spatial database for the distribution of mammals particularly large carnivores and their prey (ungulates, galliformes) in the different watersheds of Khangchendzonga Biosphere Reserve (KBR); (ii) investigate habitat use patterns of ungulates and galliformes and food habits of carnivores in KBR; and (iii) develop a monitoring programme for the monitoring of large carnivores and their prey (ungulates, galliformes) and their habitats in KBR.

Progress: Following the selection of researchers in January 2008, the orientation, planning and preparatory works were carried out. A meeting with the senior officials of the Department of Forests, Environment and Wildlife Management, Govt. of Sikkim was held in February 2008 and this was followed by a reconnaissance of KBR. An intensive study area (Prek Chu Catchment) was selected for the proposed study.

An integrated approach to reduce the vulnerability of local community to environmental degradation in the Western Himalayas, India

Funding source: Grant –in-aid
Investigators: Dr. Ruchi Badola and Dr. S.A. Hussain
Researchers: Ashi Qureshi
Date of initiation: February 2008
Date of completion: February 2012

Objectives: (i) Study the patterns of interaction between the local livelihoods and natural ecosystems; (ii) Identify the key drivers of land use and resource use changes that have taken place in the region and assess their implications for ecosystem integrity and vulnerability of the local people; (iii) Identify ecosystem management actions and sustainable livelihood options that may reduce the vulnerability of communities to environmental degradation; and (iv) Promote the integration of this approach into emerging policy frameworks for sustainable use of natural resources in the region.

Progress: After initial reconnaissance of the study area, the intensive study sites have been identified. Detailed methodology for the assessment of ecosystem services and for studying human –natural ecosystem interactions has been developed and tested in the field. Field work is in progress.

Ecological assessment of timberline eco-tone in Western Himalaya with special reference to climate change and anthropogenic pressures

Funding source: Grant-in-Aid
Investigators: Dr. B.S. Adhikari and Dr. G.S. Rawat
Researchers: Sabuj Bhattacharyya, Vivek Joshi and Ishwari Dutt Rai
Date of initiation: May, 2007
Date of completion: May, 2011

Objectives: The major objectives of the project are: (i) to study the status, structural and functional aspect of timberline vegetation along the gradients of anthropogenic pressure; (ii) to compare the status of selected indicator species of flora along the timberline within and outside protected areas; (iii) to compare the abundance of selected mammals and pheasants in the disturbed and undisturbed timberline eco-tone based on direct and indirect evidences; (iv) to assess the spatio-temporal changes in the timberline (contiguity, vertical and horizontal extent, and inter-separation) using remote sensing and GIS; and (v) to develop models for predicting future scenario along sub-alpine, alpine eco-tone in the event of climate change and continued anthropogenic pressures.

Progress: Seven different forest communities *i.e. Abies spectabilis, Quercus semecarpifolia, Betula utilis, Abies mixed, Sorbus-Rhododendron-Salix, Rhododendron arboreum* and *R. companulatum* were selected and marked for quantification in and around timberline eco-tone in Tungnath region for the intensive study. For each forest community three zones *i.e.* forested, eco-tone and alpine zones were selected and boundaries of the plots (20×20m) were marked. 1 ha plot was laid in each forest community at the edge and forested area; and in each plot three (20×20m) quadrates at the edge and in forested zone were marked for regular monitoring.

The dominant tree species present in these zones were selected for the phenological observations, which are *Rhododendron arboreum, R. campanulatum, R. barbatum, Abies spectabilis, Quercus semecarpifolia* and *Betula utilis*. Five individuals of each species were selected at different altitudinal zones. In each individual tree five flowering and five leafing buds were marked. All the direct and indirect evidences of animals and birds presence were recorded. The existing habitat sites of Royle's pika in the intensive study area were identified on the basis of direct sighting of burrow and presence of fresh and old pellets. For Royle's pika study, the area has been stratified into lower, mid and higher elevation zones and within each zone permanent plots of 50×50m were marked permanently. The various parameters of pika habitat were recorded.

Outputs and outcomes: Twelve sites were sampled inside Kedarnath Wildlife Sanctuary. The density of trees forming different timberline communities was calculated in each site and it was found that *Rhododendron arboreum* had the highest density (510 trees ha^{-1}). The results clearly indicate that the species at timberline are forming communities, which are distinctive in nature and dispersed in relatively small area. The species which are commonly associated

can attain highest density only in their pure forests or in forests dominated by their associate species.

For intensive study, seven forest communities were identified. Among these forests, the density was recorded highest for Kharsu oak forest in the forested zone (408 trees ha^{-1}). The total basal area was highest for mixed forests' forested zone (43.4 m^2ha^{-1}) followed by Kharsu oak forested site (37.8 m^2ha^{-1}) and silver fir forest edge zone (37.1 m^2ha^{-1}) and forested zone (34.2 m^2ha^{-1}). The sapling density was highest in kharsu oak forest edge zone (358 individuals ha^{-1}) followed by birch forest edge zone (338 individuals ha^{-1}). A total of eight habitats were selected for intensive study of Royle's pika in the intensive study area. The transect study along timberline suggests that during morning hours the Himalayan monal had the highest encounter rate followed by Snow partridge and Himalayan griffon. However, during evening hours Himalayan tahr and Snow partridge had highest encounter rate followed by Himalayan monal and Himalayan griffon in the same transect. To study the pika burrows' micro-climatic condition, 8 permanent plots and 10 pika burrows were selected in each site and parameters *viz.* burrow width, soil temperature, burrow soil temperature, air moisture and burrow moisture were recorded at a specific time (11:30a.m.). The status of anthropological pressure in all pika habitats was evaluated. All the sites were categorized in low, moderate, high and negligible categories. It revealed that Site I had highest anthropological disturbance and Site III had the least anthropological disturbance. The livestock activity was the major anthropological disturbance factor followed by wood cutting and tourism activity.

The study suggests that the burrow width was highest in rocky forest edge habitat and lowest in *Danthonia* grassland. There was no significant relationship between soil temperatures outside and inside the burrow. In all sites except in smooth slope (mixed herbaceous meadow) the pika burrows were comparatively moist than that of open areas. The rocky forest edge habitat was moist than that of other habitat types followed by forested habitat.


B.S. Adhikari

An assessment of entomofauna for management and conservation of biodiversity in the Gangotri landscape

Funding source: Grant –in-aid
Investigator: Dr. V.P. Uniyal
Researcher: Manish Bhardwaj
Date of initiation: January 2008
Date of completion: January 2012

Objectives: The objectives of the project are: (i) to assess the ecological diversity and distribution patterns of Beetles (*Coleoptera*) and Butterflies (*Lepidoptera*) in different habitat types of Gangotri Landscape; (ii) to determine the endemicity and rarity of butterflies and their host plants relationship; (iii) to determine the status of beetles (*Coleoptera*) as pests in different anthropogenic pressures *viz.* grazing, herb collection, fire, tourism etc. on assemblages of butterflies and beetles; and (iv) to suggest and develop long-term management strategies for conservation of invertebrate diversity in the landscape.

Progress: Reconnaissance survey was conducted in different areas of Govind Wildlife Sanctuary and Gangotri National Park and base camp was established at Devghat in Gangotri National Park. Hill transects (n=13) were selected in different altitudinal gradient in Gangotri National Park to access diversity of butterflies, beetles and other prominent insects groups. Detailed field surveys will be carried out in different seasons.

A study on sympatric carnivores (tiger, leopard and wild dog) in Mudumalai Tiger Reserve, Tamil Nadu

Funding source: Grant –in-aid
Investigators: Dr. K. Sankar and Shri Qamar Qureshi
Researcher: T. Ramesh
Date of initiation: January, 2008
Date of completion: January, 2011

Objectives: The objectives of the project are: (i) to estimate density, distribution, group size and composition of prey species of sympatric carnivores (tiger, leopard and dholes); (ii) to study the food habits and prey selectivity of sympatric carnivores; (iii) to estimate the population of the sympatric carnivores; (iv) to study the distribution of sympatric carnivores and their prey species with specific reference to anthropogenic pressure; and (v) to develop conservation action plan for these sympatric carnivores.

Progress: The fieldwork was initiated in January, 2008 in Mudumalai Tiger Reserve (MTR), Tamil Nadu upon the engagement of a Technical Assistant in the project. For prey density estimation, 20 line transects (2km each) were laid in an intensive study area of 112 sq. km. Of these, six of them were walked twice, whereas remaining 14 transects will be walked during summer (April-June). In each transect, information on the number of prey species seen, animal bearing and angular sighting distance are being recorded in order to estimate the prey species density. The line transects are laid close to the camera locations, covering 9 beats of MTR.

One hundred sixty tiger scats, 100 leopard scats and 332 wild dog scats were collected to study the food habits of sympatric carnivores. These scats were washed, sun dried and processed for further analysis.

In order to assess the population of sympatric carnivores, 20 locations were selected for camera trapping. The study area (112 sq. km.) was divided into 3x3 sq. km. grids and within each grid a pair of cameras was deployed. In addition, track plots were also laid in front of all camera trap locations to study the abundance of tracks and signs of sympatric carnivores. Intensive camera trapping was initiated in March 2008 in selected beats, which include, Morgan betta, Kakanullah, Kargudi, Theppakadu, Thorapalli, Jaldhari, Mudumalai, part of Bospara, and Imbrellah.

Ecology of leopard in Sariska Tiger Reserve, Rajasthan

Funding source: Grant-in-aid
Investigators: Dr. K. Sankar, Shri Qamar Qureshi and Dr. Y.V. Jhala
Researchers: Krishnendu Mondal and Shilpi Gupta
Date of initiation: September, 2007
Date of completion: September, 2012

Objectives: The objectives are to: (i) understand factors influencing ranging pattern and home ranges of leopard; (ii) collect information on prey selection and habitat use by leopard; (iii) collect information on population structure, survivorship and dispersal pattern of leopards; and (iv) develop conservation action plan for leopard in semi arid landscape.

Progress: Fieldwork was initiated during November, 2007. Two blocks of 80 sq. km. were selected in the entire study area (core zone I) as intensive study area. Each block was then sub-divided into four units of 20 sq. km. In each unit, four line transects of two km length were laid to estimate the densities and encounter rates of major prey species. So far, 16 line transects were walked three times. On each sighting of prey species on the line transect, the total number, angular sighting distance and bearing were recorded.

To estimate the population density, survivorship and demographic details of leopards in the study area (core zone I), photographic capture-recapture techniques was chosen as an appropriate method. Ten cameras were placed in each 20 sq. km. unit for intensive camera trapping for lesser carnivores (golden jackal, hyena, jungle cat, caracal, civet cat and desert cat). These trapping sites were selected based on presence of tracks, scats and other evidence indicative of frequent leopard activity so as to maximize the capture probabilities of leopards in each grid. So far camera trapping has been done in block 1 for 60 days covering 80 sq. km. area. The matrices for leopard and other lesser carnivores are being developed. To see the survival and dispersal pattern of leopard, camera trapping will be continued for two consecutive years in each season in both the blocks. The data will also be compared with the data obtained from previous studies. Camera trapping for leopard and other small carnivores was done in one block covering almost 80 km^2 in Sariska Range. Transect walks in block 1 has been completed. Data for the encounter rate of wild ungulates, feral cattle and other livestock was collected in block 1. 105 leopard scats were collected, washed, sun dried and processed for food habits studies.

Dispersal and ecology of tigers in Ranthambore Tiger Reserve

Funding source: Collaborative Project between Rajasthan Forest Department, NTCA and Wildlife Institute of India
Investigators: Dr. Y.V. Jhala and Shri Qamar Qureshi
Researcher: J. Peter Prem Chakravarthi
Date of initiation: April 2007
Date of completion: March 2010

Objectives: The study aims to understand the ecology of tigers using Radio telemetry (VHF, GPS and Satellite) in the semi-arid landscape of which Ranthambore Tiger Reserve is a part. The emphasis of the study is on understanding how tigers disperse from a small high density population surrounded by a land-use matrix of varying hostility. The project was designed to serve the dual function of protecting tigers that disperse outside of Ranthambore with the assistance of radio-telemetry.

Progress: Three sub-adult male tigers were collared with GPS and VHF collars between April 2007 and March 2008. The first tiger Guda male was collared at Sonekatch area on April 28, 2007 and was fitted with a (Habit Research) GPS-VHF collar. The second tiger Darra male was collared at Ranideh Nallah in the forenoon of December 25, 2007 and was fitted with (VHF Wildlife Material) activity collar. The third tiger Jhalra male was collared at Jhalra area on the same day in the afternoon with a HABIT research GPS-VHF radio-collar.

The range of the three collared tigers was between 148 to 28 km^2. Continued tracking of these tigers and additional tigers that will be radio-collared will provide the data needed to address the above objectives in the following years. The Ministry of Environment and Forests, GoI and the Chief Wildlife Warden of Rajasthan have provided permissions for radio-collaring ten tigers for this project.

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

Funding source: Grant-in-Aid
Principal Investigator: Dr. S.P. Goyal
Co-investigators: Dr. K. Sankar and Shri Q. Qureshi
Researchers: Randeep Singh and Udayan Borthakur
Date of initiation: April, 2007
Date of completion: October, 2009

Objectives: Under the Phase-II of the project, the objectives were to: (i) determine tiger population employing pugmark, camera trap (sight and re-sight) and non-invasive DNA based techniques using scat and remotely collected hair in intensive study area of ca. 150-200 sq. km of Ranthambhore Tiger Reserve, Rajasthan, and Panna Tiger Reserve, M.P., and (ii) compare tiger estimates determined by various methods and seasons with respect to precision and accuracy and suggest appropriate protocols which are practical, suitable at variety of scales and cost effective for estimating tiger numbers for dry tropical habitats.

Progress: Data was collected in winter and summer. The efficacy of three different camera traps was checked using Trail-master (n=17) with Active-sensor, Wild-view (n=28) with Passive sensor) and Stealth-cam (n=19) with Passive sensor during the sampling period. Each camera trapping station was operated for 15-20 days. The study area was divided into 1x1 km grids and sampled during winter in four blocks by deploying 45 to 64 camera traps from 15 November 2007 to 02 March 2008. Intensive monitoring of 224 remotely triggered camera trapping stations during 108 days amounted to 4,440 trap nights and documentation of a total of 193 tiger photographs (96 right and 97 left flanks). A total of 168 camera-trapping stations have Track Plots (TP) for collecting the pugmark of identified individuals based on stripe patterns. Hind left or right pugmark was traced using tiger tracers, and was also photographed. The pugmark casts were also prepared using plaster of paris. A total of 87 digital photos of pugmark sets from 19 individuals, 73 set of pugmark cast of 18 individuals and 59 set of pugmark tracing of 16 individuals were collected. A total 211 scats were collected for DNA based individual identification.

Outputs and outcomes: During the study period, 32 individuals (16 female and 11 male and 5 cubs) based on left side and 31 individuals 17 female and 10 male and 4 cubs) including cubs based on right side stripe patterns were identified respectively. Estimated tiger density was 7.71 per 100 km^2 using minimum convex polygon of 228.3 km^2 of buffer width of 2.16 km^2. Male and female density was 2.66 and 4.66 per 100 km^2 respectively.

Status and distribution of Malayan sun bear *(Helarctos malayanus)* in North Eastern States, India

Funding source: Grant-in-Aid
Investigator: Dr. N.P.S. Chauhan
Researcher: Lalthanpuia
Date of initiation: April, 2007
Date of completion: October, 2009

Objectives: The project has the following objectives: (i) to assess the status and distribution of Malayan sun bear in Arunachal Pradesh, Nagaland and Mizoram; (ii) to investigate habitat use by sun bear in these three States; (iii) to assess the nature and extent of human-sun bear conflicts: human casualties and agricultural crop damage by sun bear in these States; (iv) to identify 'conflict zones' and conservation threats for the survival of sun bear in these States; and (v) to suggest conservation and management strategies for sun bear in these States.

Progress: People of 44 fringe villages of six protected areas and one reserved forest in Mizoram were interviewed using well designed questionnaire formats. Only in 28 villages, there were 52 respondents who had direct sighting of sun bears and had seen their indirect evidences in the vicinity of villages or in Protected Area or Reserved Forest. Occurrence of sun bear was confirmed in vicinity of Thorangtlang Wildlife Sanctuary, Sairep Reserved Forest and Khawnglung Wildlife Sanctuary in Lunglei district. Sun bear is also present in Ngengpui Wildlife Sanctuary and Phawngpui National Park in Lawngtlai district. In Aizawl and Serchhip districts, sun bear has been found to occur in vicinity of Tawi Wildlife Sanctuary.

There are no reports of its occurrence in 16 villages. Among these, the status of sun bear occurrence was low in eight villages situated adjacent to two Protected Areas and one Reserved Forest, whereas, the status seems to be high in 36 villages adjacent to four Protected Areas. From this limited data, it was not possible to reveal actual status of sun bear. From the 52 responses, maximum sightings were inside mixed forest (n=34), followed by crop field (n=8), bamboo forest (n=6), road (n=2), water body (n=1) and degraded lands (n=1). The respondents observed 28 bears walking, 16 feeding, seven resting and one was swimming. They were mostly sighted alone (n=44), two individuals (n=3), mother with cub(s) (n=5). Direct sightings of the bear were highest in the evening (n=24), followed by noon (n=17), morning (n=9) and night (n=2).

Output and outcomes: Thirty seven respondents observed sun bear scats, 42 respondents observed claws, 47 respondents observed footprints, 31 respondents observed tree nest, 21 respondents observed log or tree cavity. Thus, the two-month data confirms the presence of sun bear in Mizoram, but status report and distribution map of sun bear will be developed only after completion of the study. Direct and indirect evidences of sun bear in some parts of the Namdapha Tiger Reserve, Arunachal Pradesh have been recorded. A systematic survey on sun bear distribution and ecology will be done in Arunachal Pradesh.

Academic & Training


V.P. Uniyal

X M.Sc. in Wildlife Science

Status of Doctoral Research

XXVIII PG Diploma Course

XXIX PG Diploma Course

XXIII Certificate Course

M.Sc. dissertation titles and supervisors

Aggarwal, I. (2007): **Habitat relationships and resource partitioning in a lizard community of the Thar Desert.** Wildlife Institute of India, Dehra Dun. Dr. S.P. Goyal (Supervisor).

Chakresh Pathak (2007): **An assessment of heavy metal concentration in soil, water and vegetables in some areas of Dehra Dun.** Gurukula Kangri Vishwavidhyalaya, Haridwar, Uttarakhand. R.K. Negi and Dr. K. Sankar (Co-supervisors).

Chanchani, P. (2007): **Patterns of habitat use and food selection among wild and domestic ungulates in the Sikkim Trans-Himalaya.** Wildlife Institute of India, Dehra Dun. Dr. G.S. Rawat and Dr. S.P. Goyal (Supervisors).

Deep Contractor (2007): **Evaluating the effect of design and sampling intensity on estimating tiger population and density.** Wildlife Institute of India (Saurashtra University), Dehradun. Dr. Y.V. Jhala (Supervisor).

Dhritman Das (2007): **Ecosystem services of Manas National Park, Assam.** Forest Research Institute University. Dr. Ruchi Badola and Dr. S.A. Hussain (Supervisors).

Ghosh Suvankar (2007): **Vegetation community structure and ungulate habitat use in the Gir forests of Gujarat.** Forest Research Institute University, Dehradun. Dr. Y.V. Jhala (Supervisor).

Navendu Page (2007): **Patterns in plant species richness in forest fragments of Western Ghats, Karnataka.** Wildlife Institute of India, Dehradun. Dr. G.S. Rawat (Supervisor).

Pavlos Georgiadis (2007): **An ethnobotanical survey in the Garhwal Himalaya, Uttarakhand, India.** University of Hohenheim, Stuttgart, F.R.Germany. Dr. G.S. Rawat (Supervisor).

Shubham Dutta (2007): **Density and biomass estimation of prey-base for large carnivores in Simlipal Tiger Reserve, Orissa.** University of Bundelkhand, Jhansi, Uttar Pradesh. Dr. Y.V. Jhala (Supervisor).

Status of Doctoral Research in WII

Awarded

Anil Kumar Singh (2007): **Ecological investigations on the human-elephant conflicts in south-west Bengal.** Saurashtra University, Rajkot, Gujarat. Dr. Sushant Chowdhury (Supervisor).

Panna Lal (2008): **Development of spatial database in geographical information system domain for Bandhavgarh Tiger Reserve and assessment of landuse/landcover changes.** Forest Research Institute University, Dehra Dun. Dr. V.B. Mathur (Supervisor) and Shri Qamar Qureshi (Co-supervisor).

Priyadarshini, K.V.R. (2007): **Interactions between forage, recruitment and activity patterns of Blackbuck (*Antelope cervicapra*).** Saurashtra University, Rajkot, India. Dr. Y.V. Jhala (Supervisor).

Sharma, N.K. (2007): **Analysis of landscape features in part of Kumaon Himalaya with special reference to woody vegetation.** Forest Research Institute University, Dehra Dun. Dr. G.S. Rawat (Supervisor) and Dr. A.K. Tiwari (Co-supervisor).

Tambe, S. (2007): **Ecology and management of alpine landscape in Khangchendzonga National Park, Sikkim.** Forest Research Institute University, Dehra Dun. Dr. G.S. Rawat (Supervisor).

Thesis Submitted

A.K. Bhardwaj (2007): **An assessment of ecodevelopment initiatives in Periyar Tiger Reserve.** Forest Research Institute University, Dehra Dun. Dr. Ruchi Badola (Supervisor).

Bipin Chandra Rathore (2008): **Ecology of brown bear (*Ursus arctos*) with special reference to assessment of human-brown bear conflicts in Kugti Wildlife Sanctuary, Himachal Pradesh and mitigation strategies.** Saurashtra University, Rajkot, Gujarat. Dr. N.P.S. Chauhan (Supervisor).

Kumar, P. (2007): **Systematics and some aspects of ecology of orchids in Jharkhand State, India.** Forest Research Institute University, Dehra Dun. Dr. G.S. Rawat (Supervisor).

Rina Rani Singh (2007): **Characterization of bone, rhino horn and antler for identifying species to deal wildlife offences.** Forest Research Institute University, Dehra Dun. Dr. S.P. Goyal (Supervisor).

Registered

Lalit Kumar Sharma (2007): **Ranging patterns of Asiatic Black Bear *(Ursus thibetanus)* with reference to food availability in Dachigam National Park, Kashmir.** Saurashtra University, Rajkot. Dr. S. Sathyakumar (Supervisor).

Mukesh (2007): **Genetic diversity and admixture analysis of Red Junglefowl with the chicken in north central India.** Kurukshetra University. Dr. S. Sathyakumar (Co-supervisor).

Rajkishore Mohanta (2007): **Habitat characteristics, impact of biotic pressure and activity pattern of brown bear (*Ursus arctos*) in Kugti Wildlife Sanctuary, Himachal Pradesh.** Saurashtra University, Rajkot. Dr. N.P.S. Chauhan (Supervisor).

Samina Amin Charoo (2007): **Asiatic Black Bear *(Ursus thibetanus)* abundance, habitat occupancy and conflict with humans in and around Dachigam National Park, Kashmir.** Saurashtra University. Dr. S. Sathyakumar (Supervisor).

Singh, P. (2008): **Study of altitudinal and geographical song variation, and inter-specific interaction among *Phylloscopus* warblers in the Himalaya.** Forest Research Institute University, Dehra Dun. Dr. G.S. Rawat (Supervisor).

Th. Sanggai Leima (2008): **A study on the people – protected area interface at Keibul Lamjao National Park, Manipur.** Forest Research Institute University, Dehra Dun. Dr. Ruchi Badola (Supervisor) and Dr. S.A. Hussain (Co-supervisor).

Tiwari, Umeshkumar (2008): **Systematics and ecology of berberidaceae in Uttarakhand.** FRI University, Dehra Dun. Dr. G.S. Rawat (Supervisor).

Upadhyay, A. (2007): **Ecology and conservation of wild ungulates in northern parts of Changthang Wildlife Sanctuary, Eastern Ladakh. Saurashtra University, Rajkot.** Dr. G.S. Rawat (Supervisor).

Vasundhara Kandpal (2007): **Evaluating threatened species in relation to anthropogenic pressures and their management strategy in Nanda Devi Biosphere Reserve, Western Himalaya.** Forest Research Institute University, Dr. S. Sathyakumar (Co-supervisor).

The Institute's Gold Medal for Top Trainee	Ms. Suveena Thakur
Wildlife Preservation Society Silver Medal for Second in Merit	Shri Neeraj Kumar
Silver Medal for Best All Round Wildlifer	Ms. Suveena Thakur
N.R. Nair Memorial Silver Medal for Best Management Plan	Mr. Jigme Tshelthrim Wangyal
Best Management Term Paper	Shri A.K. Chatterjee
Top Trainee in Wildlife Biology	Ms. Suveena Thakur
Best Foreign Trainee	Mr. Jigme Tshelthrim Wangyal

XXVIII P.G. Diploma Course in Wildlife Management *September 2006 to May 2007*

During the reporting period, the officer trainees undertook Management Planning Exercise tour to Periyar Tiger Reserve, Kerala from April 22 to May 11, 2007, which was followed by Management Plan writing. Prior to conclusion of the course, the *Viva-Voce* examination for officer trainees was held on May 25-26, 2007. The valedictory function was organized on May 31, 2007. Dr. Devendra Pandey, IFS, Director General, Forest Survey of India, Dehra Dun, was the Chief Guest of the function. He gave away the Diplomas and awards to the passing out officers. All 17 officer trainees were awarded 'Diploma in Wildlife Management' on their successful completion of the course. Six officer trainees *i.e.* Ms. Suveena Thakur, Himachal Pradesh; Shri Niraj Kumar, Uttar Pradesh; Dr. C. Muthukumaravel, Assam; Ms. Sangeeta Chandel, Himachal Pradesh; Mr. Jigme T. Wangyal, Bhutan and Mr. Binod Regmi, Nepal were awarded the Honours Diploma for obtaining highest aggregate marks of 75% and above.

XXIX P.G. Diploma Course in Wildlife Management *September 2007 to May 2008*

The course commenced on September 1, 2007 for nine months duration at the Institute. Fifteen officer trainees joined the course, of which eleven are from Forest Departments of various Indian States. In addition, there are four foreign nationals, one each from Vietnam and Bhutan under the sponsorship of the Global Tiger Forum, New Delhi and one from Bhutan sponsored by South Asian Association for Regional Cooperation (SAARC) Wildlife Management Fellowship Scheme. One officer trainee from Afghanistan was sponsored by United Nations Office for Project Services (UNOPS). As part of the course, the following field visits were undertaken by the officer trainees: (i) Orientation Tour was conducted in Kalagarh, Corbett Tiger Reserve, Uttarakhand from September 28 to October 2, 2007. The objective of this tour was to introduce trainee officers to vegetation types, terrain, birds, mammal signs and tracks, and familiarize them with different habitats, wildlife values of the area, use of water holes, animal sightings, data analysis and man-wildlife interface situations. Short-treks were conducted along with visits to various sites both within and outside the Park. (ii) High Altitude Techniques Tour was conducted in Kedarnath Wildlife Sanctuary and Nanda Devi Biosphere Reserve, Uttarakhand from October 28, 2007 to November 2, 2007. The objective of this tour was to study the habitat requirements of endangered Himalayan fauna and its conservation. The tour also addressed the issue of population monitoring and estimation in the mountain ecosystem. (iii) A half-day trip to the mining site at Maldevta on November 22, 2007 for assessing environmental impacts. (iv) The Techniques Tour was undertaken at Sariska Tiger Reserve, Rajasthan from November 25, 2007 to December 8, 2007. The tour primarily addressed the various techniques involved in the estimation and monitoring of plant and animal populations. (v) Visit to Asan Barrage on December 16, 2007 for wetland study and identification of water birds. (vi) One-day field trip to Dhanolti, Mussoorie on January 5, 2008. (vii) Management Tour to Kanha


Vinod Verma

National Park (M.P.), Mysore Zoo, Bandipur Tiger Reserve, Mudumalai Wildlife Sanctuary/National Park, Indira Gandhi Wildlife Sanctuary, Annamalai, Arignar Anna Zoo and various Protected Areas in Sri Lanka from January 28 to February 22, 2008. For the first time, the officer trainees were taken to a neighbouring country *i.e.* Sri Lanka as part of their Management Tour from February 12-21, 2008. (viii) Field trip to Corbett National Park from February 28–March 2, 2008. (ix) Captive Management Tour to National Zoological Park (Delhi), Central Zoo Authority and Aravalli/ Yamuna Biodiversity Park from March 9-11, 2008. They also got an opportunity to meet the Hon'ble Chief Minister of Delhi, Mrs. Sheila Dixit. (x) The Management Term Paper Exercise at Kaziranga National Park, Assam from March 12-21, 2008.

XXIII Certificate Course in Wildlife Management ***November 2007 to January 2008***

The Certificate Course commenced on November 1, 2007 for the duration of three-month at this Institute. Sixteen officer trainees (Range Forest Officers and officers of equivalent rank) joined the course. The officer trainees were one each from A & N Islands, Tripura, Orissa, Bihar, Karnataka and Manipur; two each from Sikkim amd Himachal Pradesh. One officer tainee each from Bhutan, Indonesia and Nepal was sponsored by Global Tiger Forum and three officer trainees from Bhutan were sponsored by Royal Govt. of Bhutan. Apart from providing in-house teaching, the trainees were taken to the Rajaji National Park (Beribada) on an Orientation-cum-Techniques Tour during November 25-December 4, 2007. At Rajaji National Park, ten days were spent on imparting training on jungle craft, population monitoring and estimation techniques, and impact of developmental activities on wildlife and human. Trainees were explained about the identification of plants, animals, tracks and signs. They visited Bhimgoda barrage for an exercise on counting water birds along the river Ganges. They also visited a *Gujjars dera* and the Gaindikata village, where some of the *Gujjars* have been rehabilitated.

The Wildlife Conservation Gold Medal for the Top Trainee	Shri Devinder S. Dhadwal
The Best Foreign Trainee	Mr. Iding Achmad Haidir
Institute's Prize for Wildlife Management	Shri Pradeep Bhandari

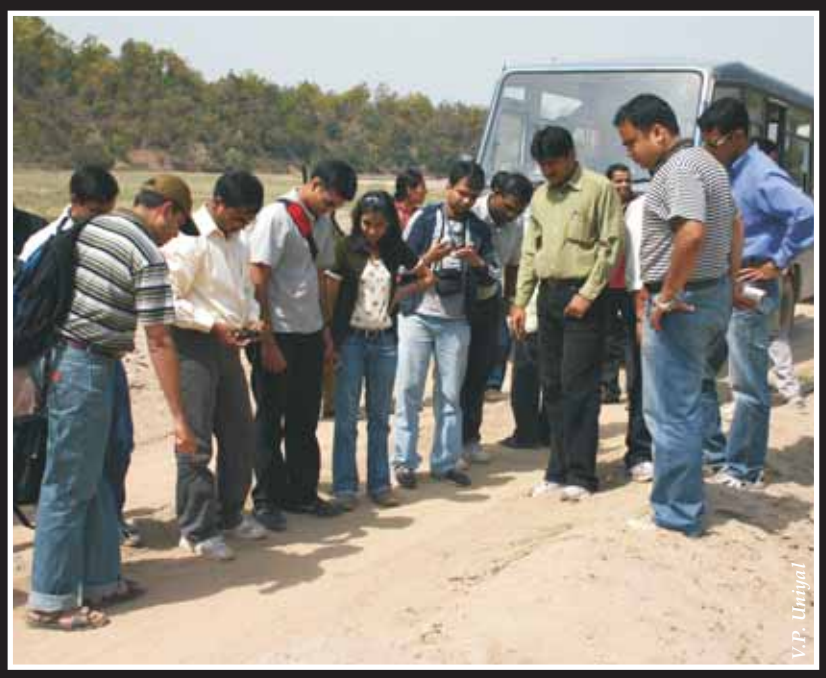
Bitapi C. Sinha

Vinod Verma

The Management Tour was conducted from January 2-21, 2008 in various parts of Gujarat *viz.* Gujarat Ecological & Educational Research Foundation, Kamla Nehru Zoological Park and Centre for Environment Education, Nalsarovar Wildlife Sanctuary, Wild Ass Sanctuary, Marine National Park, Sakkarbagh Zoo, Gir National Park and Kanha National Park in Madhya Pradesh. During this tour, the emphasis was on study of the wide range of management practices and problems in India's Protected Areas.

The valedictory function was organized on January 31, 2008. Dr. R.D. Jakati, Additional PCCF and Chief Wildlife Warden, Haryana distributed the certificates and awards to the officer trainees. All 16 officer trainees successfully completed the course. The Honours Certificate was awarded to seven officer trainees, who secured 75% or more marks.

Capacity Building



Workshops, Seminars & Conferences

Organized

Attended

Vinod Verma

South & West Asia sub-regional workshop on the review of, and capacity-building for, the implementation of the CBD Programme of Work on Protected Areas, Dehradun, *April 2-4, 2007.* The workshop was inaugurated by His Excellency, Shri Sudarshan Agarwal, Governor of Uttarakhand at the Wildlife Institute of India, Dehradun. Shri B.S. Parsheera, Additional Secretary, MoEF, Government of India presided over the function. Dr. Jo Mulongoy and Dr. Sarat Babu Gidda representing the CBD Secretariat, participants from about 19 South & West Asian countries, the Chief Wildlife Wardens of various States of the country and other officers of Central & State Governments were also present on the occasion.

The three-day workshop organised by the Ministry of Environment & Forests (MoEF), Government of India aimed to review the progress made in implementing the programme of work on protected areas, which was adopted in the Conference of the Parties to the CBD, at its seventh meeting in 2004 at Kuala Lumpur, Malaysia. The programme had an overall objective to establish and maintain, by 2010 for terrestrial areas and by 2012 for marine areas, "comprehensive, effectively managed and ecologically representative systems of protected areas". During the review workshop, the constraints and opportunities to promote implementation were also identified.

Shri Namo Narain Meena, Minister of State, Environment and Forests was the Chief Guest at the concluding session held on April 4, 2007.


Vinod Verma

Training workshop on "Wildlife crime prevention, detection and identification of wildlife parts and products in illegal trade" for government/enforcement agencies, Govt. of Nepal, Dehradun, *April 23-27, 2007.* Based on the request from WWF-Nepal, a training workshop was organised to sensitize the enforcement officers of Govt. of Nepal on the extent and kind of wildlife trade and conservation threats to species; various Acts and Treaties for controlling illegal trade of wildlife parts, different aspects of crime detection and prevention, documentation and identifying species from various parts and products of fauna and flora. The workshop covered various aspects such as: conservation of biodiversity – national and international scenarios; role of protected areas in conservation; Wildlife (Protection) Act-1972; CITES; illegal trade in flora and fauna with special reference to turtles; reptiles, birds, mammals and plants in trade; wildlife forensic techniques to identify species from various parts and products; identifying plant species reported in trade; documentation collection of samples for forensic examination; and role of DNA techniques in wildlife forensics were the topics that were covered in the workshop. One-day visit to Rajaji National Park for interaction with Park Managers on "Wildlife crime monitoring and investigation" was part of the workshop.

Indo-US professional training course "Tools for conserving biodiversity", Dehradun, *May 1-16, 2007.* The professional training course was undertaken in India in partnership between the Smithsonian Institution (SI) MAB Program and the Wildlife Institute of India (WII). The course was tailored

for graduate students and early career professionals, who were interested in gaining a broad background on various tools used for conserving biodiversity. The course was funded by the IUSSTF with in-kind contributions from WII and SI. 15 Indian participants and 5 US participants were selected to attend this course.

Students spent the first part of the course learning field and laboratory techniques. The second half of the course was spent in the field at the Chilla Range in Rajaji National Park. Participants were also given the opportunity to experience local culture at various times. A final closing and official presentation of certificates was led by Shri S.K. Mukherjee, former Director of WII.

Staff from SI and WII discussed potential future conservation partnerships and collaborations between the two organizations. The MAB Program is looking to develop regional training hubs where they can offer their curriculum of training courses in various regions of the world including India.

Workshop on 'Wildlife research in Nanda Devi Biosphere Reserve and Kedarnath Wildlife Sanctuary by the Wildlife Institute of India during 2002-2006', Joshimath, *May 25, 2007.* The objectives of the workshop were: (i) to share the outputs of WII's Research activities in Nanda Devi Biosphere Reserve and Kedarnath Wildlife Sanctuary during the period 2002 to 2006 with the protected area managers and field staff; and (ii) to review wildlife monitoring techniques and their applications. The workshop was organized by Wildlife Institute of India and sponsored by Ministry of Environment & Forests, Government of India. In all 50 participants took part in the workshop. The summary of findings of WII's research projects and the training material were prepared in Hindi and provided to the participants of this workshop.

Mitigation of impacts on biodiversity: best practices in key sectors, Seoul, Korea, *June 3-4, 2007.* This 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) in collaboration with the Business and Biodiversity Offset Program (BBOP). The objectives of the training course were to: (i) build capacity of participants for linking biodiversity conservation and development; (ii) discuss benefits of good mitigation planning for harmonizing conservation and development; (iii) share common understanding of traditional approaches of impact mitigation and the ground rules for following the hierarchy of mitigation options; (iv) review market solutions for incorporating biodiversity into business plans and decisions; and (v) introduce the concept of biodiversity offsets and review the prospects and challenges of its applications for benefiting biodiversity and business plans.

Course inputs were provided by WII faculty Dr. Asha Rajvanshi and Dr. V.B Mathur with some inputs from Dr. Jo Treweek, Technical Project Manager, IAIA-CBBIA Project; Kerry ten Kate, Director, Business and Biodiversity offset programme and Jonathan Ekstrom. It was sponsored by International Association for Impact Assessment (IAIA). Seventeen participants from eleven countries participated in the course.

National workshop on 'Guidelines for preparation of Tiger Conservation Plan', Dehradun, *July 26-27, 2007.* The National Tiger Conservation Authority, Ministry of Environment & Forests, Government of India organized the national workshop at Wildlife Institute of India to discuss the

guidelines for preparation of Tiger Conservation Plan. The objectives of Tiger Conservation Plan are to ensure: (i) protection of tiger reserve and providing site specific habitat inputs for a viable population of tigers, co-predators and prey animals without distorting the natural prey-predator ecological cycle in the habitat; (ii) ecologically compatible land uses in the tiger reserves and areas linking one protected area or tiger reserve to another for addressing the livelihood concerns of local people, so as to provide dispersal habitats and corridors for spillover population of wild animals from the designated core areas of tiger reserves or from tiger breeding habitats within other protected areas; and (iii) forestry operations of regular forest divisions and those adjoining tiger reserves which are not incompatible with the needs of tiger conservation.

Definition and need for inviolate core areas was discussed. Criteria for setting aside inviolate cores in tiger reserves were evolved. Guidelines were developed for management of tiger reserve buffer, where tigers could potentially co-exist with humans and eco-friendly land uses.

Training workshop on 'Capacity building in wild animals immobilization and restraint' for State Forest Department, Wardha Forest Division, Maharashtra, *July 30, 2007.* The workshop was conducted for frontline staff of Wardha Forest Division, Maharashtra State. The participants were exposed to various aspects of ethical and scientific restraint and management of wild animals in distress. Dr. Parag Nigam demonstrated the use of drug delivery equipments besides sharing experiences of wild animal rescue and rehabilitation.

Consultation workshop of taxon experts groups for development of criteria and listing of species in the schedules of the Wildlife (Protection) Act, 1972, Dehradun, *August 6-7, 2007.* The workshop was organized to finalize the criteria for inclusion of animal species in the schedules of the Wildlife Protection Act, 1972 and also for listing the animal species in the various schedules. A total of 34 experts from various organizations participated in this two days workshop. Experts of various taxon groups such as mammals, birds, reptiles, amphibians, fishes, insects, crustacea, mollusca and echinodermata provided professional inputs.

Collaborative workshops with United Nations Institute for Training and Research (UNITAR), Dehradun, *August 12-17, 2007.* The UNITAR Hiroshima Fellowship for Afghanistan, started in late 2003, is a long-term initiative aiming at building leadership and management skills and providing technical and institutional support to a core group of senior Afghan government officials, academics and practitioners. In order to provide a better learning environment and considering the security issues, the United Nations Institute for Training and Research (UNITAR) Hiroshima Office for Asia and the Pacific (HOAP) requested the Institute to organize workshops for Afghan civil servants.


S. Wilson

Twenty eight fellows and coaches from Afghanistan and four WII faculty members attended the workshops "Introduction to organization development and change" and "Introduction to project management". The lead resource persons of these workshops, Dr. Howard Lamb, Ms. Sue Ries Lamb, and Dr. Jobaid Kabir, were supported by Mr. Henry Kwok, Singapore International Foundation, and Ms. Sharapiya Kakimova, UNITAR HOAP. The overall objectives of the workshop "Introduction to organization development and change" were to: (i) equip participants with tools for

assessing organizations and teams, and analyzing and reporting the assessments; (ii) enhance the understanding of an organization's culture and change process; (iii) review assignments and assess their progress; and (iv) assist in developing team projects. The overall objectives of the workshop on "Introduction to Project Management" were to: (i) enhance participants' understanding of project design and management; (ii) provide tools for project scheduling, monitoring and evaluation, budgeting and reporting; (iii) introduce skills in proposal writing and the use of tools such as MS Project software; and (iv) review and further develop team projects.

Training workshop on "Mountain and forest ecosystems: Challenges, issues and way forward", Dehradun, *August 13-14, 2007.* Wildlife Institute of India (WII) and the United Nations Institute for Training and Research (UNITAR) Hiroshima Office for Asia and the Pacific (HOAP) organized this workshop in which 24 participants representing wildlife managers, scientists, representative of scientific and non-governmental organizations participated. Ms. Nassrine Azimi, Director, UNITAR-HOAP and Shri P.R. Sinha, Director, WII jointly inaugurated the collaborative workshop.

Vinod Verma

The workshop was designed to achieve the following objectives: (i) rendition by various experts in India working in mountain, forest and wetland ecosystems of the challenges faced in their conservation work; (ii) consultation with national and international experts and identification of next steps to tackle identified challenges, especially in the field of capacity-building; (iii) making use of case studies, best practice and lessons - learned approaches, exchange knowledge on the appropriate conservation measures among the participants and create a network of information exchange to continue after the workshop; and (iv) feedback of the findings to international bodies such as Convention on Biological Diversity (CBD) and Ramsar and into the future training programmes of WII and UNITAR. The high point of the workshop was the field visit to Asan Conservation Reserve.

PENTA – WII collaborative workshop on environmental assessment curriculum, Dehradun, *September 24–26, 2007.* Promotion of European Education on Environmental Assessment for Third Country Audience (PENTA) Project is coordinated by Slovak University of Technology, Slovakia and jointly implemented by its partners - the University of Liverpool, United Kingdom and Austrian Institute for the Development of Environmental Assessment. The project's main objective is to promote education outside the European Union (EU), enhance the attractiveness of Environmental Assessment (EA) courses and attract third country students to study this field in EU countries. The workshop was jointly organized by the PENTA and WII teams. The objectives of this workshop were to: (i) inform about PENTA project objectives and to present project outcomes to increase third country based knowledge on EA and to thus enable them understand how best to access the teaching materials; (ii) exchange experiences on EA related Master programmes in Europe to enable development of future Master Courses on EA for third country students; (iii) provide a window for discussion on the South Asian regional EA processes, practical experience, capacity and future needs to seek the support of PENTA in promoting EA education for third world countries; and (iv) discuss and exchange best practice and create contacts and networking strategies that may enrich the PENTA Project outputs.

S. Wilson

The workshop was attended by 33 participants from Nepal, Bangladesh, Sri Lanka and India. The workshop was also attended by reviewers and

officials of Ministry of Environment & Forests, directly responsible for environmental decision-making and representatives of civil society and Quality Council of India. The workshop not only provided a window for discussion on the South Asian regional EA process and sharing practical experience of EA and identifying needs for future capacity building but also emerged as a very appropriate platform for fostering a strong network of EA professionals and academicians to enable development of master courses on EA under EU education for third country students.

III Internal Annual Research Seminar (IARS) *September 17-18, 2007* **& XXI Annual Research Seminar (ARS) of the Institute, Dehradun,** *September 19-20, 2007.* The III IARS was chaired by Sh. V.B. Sawarkar, Chairman, Training, Research & Academic Council (TRAC). During the IARS, a total of 40 presentations were made by the researchers and faculty members of the Institute in eight sessions to represent all research projects that have been initiated recently. Five presentations were adjudged as the best presentations and the researchers were awarded book prize worth Rs.1000.00 each.

Rank/Name	Topic of Presentation
I. R. Suresh Kumar	An investigation on the relationship of offshore distribution patterns of Olive Ridley turtles and mass nesting along the Rushikulya rookery of Orissa.
II. Sruthi Kumar	An ecological assessment of the critical habitats of the three sympatric species of marine turtles in the Lakshadweep islands.
III. Merwyn Fernandes	An assessment of the current distribution and trait characteristics of Red Junglefowl.
IV. Kaushik Banerjee	Social organization and dispersal of Asiatic lions: Research achievements and way ahead.
V. Chittaranjan Dave	Chital and livestock in Gir: Impact on vegetation.

S. Wilson

The ARS was also chaired by Sh. V.B. Sawarkar, Chairman, TRAC. In total, 21 presentations were made by M.Sc. students, researchers, former researchers and faculty members in seven sessions. The presentations were based on completed and ongoing research studies of the Institute. One special session with four presentations (two by WII faculty members and two by external delegates) was also conducted during the ARS.

About 250 delegates/participants attended the ARS that included the Principal Chief Conservators of Forests (PCCFs), Chief Wildlife Wardens and other senior officials representing State Forest Departments, NGOs, scientists, conservationists, wildlife experts, faculty members, researchers, M.Sc. students and the Post Graduate Diploma course officer trainees of WII. Five presentations were adjudged as the best presentations of the Annual Research Seminar. All five researchers were given book awards, each worth Rs.1000.00.

Rank/Name	Topic of Presentation
I. Mousumi Ghosh	Winter ecology of three species of sympatric *Phylloscopus* warblers.
II. Sutirtha Dutta	Ecological aspects of Indian spiny-tailed lizard *Uromastyx hardwickii* in Kutch.
III. Deep Contractor	Evaluating the effect of design and sampling intensity on estimating tiger population and density.

IV. Abishek Harihar	Response of tiger and wild ungulate prey populations to human disturbance in Rajaji National Park, Uttarakhand: Spatial and seasonal variations.
V. Ambica Paliwal	Spatial distribution of ungulates and vegetation structure in Tadoba-Andhari Tiger Reserve (TATR), Maharashtra.

S. Wilson

One-week compulsory training programme for IFS officers, Dehradun, *October 22-26, 2007*. The training programme for IFS Officers on "Wildlife Management in India and Protected Area Effectiveness" was organized by Wildlife Institute of India (WII). This programme was sponsored by the Ministry of Environment and Forests, Government of India. The main objectives of the programme were to: (i) sensitize the officers about major issues of wildlife conservation in India, (ii) apprise the officers about current approaches of effective wildlife management in the country, and (iii) share the latest experiences of WII in wildlife monitoring and PA management effectiveness evaluation. The training programme was attended by 22 participants representing 12 States of the country. The conceptual inputs on different sessions were provided by in-house faculty and invited resource persons. Field visit for a day to Rajaji National Park was organized for exposing the participants to the field implementation of latest wildlife monitoring initiatives.

Training workshops for undertaking census/estimation of elephants in Arunachal Pradesh, Itanagar and Namsai, *October 28 - November 2, 2007.* On the invitation of the Forest Department, Government of Arunachal Pradesh, WII organized workshops at two field sites in Arunachal Pradesh. The objectives of these workshops were to enhance capacities of officers and field staff to carry out synchronized elephant estimation which was planned along with other neighboring states in the year 2007. The Itanagar workshop was attended by 56 participants including Conservator of Forests, DFOs, ACFs, ROs and other frontline field staff. Similarly, the Namsai workshop was also attended by 48 participants. From the Wildlife Institute of India, Dr. Sushant Chowdhury and Shri Qamar Qureshi participated in the workshops for providing various inputs on use of map and compass; GPS; planning block sample counts; dung counts; habitat stratification; size class categorization and sexing of individual elephants; coordination of elephant estimation in block, zonal & state level; and involvement of NGOs and other interest groups were also emphasized.

Two-day training workshop on "Options for improving conservation of wild animals in their natural habitats", Dehradun, *November 6-7, 2007.* This workshop was sponsored by the Ministry of Environment & Forests, Government of India for IFS officers. A total of 14 IFS officers from the States of Maharashtra, Andhra Pradesh, Chhattisgarh, Gujarat, Haryana, Madhya Pradesh, Uttar Pradesh, Assam and Bihar attended the training workshop. Seven presentations were made on various topics related to the theme of the workshop. The presentations were followed by discussion sessions and in addition two panel discussions were also held for eliciting the views and experiences of the participants. Some of the important topics dealt during the workshop were: Conservation approaches and their successes; Sustainable utilisation of wildlife; increasing the stakes in wildlife tourism; integrating *ex-situ* and *in-situ* conservation efforts; and dealing with human-animal conflicts.


Vinod Verma

Vinod Verma

Symposium on "Biodiversity conservation in the tropics: issues, concerns and strategies", Dehradun, *December 4, 2007*. Wildlife Institute of India organized one-day symposium in collaboration with HNB Garhwal University, Srinagar and International Society for Tropical Ecology (ISTE). This symposium formed part of International Tropical Ecology Congress–07 held at Dehra Dun during December 2-5, 2007. Major objectives of the symposium were: (i) to facilitate interaction among the leading ecologists, managers and scientists for sharing experiences on various aspects of tropical biodiversity; (ii) to share results of recent case studies on Biodiversity Surveys and Monitoring in the tropics; and (iii) to revisit the conservation issues in the tropics and assess efficacy of various strategies including effects of legislation following CBD Agreement. The symposium was attended by scientists from India and abroad as well as young ecologists numbering over 80. There were five sessions *viz*., Introductory & opening session, Biodiversity quantification & monitoring; Park–people interface & participatory research; *ex-situ* conservation; and poster session. Dr. Alan Rodgers, Former Regional Coordinator, Global Environmental Facility, UNDP, and noted Wildlife Ecologist delivered the keynote address on 'Ecology and the Conservation of Biodiversity-Global Patterns of Change: 1992–2007'.

Amphibian Biodiversity Conservation (ABC) course – South Asia, Periyar Tiger Reserve, *December 10-16, 2007*. The course was designed for amphibian conservationists, researchers and managers working in south Asia. The seven-day course was adapted from the first ever course on ABC launched by the Durrell Wildlife Conservation Trust, in Jersey in 2006. It was developed in response to the Washington Amphibian Summit in 2005, where tasks were identified to deal with the current 'amphibian extinction crisis'. The ABC - Asia course was designed with the aim of creating networks of amphibian conservation biologists working in research-based organizations. The course was developed and administered in partnership with Durrell Wildlife Conservation Trust, Central Zoo Authority, Durrell Institute of Conservation and Ecology, Amphibian Network of South Asia, Zoo Outreach Organization, Conservation Breeding Specialist Group – South Asia and the Wildlife Institute of India (WII).

Training course for middle level officers in Indian zoos, Ahmedabad, *January 9-18, 2008*. This training course was organised at Ahmedabad. The Central Zoo Authority provided financial support for the course. The course had twenty-two participants from twenty-one zoos of the country. The course was inaugurated by Shri Pradeep Khanna, Principal Chief Conservator of Forests (Wildlife), Gujarat. The theme of the programme was 'Marketing and Fund-raising' and 'Education'. Besides this, other subject areas like Population Management, Health Care & Sanitation and Zoo Management were covered. Three field visits were conducted for the benefit of the trainees to Kamla Nehru Zoological Garden, Ahmedabad; Gir National Park, Junagadh; and Sakkarbaug Zoo, Junagadh. The Valedictory Function of the course was presided by Shri Z.A. Sacha, Deputy Municipal Commissioner, Ahmedabad Municipal Corporation.

Training programme in wildlife management for forest guards of Uttarakhand Forest Department, Dehradun, *February 4-5, 2008*. The two-day course was organized at the Institute in collaboration with the Uttarakhand Forest Department for the forest guards from Corbett Wildlife Training Centre, Kalagarh (Garhwal). Twenty forest guards participated in the course. The aim of the course was to educate and sensitize them towards wildlife management and biodiversity conservation.


Vinod Verma

Training workshop on "Enforcement of Wildlife (Protection) Act, 1972 and India's international obligations" for enforcement agencies, Dehra Dun, *February 4-8, 2008*. A five-day training workshop for seven officers from different enforcement agencies was conducted by the Wildlife Institute of India (WII) in collaboration with Wildlife Crime Control Bureau (WCCB), Ministry of Environment and Forests, Govt. of India. The aim of the training workshop was to sensitize the enforcement officers on the extent and kind of wildlife trade, conservation threats to species, various Acts and International Obligations for controlling illegal trade of wildlife parts, different aspects of crime detection and prevention, documentation and identifying species from various parts and products of fauna and flora.

Training workshops on "Building capacity in managing wild animals in distress", Lucknow, *February 19-20, 21–22 and 23–24, 2008.* Three consecutive 2-day training workshops on "Building capacity in managing wild animals in distress (Immobilization, Rescue and rehabilitation)" were jointly organized by Wildlife Institute of India and Uttar Pradesh Forest Department at Lucknow Zoo. A total of 45 participants including Protected Area managers and frontline staff from various forest divisions of Uttar Pradesh participated in the workshops. The workshops were organized with the objective of enhancing capacities locally to deal with wildlife emergencies. The workshops provided exposure to the participants on various options and procedures available for scientific, ethical and professional management of wild animals in distress. Besides the faculty members of the Institute, eminent practicing veterinarians and wildlife managers were invited as resource persons. The training methodology included interactive lectures, case study presentations, hands-on exercise and experience sharing session of the participants.

Two-week special short-term training programme for the Indian Revenue Service (Customs & Central Excise), Group `A' Probationers of 58th Batch, Dehradun, *March 31 –April 11, 2008.* The objectives of the course were: (i) to sensitize the participants about the unique biodiversity of India, its importance and the challenges of conservation; (ii) to understand the gravity of issues related to illegal trade of wildlife and wildlife products, available legal instruments to control this trade and role of custom officers; (iii) to provide basic skills of Forensic Science for identification of important wildlife products in trade; and (iv) to generate discussions and share experiences of field officers dealing with issues of trade at international borders. The training programme was jointly organised by Wildlife Institute of India and National Academy of Customs and Central Excise. In total 53 officers participated in the training programme.

Indo-Bhutan workshop on wildlife conservation, Madarihat, West Bengal, *April 4-6, 2007***.** The Global Tiger Forum in association with WWF-India organized the above workshop for developing bilateral cooperation for wildlife conservation between India and Bhutan under the laid agenda of Dhaka Declaration on tiger conservation. This workshop was attended by the delegation from India, Bhutan, Central Zoo Authority and Project Tiger, Government of India. Trans-boundary issues, information and technology cooperation, capacity building and training, joint strategies to combat poaching of tigers were main agenda of the workshop. On behalf of the WII, Dr. Sushant Chowdhury participated in the workshop and provided a presentation on "An overview on landscape level conservation practices and mechanism at local (PA Managers)/regional (State level)/country level". Synchronized monitoring of movement of tigers and elephants across India and Bhutan was also discussed.

Training workshop on 'World heritage management overtime – maintaining values and significance', Hiroshima, Japan, *April 15-20, 2007.* The United Nations Institute for Training and Research (UNITAR) organized this training workshop. The 2007 training workshop was designed to expand upon a values-based approach to heritage management, with the following specific objectives: (i) review the basics of the World Heritage regime, available information, updates and current trends; (ii) elucidate the underlying principles of values-based heritage management, with a particular focus on changes in values over time; (iii) examine leading policies and strategies, identifying best practices and lessons learned; (iv) utilize the nomination dossier format as the basis for exploring a range of issues relating to the identification and management of World Heritage sites; and (v) enhance long-term learning and exchange among the participants. The workshop was attended by 47 participants, resource persons and staff, representing 26 countries from Asia, Europe and North America. Dr. V.B. Mathur, was invited as a resource person in this training workshop. He also participated in the round-table meeting organized by UNITAR on "Ten Years of World Heritage in Hiroshima".

International conference on "Environmental Forensics: A new frontier", Bournemoth University, Poole, UK, *April 16-18, 2007.* Dr. S.P. Goyal participated in this conference, which was organized by School of Conservation Sciences, Bournemoth University. His talk was on initiative undertaken by the Wildlife Institute of India in establishing Wildlife Forensic Cell and the need for integrating modern tools in developing such facility for combating wildlife crimes. Dr. Goyal was also invited by Prof. S. Russell of the Centre for Arid Zone Studies Natural Resources, Bangor for a talk on "The application of forensic science in the battle against wildlife crime in Asia" which was attended by more than 30 participants from different departments.

National conference on "Environmental pollution on problems and solutions", New Delhi, *April 19-20, 2007.* The conference was organised by

International Development Centre Foundation (IDCF), Central Pollution Control Board, Centre for Occupational and Environmental Health, Department of Science and Technology (DST) and Ministry of Environment and Forests. More than seventy participants attended the conference. Dr. Pranab Pal from the Institute presented a paper on "Role of solid waste management in enhancing environmental values".

International congress on advances in zoo and wild animal health and management and symposium on impact of diseases on conservation of wild animals, Jammu, *April 26-27, 2007.* The objectives of the congress were: (i) to provide a synthesis on the advancement made in Zoo and wild animal health and management; and (ii) to provide a forum and exposure to professionals in wild animal diseases and wild animal conservation. The international congress was organized by Faculty of Veterinary Sciences and Animal Husbandry, Sher-e-Kashmir University of Agricultural Sciences and Technology, R.S. Pura, Jammu under the auspices of the Association of Indian Zoo and Wildlife Veterinarians. The international congress covered varied topics in applied animal health ranging from disease diagnosis, wildlife restraint to species recovery programs. WII's participation was marked by a poster presentation made by Dr K. Vasudevan and Dr. Parag Nigam which won a best poster award in the congress.

National level steering committee for Asia Pacific forestry sector outlook study workshop, New Delhi, *May 18, 2007.* Dr. B.K. Mishra participated in the workshop and contributed towards: (a) reviewing and suggesting changes on the draft structure of the country outlook paper; (b) outlining issues that the country outlook paper should take into account; and (c) indicating how the process of preparation of the country outlook paper may be improved to enhance its relevance and usefulness.

Meetings of expert technical committee on Asiatic lion conservation, Gandhinagar, *June 4, 2007* and *October 19, 2007.* Dr. Y.V. Jhala was nominated as member of 'Expert Technical Committee on Asiatic Lion Conservation' by Gujarat Government. He attended both meetings of the committee. Discussions were held on application of modern technological tools for lion conservation in Gir Protected Area.

Meeting of the State Board for Wildlife, Government of West Bengal, Kolkata, *June 7, 2007*. Dr. Sushant Chowdhury attended Vth Meeting of State Board for Wildlife, Government of West Bengal. The meeting was chaired by Shri Buddhadev Bhattacharjee, Hon'ble Chief Minister of West Bengal. Besides, confirmation of minutes of previous meeting and action taken on the recommendations there were five new agenda for discussions. Important among them were the agenda related to management of Alipore Zoological Garden and establishment of Bio-ecological Park at Bhagwanpur and reactivating the Bengal Natural History Museum for its valued role in conservation.

Vth Brazilian Congress on protected areas, Foz do Iguacu, *June 17-21, 2007.* The Congress was organized by the Boticario Foundation for Nature Protection and was attended by over two thousand delegates from various countries in Latin America. The five-day event included lectures and round-table discussion sessions. Dr. V.B. Mathur attended this event and presented a paper 'Protected Area Management in India: Issues and Challenges'.

XXXI session of UNESCO World Heritage Committee, Christchurch, *June 23- July 2, 2007.* Dr. V.B. Mathur, participated as member of the Indian delegation in the XXXI session of the UNESCO World Heritage Committee and provided inputs in matters relating to natural world heritage sites in India.

Consultation workshop on 'Himalayan Biosphere Reserves – Defining role under global change scenario of climate and human economies', Almora, *July 6-7, 2007.* The objective of the workshop was to define the role and strategies for the conservation of Himalayan Biosphere Reserves under the global change scenario of climate and human economies through consultative process. It was organised by G.B. Pant Institute of Himalayan Environment and Development, Almora. In this consultative workshop, different stakeholders such as biologists, managers, local communities, policy makers and conservationists participated in the different working groups to define the role and strategies for conservation of the Himalayan Biosphere Reserves. Dr. S. Sathyakumar attended the workshop.

7th World congress of the International Association of Landscape Ecology (IALE), Wageningen, Netherlands," *July 8-12, 2007.* The World Congress coincided with the completion of 25 years of IALE. The Congress aimed to discuss developments in the field of landscape ecology and its application in various fields and facilitate the academic exchange amongst the international scientific community. It was organized by the IALE, Wageningen. Dr. P.K. Mathur attended the Congress and presented a paper entitled "Landscape management approach - vital to conservation in India".

Training programme on indicators of environmental pollution and valuation techniques, ASCI, Hyderabad, *July 30–August 3, 2007.* The training programme was sponsored by Ministry of Environment & Forests, Govt. of India. A total of 20 IFS officers from different States of the country participated in it. Shri A.K. Nayak from the Institute participated in the training programme.

Meeting of the State Board of Wildlife, Himachal Pradesh, Shimla, *August 10, 2007.* It was the third meeting of the State Board for Wildlife, Himachal Pradesh as per the provisions/requirements of the Wildlife (P) Act, 1972. The meeting was convened by the Addl. PCCF (WL), and Chief Wildlife Warden, H.P. The Board reviewed the major activities of Wildlife Wing, Forests Department in the field of wildlife conservation in Himachal Pradesh and approved different proposals including a proposal on rationalization of PA boundaries as submitted by the CWLW and the Member Secretary. Dr. P.K. Mathur attended the meeting and provided inputs on various agenda items.

Meeting on management of tigers in the larger Corbett landscape, *August 18, 2007.* Dr. Y.V. Jhala made a presentation on 'Monitoring tigers, prey and habitat at this meeting of Corbett Tiger Reserve Staff and Chief Wildlife Warden, Uttar Pradesh.

National annual conference on "Environmental Education", Goa, *August 23-25 2007.* Dr. Pranab Pal participated in the conference which was organised by the Indian Environmental Society and sponsored by Ministry of Environment & Forests and Department of Science & Technology. More than fifty participants from different parts of the country attended the conference. He presented a paper on "Management of biological diversity in India".

Meeting of the State Board for Wildlife, Government of Chhattisgarh, Raipur, *September 11, 2007.* Dr. Sushant Chowdhury attended the 2nd meeting of the State Board for Wildlife, Government of Chhattisgarh. The meeting was chaired by the Vice-Chairman, Minister of Forests, Revenue and Rehabilitation, Shri Brij Mohan Aggarwal. Besides, confirmation of the minutes of the previous meeting a large number of agenda were discussed in the meeting. Important among them were establishment of separate wildlife wing in the State, establishment of State Biodiversity Board, extension of areas of Barnwapara Sanctuary, appointment of committee for preparation State Wildlife Action Plan and preparation of Tiger Conservation Plan.

Meeting of the committee on approval of Management Plans for Protected Areas, Gujarat, Gandhinagar, *September 26, 2007.* The meeting was convened to consider draft management plans of eight different protected areas in Gujarat. Dr. P.K. Mathur attended the meeting and provided comments on eight draft management plans of different Protected Areas in Gujarat (Gulf of Kutchch Marine National Park and Wildlife Sanctuary (WLS), Nalsarovar WLS, Kutchch Desert WLS, Barda WLS, Rampara WLS, Gaga GIB WLS, Porbandar WLS, and Hingolgadh WLS). The meeting was held under the chairmanship of the PCCF (Wildlife) and Chief Wildlife Warden, Gujarat.

National seminar on 'Water conservation: Need of the hour', Kurukshetra, Haryana, *September 28-29, 2007.* Dr. V.P. Uniyal attended the UGC sponsored national seminar, which was organized by Department of Zoology, Gandhi Memorial National College, Ambala at Kurukshetra University. He presented a paper on 'Parbati River hydroelectric project, Kullu, Himachal Pradesh, its impact on biodiversity – A case study.'

Workshop on "Biodiversity education and hands-on training on applications of polymerase chain reaction and DNA sequencing", Dehradun, *October 3-7, 2007.* This workshop was organized for college and university teachers, scientists and students under the auspices of State Biotechnology Programme, Govt. of Uttarakhand in collaboration with Forest Research Institute and Wildlife Institute of India. Dr. P.K. Mathur attended the workshop and delivered keynote address during the inaugural function of the workshop on "Biodiversity, bioresources, bioprospecting and biotechnology and their role for humanity'.

Local project advisory committee of DST, GoI funded project "Expert system for Indian woods – Their micro-structure identification and uses", Dehra Dun, *October 16, 2007.* The objective was to review the progress on ongoing DST, supported project and advice on matters related to project theme, governance and accomplishments. The meeting was organized by ICFRE, Dehra Dun. Dr. P.K. Mathur attended the meeting of the Committee as an external expert.

International workshop on preparation of IUCN SSC guidelines for the re-introduction and translocation of Asian and African Rhinoceroses for conservation purposes, Tsavo National Park, Kenya, *October 29-31, 2007.* The workshop was organized by the Zoological Society of London in association with the Kenya Wildlife Service. It was organised to bring together the Rhino expertise, to share experiences and to discuss the draft guidelines that were prepared during a working group at the 2006 African Rhino Specialist group meeting. These were jointly compiled by the IUCN Species

Survival Commission's (SSC) African Rhino Specialist Group (AfRSG), Asian Rhino Specialist Group (AsRSG) and Veterinary Specialist Group (VSG) with the Re-introduction Specialist Group (RSG) providing generic reintroduction guidelines. The document was further developed during the workshop. The workshop was attended by governmental and non-governmental professionals from South Africa, Kenya, Zimbabwe, Tanzania, Nepal, Malaysia, Indonesia and India. Dr. Parag Nigam attended the workshop as a resource person.

Second GEF national dialogue initiative workshop, Bhubaneswar, *October 30-November 1, 2007.* The objective of the workshop was to prioritize allocation of funds in sectors for conservation of biodiversity. It was organized by GEF, New Delhi. After a brainstorming exercise, consultations were held with the representatives of Gujarat, Orissa and West Bengal on marine biodiversity conservation. Shri A.K. Nayak attended the workshop.

3rd session of the International Conference on World Natural Heritage, Sichuan Province, China, *November 6-8, 2007.* The UNESCO World Heritage Centre, Paris, National Committee of UNESCO in China, People's Government of Sichuan Province and the Construction Ministry of China jointly organized the 3rd session of the International Conference on World Natural Heritage in Sichuan Province, China. The objectives of the conference were to exchange views and explore solutions to issues concerning the management and conservation of world natural heritage sites. Dr. V.B. Mathur participated in this conference and presented a paper on 'Natural Heritage Conservation: From Tentative List to Nomination Dossiers'.

Meeting on progress of All India tiger Status Estimation, Ministry of Environment & Forests, New Delhi, *November 12, 2007.* Dr. Y.V. Jhala made a technical presentation for the members of National Tiger Conservation Authority in this meeting on progress of All India Tiger Status Estimation.

Meeting of Chief Wildlife Wardens, Field Directors and other officers for management planning and other issues of Tiger Reserves and other Protected Areas, *November 29, 2007.* The objectives of the meeting were: (i) identification of critical wildlife habitats; (ii) protection of wildlife – deployment of Tiger Protection Force in Tiger Reserves; (iii) management effectiveness evaluation of protected areas - presentation of draft report by M/s. JPS Associates; (iv) uniform policy for filming in Protected Areas. The meeting was organised by the Wildlife Institute of India and sponsored by National Tiger Conservation Authority and Ministry of Environment & Forests, Government of India. This meeting was a follow-up of the 'Management Planning Workshop on Tiger Reserves'. The meeting reviewed the progress in identification of critical wildlife habitats for tiger reserves. It also discussed the proposed guidelines for the management plan writing of tiger reserves and the timeline for various tasks in this regard. Shri A.K. Bhardwaj participated in the meeting.

International Tropical Ecology Congress, 2007, Dehradun, *December 2-5, 2007.* On the occasion of the International Tropical Ecology Congress, a symposium on 'Biodiversity conservation in the tropics: Issues, concerns and strategies' was organized by the International Society for Tropical Ecology. Dr. B.K. Mishra participated in this symposium and presented an invited paper entitled "Social issues and concerns in biodiversity conservation - experiences from Indian protected areas."

Consultation workshop on "Island Ecology/Economy", Port Blair, *December 18, 2007.* The Tata Institute of Social Sciences (TISS), Mumbai organized this consultation workshop to discuss ways and means to plan and implement an inter-disciplinary approach for conservation and sustainable development of island ecosystem. Dr. V.B. Mathur, attended this workshop and presented a paper on "Developing Capacity for Conserving Island Ecosystems".

XX annual conference "Global warming boon or bane", Delhi, *December 27-29, 2007.* Dr. Pranab Pal participated in the conference held at Jamia Hamdard University, New Delhi. The conference was organized by the National Environmental Science Academy, New Delhi; Jamia Hamdard University, New Delhi; Centre for Occupational and Environmental Health, New Delhi; Indian Council of Medical Research (ICMR); and Initiative for Social Change and Action (ISCA) of Delhi. More than 150 participants attended the conference. Dr. Pal presented a paper on "Anthropogenic causes of biodiversity loss". Dr. Pranab Pal was awarded the "Environmentalist of the year - 2006" in the conference. The award comprised of a gold medal, memento and citation.

Annual conference of the International Association of the Impact Assessment (IAIA) on "Growth, conservation and responsibility – promoting good governance and corporate stewardship through impact assessment", Seoul, Korea, *June 3-9, 2007.* The conference theme for IAIA'07 provided EIA professionals with an opportunity to explore the compatibility of economic growth with conservation and sustainability and address the perspectives of global responsibility towards promoting good governance and corporate stewardship through best practices in impact assessment. Dr. Asha Rajvanshi and Dr. V.B. Mathur attended the 27th Annual Conference. Dr. Asha Rajvanshi presented the paper **"**Building Capacity for Biodiversity-Inclusive Impact Assessment in the Regional Context**"** and Dr. V.B. Mathur presented the paper "Integrating Environmental and Biodiversity Concerns in Development Planning through Enabling Policy and Regulatory Framework**"** in the technical session CS2.2 Biodiversity and Ecology: Global Responsibility for Integrating Biodiversity in Impact Assessment: Review of Experiences from around the World (Role of Business Groups and other Country-Specific Efforts). Dr. Asha chaired the session Best Practices for Mainstreaming Biodiversity Conservation in Infrastructure and Water Development Projects: Country and Sector Cases. Dr. V.B. Mathur chaired the session "Growth, Biodiversity Conservation and Sustainable Development: The Pan-Asian Perspectives."

Workshop on Environmental Impact Assessment of hydropower projects, New Delhi, *January 10, 2008.* The workshop aimed at bringing about the convergence of professionals of individual eminence, representatives from the expert agencies/consultants, non-government organizations, academic institutions, government agencies, PSUs and international funding agencies to review the process of impact assessment relevant to hydropower projects, identify gaps in current reporting and discuss the mechanism to improve the effectiveness of EIA. National Hydropower Cooperation (NHPC) invited Dr. Asha Rajvanshi to share her experience on treatment of biodiversity in impact assessment studies undertaken for hydro-power projects and discuss "Field techniques and tools for generating biological baseline for impact assessment: Practical difficulties and constraints". Dr. Rajvanshi also chaired the Technical Session 2 - Establishing baseline data for EIA.

International conference on "Biodiversity conservation and management" BiOCAM2008, Cochin University, *February 3-6, 2008.* Dr. Pranab Pal participated in this international conference. The conference was jointly organized by the Cochin University; Zoological Survey of India; S.S. University, Kalada; National Biodiversity Authority, Chennai; Ministry of Environment & Forests, New Delhi; CSIR, New Delhi; ICAR, New Delhi; Department of Biotechnology, GoI; Ministry of Earth Science, GoI; MHRD, GoI; and Centre for Environment and Development Society of Advancement of Biological Science. More than 380 participants attended the conference. Dr. Pal presented a paper on "Environmental degradation and threat to biodiversity loss".

Conference on "Trends in data warehousing, data mining and data modelling", Dehradun, *February 9-10, 2008*. This national conference with delegates from sister organizations of Ministry of Environment & Forests; National Informatics Centre (NIC), New Delhi; Indian Institute of Technology (IIT), Roorkee; Birla Institute of Technology and Science (BITS), Pilani; Jawaharlal Nehru University (JNU), Delhi and firms *viz.* Oracle, SAS and Microsoft participated. Shri Lekh Nath Sharma and Smt. Alka Aggarwal attended this conference.

One-day workshop on "Ecotourism in Karnataka: Challenges, policy and the future", *February 26, 2008.* The objectives of the workshop were: (i) to discuss the present scenario of ecotourism in the State; (ii) to debate upon the existing policies of ecotourism in India; and (iii) to get views of different stakeholders for the future ecotourism policy of Karnataka. The workshop was organised by Jungle Lodges and Resorts, Karnataka. Shri A.K. Bhardwaj participated in the workshop.

Second International Conference on Health and Biodiversity (COHAB 08), Galway, Ireland, *February 25–28, 2008*. The international conference aimed to explore how the ecosystem approach to health and development can help to address some of the key challenges facing the health and environmental professionals, scientists, decision makers and communities in the 21st Century. This event brought 170 delegates from over 70 countries together, to collaborate on new approaches for protecting human health and well-being through the conservation and sustainable use of the world's biological diversity. Dr. Asha Rajvanshi and Dr. V.B. Mathur attended the conference. Dr. Asha Rajvanshi made a presentation on "Tsunami, biodiversity and people: Strategic framework for disaster management and preparedness" in the thematic workshop on 'Disaster relief and emergency preparedness'. Dr. V.B Mathur made a presentation on "Best practice guidance for biodiversity-inclusive EA: a South-Asian initiative".

Second annual meeting of the Himalayan University Consortium (HUC), ICIMOD, Kathmandu, Nepal, *February 26-27, 2008.* Dr. P.K. Mathur represented the Institute in the meeting convened by the International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal. The HUC was formed in March, 2007 with the aim of promoting mountain specific curriculum development in higher education and collaborative training, research and outreach. The WII is one of the founder members of HUC. All founder members were invited in the meeting. The meeting was attended by 23 participants. The meeting specifically deliberated on the following two agenda items: (i) Climate change and adaptation - towards a collaborative programme of the Hindu-Kush Himalaya (HKH) Universities; and (ii) Human capacity development in Afghanistan's Universities and Training Institutions.

Professional Exchange

International Collaborations

UNESCO-UNF Project on 'Enhancing our heritage: Monitoring and managing for success in World Natural Heritage Sites'

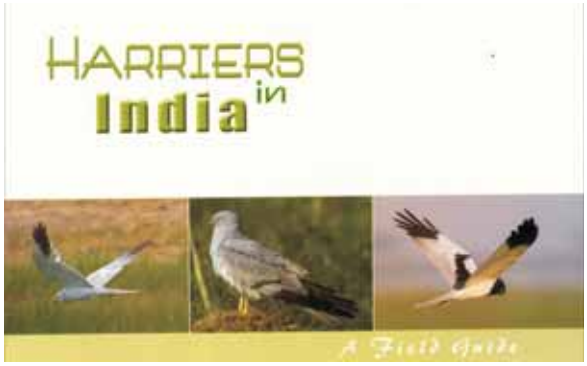
The UNESCO World Heritage Centre (WHC) in collaboration with the IUCN World Commission on Protected Areas (WCPA), the University of Queensland, Australia and with funding support from the United Nations Foundation (UNF) had initiated a project 'Enhancing Our Heritage: Monitoring and Managing for Success 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.

Nine 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 Chitwan National Park (CNP), Nepal. The Ministry of Environment and Forest, 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 the final reports of Management Effectiveness Evaluation of the 3 project sites in South Asia were prepared and submitted to the UNESCO World Heritage Centre. In order to facilitate the monitoring and reporting process, work was initiated on the design and development of e-Worksheets for the Enhancing Our Heritage Toolkit.

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 $ 1.83 million for the 4 year implementation phase of the WHBPI.

During the reporting period, the project "Building partnerships to support UNESCO's World Heritage Programme: India" was launched by Thiru S. Regupathy, Hon'ble Minister of State on July 25, 2007. During this event, the field guide "Harriers of India" published by the Institute was released. Three meetings of the Project Steering Committee under the Chairmanship of Additional Director General (Wildlife), MoEF were organized to discuss the operational modalities and budgetary re-allocation in view of the reduced funding now available for the project.

International Memorandum of Understanding (IMoU) with Colorado State University, USA

In recognition of the mutual educational and scholarly interests, Wildlife Institute of India signed an International Memorandum of Understanding (IMoU) with the Colorado State University (CSU), USA in March, 2008. The purpose of this IMoU *inter alia* is to recognize the value of cooperative, educational experiences that integrate theory and practice in the field of wildlife conservation and management. A team of four faculty members from CSU *viz*. Dr. Michael Manfredo, Dr. Tara Teel, Dr. Jessica Thompson and Dr. Ryan Finchum visited the Institute from March 15-23, 2008 to discuss various activities to be jointly undertaken under the IMoU. The CSU team also visited Rajaji and Corbett National Parks and held discussions with park managers regarding the range of activities that can be taken under the IMoU.

Collaboration with Department of Civil and Environmental Engineering (DICA) of the University of Trento, Italy

A Memorandum of Understanding between WII and Department of Civics and Environmental Engineering (DICA) – University of Trento, Italy was signed on July 20, 2005 to establish a basic framework for conducting cooperative activities between WII and DICA and promote professional exchange between the two institutions. Under the provisions of the joint MoU, between WII and DICA, a collaborative research project entitled 'Development of spatial decision support system for ecological impact assessment of urban developments in natural areas' was 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. The above project has been successfully completed and also led to the award of a doctoral degree to Dawa Dorje for his work "Environmental Impact Assessment of Tourism Development in Ladakh, Indian Himalaya". The focus of the research was to generate a spatial environmental database for Ladakh, using GIS and remote sensing techniques; provide an assessment of the environmental impact of tourism development in Ladakh; understand and quantify spatial patterns of urban sprawl around Leh, the capital city of Ladakh and to provide scientific support to local government on best-practice policies.

Capacity Building Programme through IAIA – CBBIA Project (Asia)

The 'Capacity Building for Biodiversity and Impact Assessment (CBBIA)' project which is managed by International Association for Impact Assessment (IAIA) and funded by the Netherlands Government was initiated in 2005. This three-year global project was aimed 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 and develop capacity among stakeholders in developing countries in several regions, including southern Africa, Central America and Asia. The outcome of this project was the development of guidance "Best practice guidance for biodiversity-inclusive impact assessment: A manual for practitioners and reviewers in South Asia" authored by Dr. Asha Rajvanshi and Dr. V.B Mathur of this Institute and Mr. Usman Iftikhar of IUCN, Asia. This guidance manual was released at the Annual general meeting of IAIA on June 6, 2007 at Seoul, Korea in the presence of current and past presidents of IAIA.

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. The SEC submitted its report to the Government of Rajasthan in August, 2005. The SEC has been re-constituted into 'Steering Committee on Forestry and Wildlife Management' with a broader mandate that *inter-alia* includes the follow-up of the recommendations for the 3 PAs in Rajasthan. As a member of this re-constituted committee Dr. V.B. Mathur provided inputs in the deliberations of the committee meetings.

Evaluation of northern coal field mining sites for development of habitat for wildlife, Singrauli, *September 2-6, 2007*. On the invitation of Northern Coal Field Limited (NCL), Dr. Sushant Chowdhury and Shri Pratap Singh from WII visited Singrauli project sites. The coal explored area of Moher Basin of Singrauli coal field is around 210 km^2, of which coal mining activities are done over an area of 90 km^2. Coal production through open cast mines is carried out in eight mine blocks. The WII team visited four mining project sites *i.e.* Bina, Jayant, Nigahi and Amlohri. In all the sites besides other environmental issues, overburden management and re-vegetation of mine-spoil sites were important for reclaiming the area as natural as possible. Between 1986 and 2007, massive plantation of 196 lakh plants were done with the help of DFO, Renukoot, Uttar Pradesh and Rajya Van Vikas Nigam Limited, Madhya Pradesh. In initial years, more exotic plant species were selected, but now NCL is trying to undertake plantation of native plant species only to add value to the recovered areas as natural as possible for promoting wildlife dispersal and occupancy. These sites were found important for undertaking short-term research projects on restorative ecology.

Meeting of the Task Force constituted for conservation of Wild Buffalo in Chhattisgarh, Udanti, Raipur, *July 5-6, 2007*. Forest Department, Chhattisgarh constituted a Task Force chaired by Shri M.K. Ranjit Sinh to look into the issues of protecting, augmenting and genetic preservation of wild buffalo in Chhattisgarh. Dr. Sushant Chowdhury from WII participated in this meeting. The wild buffalo in Chhattisgarh is now at critically low population levels surviving in two protected areas *i.e.* Udanti Sanctuary and Indrawati Tiger Reserve. No population estimate for Indrawati is available due to prevailing insurgency, while in Udanti, there are only seven individuals (one adult female, one calf and five adult males). The Task Force discussed the issues related to the collection and cryo-preservation of genetic samples, DNA mapping, *ex-situ*, breeding and artificial insemination as strategy for wild buffalo conservation. Other actions recommended by the Task Force were protection of remnant population and free range management of wild buffalo through elimination of habitat threat factors.

State level committee for identification of Critical Wildlife Habitat in Tripura, Agartala, *January 18, 2008*. Dr. Sushant Chowdhury attended the 3rd State level committee for identification of Critical Wildlife Habitat (CWH) in Tripura. DFO, Ambasa; DFO, Teliamura; DFO, Udaipur; DFO, Gomti and DFO, Bagafa presented availability of CWH area in their divisions for enhancing conservation of Hoolock Gibbon, Clouded leopard, Spectacle monkey and Wild elephants. DFO, Sadar and DFO, Manu informed no such availability of areas in their jurisdiction. This meeting was also attended by the Tribal Welfare Department.

Investigation and assessment of an Expert Committee on elephant mortalities on rail track in north Bengal, *February 8-9, 2008*. An Expert Committee constituted by the Ministry of Environment & Forests, Government of India visited North Bengal for investigating wild elephant mortalities on the rail track. The entire rail track of 168 km between Siliguri to Alipurduar passes through 74 km of forests including three Sanctuaries - Mahananda, Chapramari, Jaldapara and buffer areas of Buxa Tiger Reserve. Gauge conversion from Meter Gauge to Broad Gauge between the years 1999 to 2003, has enhanced train traffic, numbers and speed, making the track more vulnerable and accident prone to elephants and other animals. The two days track survey by the committee revealed six vulnerable segments for adopting necessary measures to reduce such incidences. Special recommendations were provided for three high risk sections for taking joint actions by the Forest Department and Rail authorities. Trail applications of innovative electronic devices has also been recommended in this high risk sections. The report of the committee has been submitted to the MoEF, GoI for necessary consideration and implementation. Dr. Sushant Chowdhary provided inputs in the deliberations of this expert committee.

Creation of Elephant Reserves in Chhattisgarh, *March 22-25, 2007*. Directorate of Project Elephant, Ministry of Environment & Forests, Government of India has constituted an expert team under the Chairmanship of Shri M.K. Appaya, Retd. PCCF (Wildlife), Karnataka and Member, Project Elephant Steering Committee to examine the proposed State plan for creation of Elephant

Reserves in Chhattisgarh. Dr. Sushant Chowdhury from WII was a member of this investigating team. The team undertook field investigations and interacted with DFOs of Jashpur, Korba and Dharmajaigarh; Superintendent, Badalkhol Wildlife Sanctuary; and also with CF, Bilaspur. The 2007 estimation revealed presence of 122 elephants in four districts of Chhattisgarh *i.e.* Jashpur, Sarguja, Raipur and Korba, colonized with dispersals from neighboring States of Jharkhand and Orissa. These elephants are more or less residential in the State since 2003 and rarely have rarely retreated to their original habitats. For achieving better elephant conservation objectives by minimizing human-elephant conflicts, creation of two elephant reserves has been proposed by the team. The report has been submitted to MoEF for due consideration.

Advisory Support

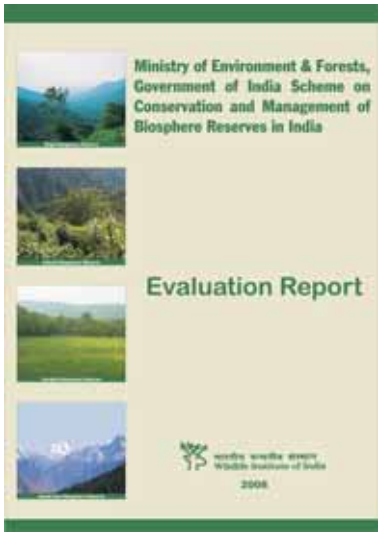
Evaluation of Biosphere Reserves

The Ministry of Environment & Forests (MoEF), Government of India assigned the task of evaluation of 4 Biosphere Reserves *viz*. Nanda Devi, Nokrek, Simlipal and Nilgiri to the Wildlife Institute of India. The objective of the evaluation was (i) to assess the overall outcome, impact as well as cost effectiveness of Biosphere Reserve Central Sector Scheme (CSS) (ii) to improve the quality of implementation (iii) to determine continued relevance of the scheme in the context of the National Environmental Policy.

The methodology of evaluation included desk review, visit to field sites, stakeholder consultations and interactions with site management staff. The draft final report of the assignment was submitted to MoEF in March, 2008.

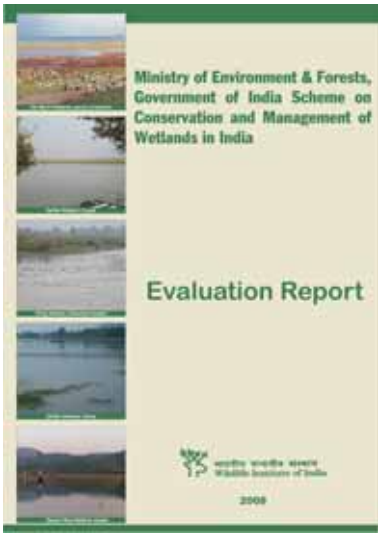
Team for Evaluation of Biosphere Reserves

Name & Designation	Position on the Team	Key Responsibility
Dr. V.B. Mathur, Dean	Team Leader	Oversight, Planning & Monitoring
Sh. N.K. Vasu, Professor	Team Coordinator	Coordination, Synthesis & Reporting
Sh. A.K. Bhardwaj, Professor	Site Specialist: Nilgiri (Kerala)	Site evaluation, Synthesis & Reporting
Sh. A. Udhayan, Sr. Reader	Site Specialist: Nilgiri (Tamil Nadu, Karnataka)	--do--
Sh. D. Mohan, Professor	Site Specialist: Nanda Devi	--do--
Dr. S. Sathyakumar, Sr. Reader	Site Specialist: Nanda Devi	--do--
Dr. B.K. Mishra, Professor	Site Specialist: Simlipal	--do--
Sh. Pratap Singh, Professor	Site Specialist: Nokrek	--do--
Dr. Asha Rajvanshi, Professor	Subject Matter Specialist (Environmental Impact Assessment)	Evaluation of aspects of sustainability & regulatory regimes; Synthesis & Reporting



Evaluation of Wetlands

The Ministry of Environment & Forests (MoEF), Government of India assigned the task of evaluation of 5 Wetlands *viz*. Tso Moriri, Harika, Pong Dam, Chilika and Deepor Beel to the Wildlife Institute of India. The objectives of the evaluation were: (i) to facilitate re-prioritization of the Wetland Central Sector Scheme in the XI Plan; (ii) to decide upon merger of smaller schemes; (iii) to assess overall



Team for Evaluation of Wetlands

Name & Designation	Position on the Team	Key Responsibility
Dr. V.B. Mathur, Dean	Team Leader	Oversight, Planning & Monitoring.
Dr. P.K. Mathur, Professor	Team Coordinator	Coordination, Synthesis & Reporting.
Dr. K. Sivakumar, Sr. Lecturer	Site Specialist: Pong	Site Evaluation, Synthesis & Reporting.
Dr. K. Sivakumar, Sr. Lecturer and Shri B.C. Choudhury, Professor	Site Specialist: Harike	--do--
Sh. B.C. Choudhury, Professor	Site Specialist: Deepor Beel	--do--
Sh. A. Nayak, Professor	Site Specialist: Chilika Lake	--do--
Dr. S.A. Hussain, Sr. Reader	Site Specialist: Tso Morari	--do--
Dr. Ruchi Badola, Professor	Subject Matter Specialist (Environmental Economics)	Evaluation of aspects of socio-economics, sustainability & regulatory regimes, inter-sectoral coordination; Synthesis & Reporting
Smt. B.C. Sinha, Sr. Reader	Subject Matter Specialist (Environmental Education)	Evaluation of aspects of awareness; interpretation, ecotourism; Synthesis & Reporting

impact as well cost-effectiveness; and (iv) to improve the quality of implementation.

The methodology of evaluation included desk review, visit to field sites, stakeholder consultation and interactions with site management staff. The draft final report of the consultancy assignment was submitted to MoEF in March, 2008.

Management Effectiveness Evaluation of Protected Area Network in India

In response to the directive from the Prime Minister's Office (PMO) to conduct an independent assessment of all National Parks and Wildlife Sanctuaries in India, the Ministry of Environment & Forests (MoEF), Government of India initiated the process of Management Effectiveness Evaluation (MEE) of Protected Area Network in India by adopting the IUCN-WCPA MEE Framework. A Central Coordination Committee under the chairmanship of Additional Director General (Wildlife) along with five Regional Expert Committees was constituted by the MoEF. A total of 30 National Parks and Wildlife Sanctuaries in the country were evaluated by five Regional Expert Committees and the results of the evaluation were presented in the meeting of Chief Wildlife Wardens held in New Delhi on November 29, 2007. The Wildlife Institute of India has been assigned the responsibility of technical back stopping of the MEE Process in India under which 30 PAs are to be independently evaluated every year.

Advisory services to MoEF

Dr. V.B. Mathur and Dr. B.K. Mishra were nominated as members of the Govt. of India Expert Appraisal Committees for mining projects to provide advisory services to MoEF on matters related to environmental decision making. In this capacity, they advised 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 the

MoEF held every month for environmental appraisal of projects and evaluation of project specific conservation plans prepared as part of Environment Management Plan (EMP).

MoEF – Conservation Action Plan for Red Junglefowl: The National Board for Wildlife under the Chairmanship of the Hon'ble Prime Minister of India had requested the MoEF to constitute an Expert Committee for developing a Conservation Action Plan for the Red Junglefowl. As a member of this Expert Committee, Dr. S. Sathyakumar attended the meetings and provided inputs in the development of the Action Plan for Red Junglefowl that was submitted to the MoEF.

Visitors

- Range Officer, Dy. Range Forest Officers and Forest Guards from Forest Department, Ladakh (J&K), April 12, 2007.
- Officials from New Delhi Municipal Council, April 13, 2007.
- State Forest Service Officer trainees from State Forest Service College, Dehradun, May 8, 2007.
- Students of X class from St. Mary's Secondary School, Clement Town, Dehradun, May 16, 2007.
- IFS officers of 1997 batch, undergoing three-week training course at IGNFA, Dehradun, June 5, 2007.
- Forest Guard trainees of 91st Batch from Natural Resource Management Centre (NRMC), Forest Department Haryana, Sohna (Gurgaon), June 6, 2007.
- Shri Prakash Sonker, Hon'ble Minister of State for Forests, Madhya Pradesh, June 4, 2007.
- Dr. S.P. Sharma, Advisor (E.1), MoEF, June 20, 2007.
- In-service SFS Officers, undergoing two-week General Refresher Course at SFS College, Dehradun, June 28, 2007.
- B. Lib. students along with their faculty members from Bareily College, Bareily, Uttar Pradesh, June 29, 2007.
- B.Sc. Forestry students and faculty members from Jhalawar, Rajasthan, July 6, 2007.
- Cadets accompanied with Masters from Rashtriya Bhartiya Sainya College, Dehradun Cantt, August 1, 2007.
- Trainees of 18th batch of Forest Guards from Forestry Training Centre, Sundernagar, August 10, 2007.
- IFS Officers of 1986 Batch, Indira Gandhi National Forest Academy, Dehradun, August 22, 2007.
- NCC Cadets from Base Camp Anarwala, Dehradun, in two separate batches, August 24&27, 2007.
- IFS Officers of 1997 undergoing AFM Course at Indira Gandhi National Forest Academy, Dehradun, September 12, 2007.
- Range Forest Officer trainees from State Forest Service College, Coimbatore, September 14, 2007.
- A group from SSB Academy, Srinagar, Garhwal, September 18, 2007.
- Students from Lewis & Clark College, USA accompanied by their teachers and group leaders from Navdanya, Dehra Dun, September 25, 2007.
- Students of Class IX from Welham Boys School, Dehra Dun, October 3, 2007.
- B.Sc. (Forestry) students from Tribhuvan University, Institute of Forestry, Pokhra, Nepal, October 4, 2007.

- Dr. Bruce G. Marcot and Dr. John F. Lehmkuhl, Research Wildlife Biologists, USDA Forest Service, USA, October 21-28, 2007.
- In-service SFSs/ ACFs from SFS College, Dehra Dun, October 23, 2007.
- Students of VII Std. from Rajghat School, Banaras, October 24, 2007.
- B.Sc. (III Year) students from Margherita College, Margherita, Dist. Tinsukia, Assam, October 29, 2007.
- In-service FRO trainees of 2006-07 from SFS College, Dehra Dun, October 29, 2007.
- Students of X Std from St. Paul's High School, Dehra Dun, November 1, 2007.
- B.Sc. (III Year) students from Mangal Dei College, Danang (Assam), Nov. 2, 2007.
- Students of 3rd year B.Sc. (Botany) from St. Xavier's College, Mapusa, Bardez, Goa, November 8, 2007.
- In-service SFS Officers from SFS College, Dehra Dun, November 13, 2007.
- Students from G.B. Public School, Mohbewala, Dehra Dun, November 14, 2007.
- Wildlife Guards of Himachal Pradesh Wildlife Wing, November 16, 2007.
- Students of B.Sc. Final Year (Forestry) from University of Agricultural Sciences, Bangalore, College of Forestry, Ponnampet, Kodagu, Karnataka, November 20, 2007.
- Students from Raja Ram Mohan Roy Academy, Dehra Dun, November 22, 2007.
- Students from Carman School, Dehra Dun, November 26, 2007.
- Post graduate (Environment Science & Biotechnology) and Under graduate students from International College for Girls, Jaipur, December 18, 2007.
- Students of XI-XII Classes from Meera Bal Mandir Sr. Sec. School, Merta, Nagaur, Rajasthan, December 31, 2007.
- Students of Final year B.V.Sc. & A.H. from Rajiv Gandhi College of Veterinary & Animal Sciences, Kurumbapet, Puducherry, January 9, 2008.
- B.Sc. (Forestry) students from Birsa Agricultural University, Ranchi, January 18, 2008.
- B.Sc. (Forestry) students from Department of Forestry, Bareilly College, Bareilly, Uttar Pradesh, January 25, 2008.
- Students from Mukundlal Public School, Yamuna Nagar, January 28, 2008.
- Participants of training course on Plant Taxonomy from Forest Research Institute University, Dehradun, January 30, 2008.
- Cadets from Rashtriya Indian Military College, Dehra Dun, January 31, 2008.
- Two Sri Lankan and one Nepali Army Officers accompanied by one Indian Army Officer from Indian Military Academy, Dehradun, February 1, 2008.
- Trainees of Foresters' Training Course from Forest Dept., J&K, Soil Conservation Training School, Miransahib, Jammu (J&K), February 15, 2008.
- Final Year B.Sc. (Forestry) students from University of Agricultural Sciences, Dharwad and College of Forestry, Sirsi, Karnataka, February 18, 2008.

- Forest Guard trainees (92nd batch) from Natural Resource Management Centre (NRMC), Forest Department Haryana, Sohna (Gurgaon), February 22, 2008.
- 3rd Year B.V.Sc.&A.H. students from University of Agricultural Sciences & Animal Husbandry, Srinagar, J&K, February 22, 2008.
- B.Sc. (Forestry) students from Allahabad Agricultural Institute–Deemed University, Allahabad, Uttar Pradesh, February 27, 2008.
- Students from DAV School, Kurukshetra (DNA Clubs Program Members of Ashoka Trust for Research in Ecology and Environment, New Delhi), March 13, 2008.
- Students of X to XII classes from Tibetan Homes Foundation, Mussoorie, March 24, 2008.
- M.Sc. and M.Phil students from School of Environmental Sciences, Jawaharlal Nehru University, New Delhi, March 25, 2008.

Professional Support

EIA

Computer & GIS

National Wildlife Database

Wildlife Forensic

Audio Visual & Wildlife Extension

Library and Documentation Centre

ENVIS

Wildlife Policy Research

Captive Breeding & Zoo Management

Research Laboratory

Herbarium

Wildlife Health Services

Conservation Genetics Laboratory

Campus Development

Environmental Impact Assessment (EIA)

The Environmental Impact Assessment Cell continued to provide professional support in capacity building initiatives at WII, sister organizations, other institutions, professional bodies, and Government and Corporate organizations. Following are the specific tasks accomplished by EIA Cell in the reporting period.

A review of the environmental clearance conditions of Keran limestone mining project, Sundernagar, Himachal Pradesh

In response to the directives of Ministry of Environment & Forests, Govt. of India, the Wildlife Institute of India (WII) and the Himachal Pradesh Forest Department (HPFD) jointly undertook the task of Ecological Assessment of Cement plant and Captive Limestone Mine of M/s Harish Cement in 2005. The task report was submitted to MoEF for grant of environmental clearance with the specific condition of restricting mining activities to the defined zone - 800m below the boundary of the Tarambri Closed Area. The project authorities re-assessed the mineable reserve in the light of the above condition stipulated by WII to retain an 800 m wide 'no mining zone' below Tarambri Closed Area and expressed that nearly 80% of the reserves would become unavailable for mining. In view of the implications of the above stated clearance condition for the viability of the project, M/s Harish Cement requested MoEF to review the recommendations and also sought the cooperation of WII to re-assess the impacts of mining on wildlife values and propose additional and appropriate measures for the project authorities to comply with.

Accordingly, WII responded to the request made by M/s Harish Cement. The WII team (comprising Dr. Asha Rajvanshi, Dr. V.P Uniyal and Shri Pragateesh) along with Shri Vinay Tandon, Additional PCCF (Wildlife), Himachal Pradesh Forest Department undertook a joint site visit in January 2008 with the following objectives: (i) to revisit the salient features of the Keran limestone project and the conservation objectives of the areas outside the mine lease boundary; (ii) evaluate the conservation potential of the Tarambri DPF Closed Area and the likely implications of allowing mining to extend up to 200m below the Closed Area as opposed to earlier decision of restricting it to 800m below the boundary of the Closed Area; and (iii) review additional conservation opportunities that may emerge from developing offsets to mitigate the impacts of relaxing the condition to mine up to 200m belt below the Tarambri DPF. The report has been submitted to MoEF for decision-making.

Review of the mitigation measures proposed for the widening of NH-14 through Balaram-Ambaji Wildlife Sanctuary, Gujarat State

As part of the East-West Road Corridor Project, the National Highway Authority of India (NHAI) proposes to upgrade the existing two lane road to four lanes on the National Highway-14 in the Swaroopgung-Palanpur section. A portion of this road is aligned through the Balaram-Ambaji Wildlife Sanctuary in Gujarat State. The NHAI and Gujarat Forest Department recommended a number of

safeguard measures including the construction of culverts/ underpasses for the movement of animals across the area and applied for the diversion of the Forest under FCA (1980).

The proposal for diversion of the 4.92 ha area of Balaram-Ambaji Wildlife Sanctuary for four laning of the Swaroopgunj-Palanpur section of the East-West Corridor under NHDP was placed for the consideration of the Standing Committee of National Board for Wildlife (NBWL) in its 9th meeting held on 10th September 2007 prior to the grant of environmental clearance by MoEF.

In response to the directives of NBWL, WII undertook the task of evaluating the suitability of mitigation measures proposed by NHAI for the implementation of the road widening project in Swaroopgunj-Palanpur section traversing the Balaram-Ambaji Wildlife Sanctuary. The WII team comprising Dr. V.B. Mathur, Dr. Asha Rajvanshi, Dr. Y.V. Jhala, Chittaranjan.V. Dave and I.P. Bopanna developed the following scope of work for field and desk based studies to review the mitigation plan prepared by NHAI: (i) Evaluate the present use of habitat by wild animals along the section of the road passing through Balaram-Ambaji Wildlife Sanctuary; (ii) Evaluate the design suitability of 'crossing over structures' proposed for mitigating the barrier impacts of roadway on wildlife and assess the appropriateness of their location within the 'crossing zones' for animal movements across the road; (iii) Suggest modifications in design of passages, if required and propose changes in the locations of proposed structures for maximizing the benefits of their use for 'crossing over' by wild animals; and (iv) Review other measures proposed for protection of wildlife and for enhancement of safety features in the upgraded roadway.

Based on the field based studies, the report was submitted to PCCF (Wildlife) and Chief Wildlife Warden, Govt. of Gujarat.

Consultancy work

Evaluation of the ecological and socio-economic consequences of setting up of proposed Mathwad Wildlife Sanctuary and Kathiwad Wildlife Sanctuary, Madhya Pradesh

Funding Source: Narmada Valley Development Authority (NVDA), Bhopal

Objectives: The Narmada Valley Development Authority requested, WII to take up the ecological assessment of the sites of two proposed wildlife sanctuaries *viz.* Mathwad and Katthiwada in Jhabua District of Madhya Pradesh for assessing their suitability as proposed protected areas and for assessing the efficacy of the mitigation measures proposed for addressing the ecological impacts of the Sardar Sarovar Project.


Asha Rajvanshi

Following were the broad scope of work under the consultancy awarded by NVDA: (i) evolve criteria for reviewing the location, size, site characteristics and conservation values for determining the suitability of the area proposed for designation as a protected area; (ii) assess consequent impacts of setting up of a protected area on livelihood, marginalization and access to common properties of local dependent communities; (iii) assess the impacts of anthropogenic pressures and other existing threats that may counter the goals and objectives of setting up of a PA; (iv) assess impacts of surrounding landscape features, demographic profile, and existing and proposed infrastructure development for evaluating ecological integrity of the area identified to be designated as a

PA; (v) review the effectiveness of the proposed PAs in mitigation of perceived impacts of Sardar Sarovar project; (vi) assess the viability of such an area as a conservation unit for long term conservation benefits; and (vii) suggest appropriate management interventions for enhancing effectiveness of PA for compensating project impacts, improve long term conservation benefits.

This task was jointly supervised by Dr. Asha Rajvanshi and Dr. V.B. Mathur and the report was submitted to Narmada Valley Development Authority (NVDA) which has been accepted for implementation of the management interventions for enhancing the effectiveness of the PAs being set up to compensate the impacts of the hydropower projects developed on Narmada river.

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. The responsibilities in this capacity involve extensive review of EIA documentation, attendance at the Expert Committee Meetings at MoEF for environmental appraisal of projects, site appraisals of some projects and review of project specific Conservation Plans prepared as part of Environmental Management Plans (EMP). Dr. Asha Rajvanshi continued to provide the advisory support as member of the Expert Committee (Thermal and Coal projects).

Committee of Environment of Indian Road Congress

Dr. Asha Rajvanshi was invited to serve as a Member of the Environment Committee (G-3) of the Indian Roads Congress, which is a premier technical body for ensuring environmental conservation and sustainable development of highways projects in India. In this capacity, Dr. Asha continued to provide professional support in accomplishing the committee's mandate of developing guidelines for biodiversity sensitive planning of roads and highways.

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). During the reporting period, Dr. Rajvanshi continued to provide professional support to QCI in the development of criteria for assessment of the EIA reports.

Professional Support to IAIA

IAIA (International Association for Impact Assessment is an interdisciplinary, non-profit professional society established in 1980. This professional body with over 2500 members representing EIA professional, practitioners, government officials, project planners, administrators, teachers and students from across the globe is the leading global authority for advancing innovations and communication of best practices in all forms of impact assessment. Dr. Asha Rajvanshi and Dr. V.B. Mathur have been members of this association since 1998. Recently Dr. Asha Rajvanshi was invited to take over as Chair of its Biodiversity section. As current Chair of this section of IAIA, Dr. Asha Rajvanshi coordinates activities of the biodiversity section. This includes organising section meetings, facilitating networking among section members, improving section's visibility at

the IAIA annual meetings. As Section Chair, she also contributes to the development of the technical programme for the annual meetings of IAIA, collaborates with other sections of IAIA for joint initiatives and report the status of section's, activities and programmes to IAIA Headquarters.

Computer and GIS

The computer facility of the Institute has a very wide array of computer hardware and software. This facility has been considerably strengthened with inputs largely from the Institute's own resources and some from collaborative projects. Computers are now used in every sphere of the Institute activities. The Institute has a heterogeneous computer hardware setup connected to Local Area Network (LAN). There are six Intel Pentium III/Xeon/Itanium servers for Internet, Intranet, database management and library automation services; four Sun Solaris workstations; and 250 plus nodes. The LAN is based on structured cabling with fibre optics as the backbone connecting all the office buildings. Wi-Fi connectivity has been provided in Guest House, Old Hostel and New Hostel and office premises *viz.* Auditorium, Library, Board Room, Porta Cabin, different classrooms and office of the Director and Dean, FWS.

Intranet services: The Institute has established intranet services (http://intranet) to facilitate the users within the campus to disseminate information online *viz.* Institute's Rules and Procedures; Work Calendar; Computer AMC Call Management System; Map Management System; Tour programmes; Circulars; Search trainees database; Meteorological data; Shabdavali–online Hindi glossary; Newspaper Clip Management Services; e-directory of Institute's employees contact addresses, phone and email; access to online journals subscribed by Institute's library; Agenda/Minutes of WII Committees.

Upgradation of internet leased line connectivity: The Institute upgraded its internet leased line connectivity from 512Kbps to 2Mbps (2048 Kbps) on leased line physical loop system through Videsh Sanchar Nigam Limited (VSNL). This was done to cope with the increase in number of simultaneous users of the Institute's internet facility and the consequent increase in the volume of data traffic.

The Institute has its own internet server hosting the Institute's 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 mail server.

Implementation of Storage Area Network (SAN): The collection of spatial and aspatial data has been growing rapidly and the demand of information dissemination from the Computer & GIS Cell is obvious within and outside the Institute. In order to maintain these huge datasets, a need was felt for a Central Data Storage system. The Cell is having GIS–remote sensing database dynamic data size of more than 1.0 TB (TeraByte) and frequently used archive data size is also of similar capacity. Hence, the Institute decided to install Storage Area Network (SAN) system based on fibre channel with the disk capacity of 2 TB expandable to 50 TB to meet future requirements. SAN is a dedicated, reliable, scalable, high performance storage network. Block-level data is transported over the SAN between server and storage devices.


S. Wilson

Extension of LAN to residential complex of the Institute: The local area network of the Institute has been extended to the residential complex of the Institute using the existing EPABX telephone line.

Training: The Computer & GIS Cell conducted computer-training courses for the students, researchers and officer-trainees of the PG Diploma 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 was also given on ArcGIS, ERDAS Imagine and IDRISI 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. Work is in progress on the development of spatial database on the boundaries of all the national parks and wildlife sanctuaries in the country. Similarly, digitization of the division, range and beat boundaries of the 17 tiger range States in the country is also in progress.

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 2007-08, the main thrust of the activities was on the updation of Protected Area and Species database, based on the collection of information from various possible sources including validation of existing information through correspondence to offices of various state forest departments. Presently, there are 613 Protected Areas including 97 National Parks, 508 Wildlife Sanctuaries, 6 Conservation Reserves and 2 Community Reserves in the country, covering 156,545.20 km^2 which is 4.76% of the total geographical area of the country. Species database was corrected and updated by adding information on the distribution of mammalian species in various protected areas. Bibliographic Database was updated by addition of new information published on Indian wildlife in the various issues of journals & periodicals received during the reporting period. Trainee database has been updated further. Website of the Database Cell has been modified and updated further by incorporating the current information. The Cell assisted to GIS Cell in further development and updation of protected area maps by providing information on various areas including newly created PAs.

The Institute made significant progress in getting the maps and gazette notifications of protected areas of India. Out of 613 PAs in the country, the Institute got maps for 518 PAs and 583 gazette notifications for the PAs.


Vinod Verma

Wildlife Forensic

Illegal trade in animal and their parts is one of the primary causes for over exploitation of threatened and endangered species. Major problem lies in identification of seized parts and products of poached animals.

During the reporting period, 173 wildlife offence cases were referred to WII. Of these, 28.32% cases pertained to skin and hair, 9.82% contained bones/claw and canines, 35.83% contained meat, 7.51% contained ivory/antler, 8.09% contained canines/claws, 4.04% contained other products like yartsha gombu, corals, snake venom etc. while finished products amounted to 6.35% that contained shahtoosh shawls, wrist watch and straps etc. Data revealed that some of the parts that cannot be identified based on morphometry can only be identified based on DNA profile. Therefore,

Table 1: DNA sequences submitted to NCBI, USA
Following sequences have been accepted at NCBI, USA

No.	Species	Common Name	Gene	Assession N0.
1.	*Cervus duvaucelii*	Barasingha	cytochrome b	EU921907
2.	*Axis axis*	Chital	cytochrome b	EU870593
3.	*Axis porcinus*	Hog deer	control region	EU870592
4.	*Cervus eldi eldi*	Thamin	control region	EU870591
5.	*Cervus eldi eldi*	Thamin	cytochrome b	EU870590
6.	*Muntiacus muntjak*	Barking deer	cytochrome b	EU285566
7.	*Panthera tigris tigris*	Tiger	NADH5	EU395633
8.	*Panthera tigris tigris*	Tiger	NADH5	EU395632
9.	*Uncia uncial*	Snow leopard	cytochrome b	EU362126
10.	*Felis chaus*	Jungle cat	cytochrome b	Felis chaus
11.	*Panthera pardus*	Leopard	cytochrome b	EU362124
12.	*Meles meles*	Eurasian badger	16S ribosomal RNA	EU344980
13.	*Gazella bennettii*	Chinkara	cytochrome b	EU223370
14.	*Cervus unicolor*	Sambar	cytochrome b	EU223369
15.	*Axis axis*	Chital	cytochrome b	EF051260
16.	*Francolinus francolinus*	Black Partridge,	cytochrome b	DQ864981
17.	*Gazella bennettii*	Chinkara	16S ribosomal RNA	EF219406
18.	*Cervus duvaucelii*	Barasingha	12S ribosomal RNA	EU084669
19.	*Cervus duvaucelii*	Barasingha	16S ribosomal RNA	EU084668
20.	*Canis aureus*	Golden jackal	12S ribosomal RNA	EU084670
21.	*Bos gaurus*	Gaur	16S ribosomal RNA	EF219404
22.	*Tetracerus quadricornis*	Four-horned antelopes	16S ribosomal RNA	EF219405
23.	*Bos gaurus*	Gaur	12S ribosomal RNA	EF219403
24.	*Moschus fuscus*	Musk deer	12S ribosomal RNA	EF219402
25.	*Panthera pardus*	Leopard	cytochrome b	EU223366
26.	*Gazella bennettii*	Chinkara	12S ribosomal RNA	EF133853
27.	*Bubalus bubalis*	Buffalo	cytochrome b	EU296625
28.	*Gazella bennettii*	Chinkara	cytochrome b	EF079832
29.	*Antilope cervicapra*	Black Buck	cytochrome b	EF079831
30.	*Gazella bennettii*	Chinkara	16S ribosomal RNA	DQ989297
31.	*Antilope cervicapra*	Black Buck	16S ribosomal RNA	DQ989295
32.	*Capricornis sumatraensis*	Serow	16S ribosomal RNA	DQ989294
33.	*Gazella bennettii*	Chinkara	cytochrome b	DQ919166
34.	*Panthera tigris*	Tiger	cytochrome b	EU362123
35.	*Gazella bennettii*	Chinkara	cytochrome b	DQ919164
36.	*Panthera tigris tigris*	Tiger	NADH5	EU395630
37.	*Capricornis sumatraensis*	Serow	16S ribosomal RNA	DQ888573
38.	*Tragulus meminna*	Mouse Deer	cytochrome b	DQ676954
39.	*Panthera pardus*	Leopard	16S ribosomal RNA	EU223367
40.	*Panthera tigris*	Tiger	12S ribosomal RNA	DQ417658
41.	*Panthera tigris tigris*	Tiger	NADH5	EU395631
42.	*Boselaphus tragocamelus*	Nilgai	control region	EU296628
43.	*Bubalus bubalis*	Buffalo	control region	EU296626

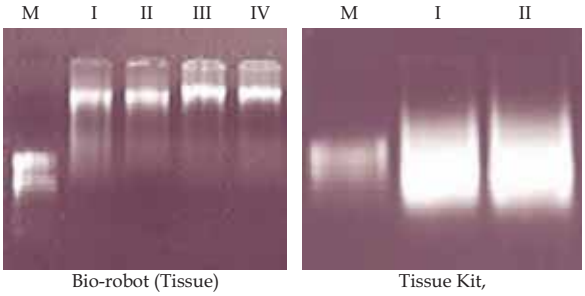


Figure 1. Electrophoretic analysis of DNA extraction from Bio-robot EZ1® and Qiagen Tissue Kit (QIAGEN, Germany) on 0.8% agarose gel. . I II, III and IV are the final elutes of same sample. M, MW marker 100bp ladder.

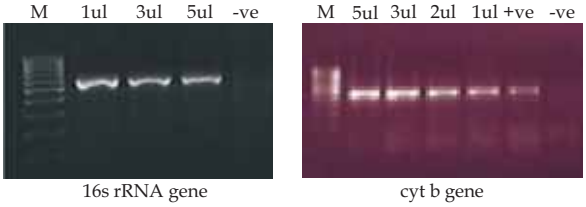


Figure 2. Electrophoretic analysis of PCR products of 550bp fragment of 16s rRNA and 450bp of cytochrome b gene of mitochondrial DNA from the case sample with different template concentrations on 2% agarose gel.

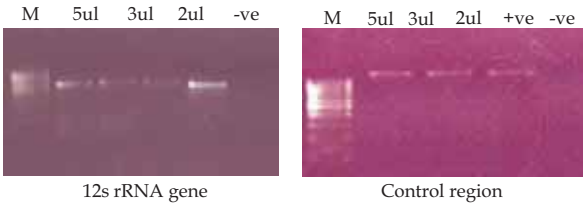


Figure 3. Electrophoretic analysis of PCR products of 1.2kb fragment of 12s rRNA and 600bp control region of mitochondrial DNA from the case sample with different template concentrations on 2% agarose gel.

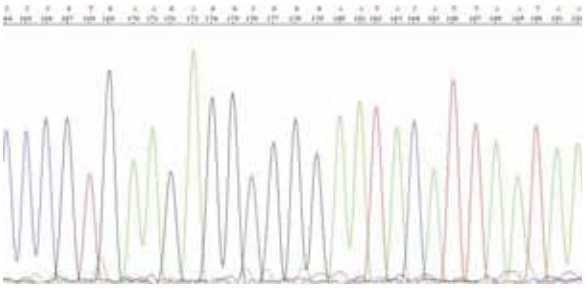


Figure 4. Sequence was obtained from ABI Prism 3130. PE-Biosystems

there is need to develop DNA profile of different species for dealing wildlife offences and better implementation of Act.

Seized biological products were of fresh meat, cooked meat, burnt meat, bone powder, skin, stain blood, soil with blood and bone. Five different types of extraction protocols were tried *viz.* Tissue Kit (QIAGEN, Germany), Phenol/chloroform extraction, Gene Clean® Q Biogene, USA, Bio-robot EZ1® Qiagen. Generally Tissue Kit (QIAGEN, Germany) and Bio-robot EZ1® Qiagen is good for all kind of sample. Around 150bp to 4kb of DNA were extracted using different methods. The protocol for bone, horn, ivory and teeth were standardized and amplified around 300 to 550bp.

While developing DNA based protocols for identifying species from various parts and products, the PCR conditions for different species for the different primers were optimized at different annealing temperature, dNTPs and DNA concentration. Around 12 primers were used for the amplification of different region of mitochondrial gene. Obtained different region of mtDNA were sequenced.

(ABI Prism 3130. PE-Biosystems) and sequence was blasted with GenBank database (National Center for Biotechnological Information, USA: NCBI) using BLAST program. The obtained sequences were submitted to NCBI database (Table 1).

During the reporting period, different protocols were standardized according to sample and sized parts. Twelve primers were used for the species identification according to DNA quality and quantity. A total of 65 cases and 49 references sample based on higher similarity in sequences and NJ tree, case samples were concluded.

Wildlife Extension & Audio Visual

The Audio Visual Unit of the Institute caters to the need of various requirements of academic activities. The unit maintains 16mm films, video films, synchronized programme, CD/DVD, Conference system, Projection system, various audio-visual equipments, still cameras and video cameras with accessories and photo library.

During the reporting period, the unit screened 46 shows of nine-projector synchronized programme "We are Nature, Nature is our world". Photographic documentation of the various activities of the Institute was done. Computerized database is being prepared for the quick retrieval of photographs and video films. The Cell is now developing capacity in producing short films.

As part of the information dissemination programme, four issues of Institute's Newsletter were published. World Environment Day was celebrated in the Institute on June 5, 2007. The theme of celebration was 'Climate Change' as declared by United Nation Education Programme. Puppet shows, Drawing & Painting Competition, Paper-craft work and Wildlife Quiz were organized for school children, villagers and jawans of Eco Task Force at Than and Bhuwan Villages in collaboration with 127 Infantry Div. (Ecological). This activity is listed in the "Inspiring examples" by UNEP.


Vinod Verma

Wildlife Week was celebrated in the first week of October, 2007. Different activities like film shows, puppet shows, popular talks, drawing and painting competition were organized for students of St. Mary's Secondary School and Dayanand Girls Inter College, Dehradun. The programmes concluded with a written wildlife quiz contest followed by a puppet show for the staff members of the Institute.

In order to enhance conservation awareness amongst the school children, the WII in collaboration with the Friends of the Doon (FoD) conducted a 'Wildlife and Environment Quiz' programme. A total of 12 schools in Dehradun participated in the programme, which was conducted in two rounds. The final round of the quiz was held during the Wildlife Week on October 5, 2007 in which teams from Ann Mary, RIMC, Touch Wood and Hopetown Girls' School participated. RIMC, Ann Mary and Touch Wood School bagged the first, second and third prize respectively. Shri Jairaj, Chief Conservator of Forests, Uttarakhand gave the WII-FoD Rolling Trophy to RIMC and distributed prizes to the winning teams.

Library & Documentation Centre

The Library and Documentation Centre (L&DC) of the Institute plays a vital role in dissemination of information to the researchers and scientists. L&DC was established in line with WII's mission as multidisciplinary information and learning resource centre on biodiversity conservation and management.

The L&DC holds over 25,958 books, 20,600 newspaper clippings, 7,350 maps/toposheets and more than 6,225 bound volumes of old and rare

I- Services provided during 2007-08

No.	Services	Numbers
1.	Photocopy exposure	72,865 nos.
2.	Documents issued/consulted	49,500
3.	Value added service	190
4.	Ready reference service	4,000
5.	Inter Library Loan	25 documents
6.	Document delivery	53 Clients(email-photocopy)
7.	Document procurement request (Articles requested from NISCAIRE [Formerly INSDOC] & other libraries)	----
8.	Articles added to WILD *(Indian Wildlife Abstract Service)*	110 Articles
9.	Map/toposheets issue/consulted	2,600


S. Wilson

II- Revenue generation from services during 2007-2008

No.	Services	Amount (Rs.)
1.	Bibliographical/Document Delivery Services	1,950.00
2.	Photocopying Service	3,910.00
3.	WII Publications	125,104.00

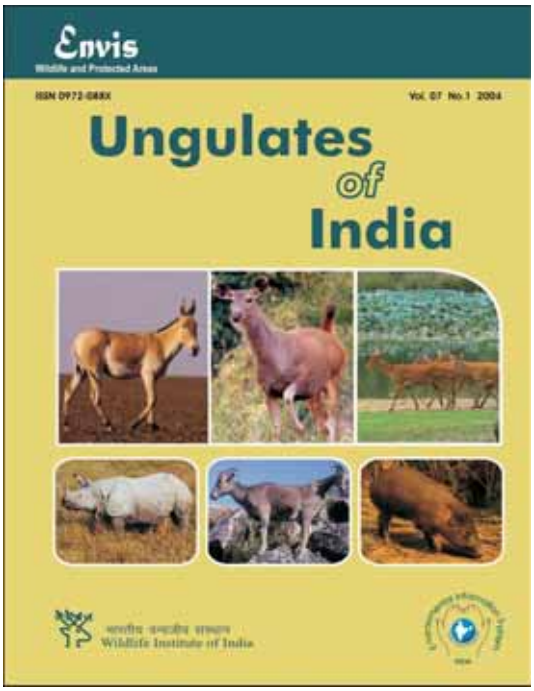
III - Volume added to library collection during 2007-2008

No.	Types of document	Numbers
1.	Books & Monographs	774
2.	Journals (bound volumes)	416
3.	Newspaper clippings	1,400
4.	Reprints	324
5.	Online journals	350

journals. The library also maintains good collection of scientific papers. It subscribes to more than 310 periodicals and approx 350 online journals. The L&DC is fully computerized, using LIBSYS Library Management Software, UNESCO'S WINISIS Software, CD Server, Barcode and related technologies. During the reporting period, an upgraded version Libsys 4 (release 5.0) has been installed. The upgraded version has the facility of WEB OPAC.

For optimum resources use by researchers, students, officer trainees and other users, 12 computer terminals are available in the library premises. Being connected to the library facility, the users have privilege 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. The L&DC provides a variety of Library & Information Services to its users.

During 2007-08, approximately 49,500 documents were issued and consulted. Value Added Service was provided to 190 clients while Ready Reference Service was provided to approx. 4,000 clients.



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 a thematic bulletin on 'Ungulates of India'. The 'Ungulates of India' is the second issue in the series of ENVIS Bulletin on ungulates in this region, the earlier one being on 'Mountain Ungulates'. These two bulletins together provide comprehensive information on all wild ungulate fauna found in India. Information on the status and distribution; natural history, ecology and conservation issues for 19 species is in the bulletin.

Wildlife Policy Research Cell

The activities of the Cell during the year are listed below: (i) collection and compilation of acts, policies, regulations and guidelines pertaining to wildlife and related matters of India and other countries; (ii) collection of gazette notifications pertaining to Wildlife (Protection) Act; (iii) collection of

the Supreme Court decisions related to forests and allied matters; and (iv) designing searchable database on various wildlife related matters and hosting the same on intranet with the help of the Computer Cell of the Institute. Two research associates working in the Wildlife Policy Research Cell (WPRC) left the Cell in July 2007 and one as part time consultant was engaged in December 2007.

Captive Breeding & Zoo Management

Development and maintenance of studbooks for selected endangered faunal types in Indian zoos
Funding source: Central Zoo Authority, New Delhi
Investigators: Shri D. Chakravarty and Shri Anup Nayak
Research associate: Dr. Anupam Srivastav
Date of initiation: October 2006
Date of completion: October 2011

Objectives: (i) Update studbooks of Asiatic lion, Bengal tiger, One-horned rhinoceros and Lion-tailed macaque; and (ii) Initiate new studbooks for Tibetan wolf, Gaur, Nilgiri langur, Hoolock gibbon, Red/Lesser panda, Snow leopard, Clouded leopard, Dhole, Wild ass, and Bhutan grey peacock pheasant.

Progress: Data from twenty zoos have been received and are being compiled.

Research Laboratory

Several research projects utilized the analytical facility of the laboratory for plant, water and soil samples, pellet/dung and carnivore scat analysis. The Research Laboratory also extends technical inputs in teaching, training and analytical fields to research projects and ongoing training programmes of the Institute. The laboratory is fully equipped with various basic and modern equipment as Atomic Absorption Spectrophotometer (AAS), High Performance Liquid Chromatograph (HPLC), UV-Visible Spectro-photometer, Microwave Sample Digester, Automatic Nitrogen & Fiber Analyzer, Millipore Water Purification System, Digital pH & Conductivity Meters, Analytical Balance, Muffle Furnace, Hot Air Oven, and newly purchased Ultrasonic bath required for the analysis of various physio-chemical parameters of ecological sample. Sophisticated Digital Microscopes system with computer attachment and measurement software was purchased for the morphometric analysis of wild animal hair.

In total, 1936 samples were analyzed in the WII Laboratory during the reporting year. Of these, 417 were ecological 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), 630 pellet and scat samples (for food habits studies). In addition, extractions of 425 meat samples were done for the determination of Diclophenac salt under the collaborative project of RSPB, UK and BNHS, Mumbai.

Teaching classes followed by practical for various ongoing courses of the Institute, for the students from various Universities and Forest Officials from India and abroad were conducted at the laboratory on `Instrumentation and Analytical Techniques' during the reporting year 2007-2008. 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.

The laboratory technicians provided technical inputs in various fields, which includes demonstration of various traps, camera traps, mist netting for birds, electric fence and radio telemetry, use of GPS to various training programs. The laboratory staff also analyzed water quality of WII Lake. The Research Laboratory maintains the meteorological record in laboratory and regularly uploads on Intranet. During the year, the maximum temperature in WII campus recorded was 43^{0}C (June 7, 2007), minimum temperature was 2^{0}C (February 11, 2008) and the total rainfall of 883.5 mm was recorded.


S. Wilson

Herbarium

The herbarium staff gave inputs in eco-guide training course and took the trainees for a plant watch in the Institute's campus and familiarized them with the identification and importance of plants. The staff of herbarium gave field inputs in orientation, techniques tour of Diploma class at Sariska Tiger Reserve and Management Plan writing exercise at Periyar Tiger Reserve.

During the reporting period, this section was engaged in the habitat survey and habitat classification of WII campus. The herbarium section received plants for identification from Dudhwa National Park and Katarniaghat Wildlife Sanctuary, Uttar Pradesh; Sitamata Wildlife Sanctuary and Sariska Tiger Reserve, Rajasthan; Bandhavgarh Tiger Reserve, Madhya Pradesh; Tadoba Tiger Reserve, Maharashtra; and Corbett Tiger Reserve, Jhilmiltal Conservation Reserve and Rajaji National Park, Uttarakhand. Some specimen from the Forest Department of Himachal Pradesh and Uttarakhand were also received for identification. Orchids' specimens of Jharkhand were added in the Herbarium collection.

Demonstrations on plant preservation techniques were imparted to the frontline staffs of different Forest Departments and students of different colleges and universities.

Wildlife Health Services

Immobilization & rescue of sambar, Dehradun Forest Division, *May 1, 2007.* An adult sambar had accidentally fallen in a water tank in a private orchard near Sabawala range, Dehradun Forest Division. The animal was successfully immobilized and rescued by Dr. Parag Nigam. As the animal had sustained multiple injuries and had fracture of hock joint, it was transported to Malsi Deer Park for intensive care. Efforts were made to repair the fracture and stabilize the animal. Dr. R.S. Negi, Field veterinarian assisted in the operation.

Management of strayed tusker, Nazibabad, *December 2, 2007.* Dr. Parag Nigam provided assistance to Bijnore Forest Division in managing a wild tusker that had strayed out into human habitation. The animal was responsible for human casualty and damage to property. Various

management options were discussed during the meeting. The tusker could be successfully directed towards the nearby forest by late evening with concentrated efforts by the forest department. No subsequent damage by elephant was reported.

Conservation Genetics Laboratory

The role of the Conservation Genetics Laboratory is to provide services to ongoing research projects of the Wildlife Institute of India that have conservation genetics components. Also basic conservation genetics related issues of endangered Indian fauna and flora are addressed by small projects in the laboratory. Currently, the activities of the laboratory involve (i) genetic research on Avian Malaria, (ii) conservation genetics of Asiatic Lions (*Panthera leo persica*), (iii) phylogeny and variability in wild canids with emphasis on the Golden Jackal (*Canis aureus*), (iv) population structure of tigers (*Panthera tigris*) in the Satpura-Maikal Landscape, Central India, and (v) phylogeny and genetic variability of Sangai (*Cervus eldi eldi*).

Three scientific publications, two in Proceedings of the Royal Society and one in Journal of Wildlife Disease were the outcome of the work on avian malarial parasites. The major findings of this work point out that avian malaria that has been a major cause of native bird extinctions in Hawaii has originated from exotic bird introductions from south Asia including India. A post doctoral fellowship by Marie Currie Actions from the European Commission has been awarded to WII to host Dr. Farah Ishtiaq to continue this important work at WII for a period of one year.

Amplification of fecal DNA from lion scat samples has been done for the Gir Protected area as well as from the satellite lion populations of Savarkundla and Palitana. Analysis is being attempted to understand if these populations have meta-population structure or there are no genetic differences between the satellite populations and the source population of the Gir Protected Area. This component will complement the ongoing radio-telemetry study of lions.

The earlier work done on the Indian wolf (*Canis lupus pallipes*) has shown that the Indian lineages of wolves were ancient and unique to India. Current analysis of Golden Jackal samples has shown extreme genetic variability even from geographically close localities with several mitochondrial haplotypes. Initial sequence data of the Mt Control Region has shown that Free Ranging Sangai is likely to be genetically different from Sangai in captive populations. This finding would have bearing in re-introduction programs of the species.


Vinod Verma

DNA was extracted from blood samples of 18 tigers from Central India that were captured for radio collaring. Twelve micro-satellite markers were used to make preliminary generalizations about the allelic diversity. Micro-satellite loci from blood and scat samples from the same individual are being analyzed to assess and estimate genotyping error rates with scat DNA. The average number of alleles was 3.4 and no loci had fewer than 3 alleles. Average observed heterozygosity values across these loci was 58% and ranged from 25 to 75%. The initial conservative estimate of probability of identity of siblings over the first six loci was 0.00733. In other words, there is a chance of 1 in 135 that two randomly chosen Kanha tigers will share the same micro-satellite signature, assuming the population is composed entirely of siblings, an extreme natural scenario.

The Conservation Genetics laboratory was requested to identify a problem tiger operating on the periphery of Kanha Tiger reserve that had killed three humans based on its scat sample. There were two tigers operating in that area, who were the likely candidates. Scat samples from these two tigers were obtained and 8 micro-satellites were amplified from all tiger scats. The micro satellite analysis revealed mismatches at two and three loci with the suspected tigers, resulting in a conclusion that the problem tiger was a different tiger and not any of the two suspected tigers operating in the area.

Another applied application has been in delineating the range occupancy by endangered species. The case being of a suspected tiger scat obtained from Manipur. Presence of tigers in Manipur has been suspected and the identity of the scat needed to be confirmed by genetic analysis. A 115 bp segment of the mitochondrial cytochrome b was sequenced and compared it with known samples of tigers and leopards. 100% match was obtained with tiger sequences, but not leopard which was reflected in the distinct clustering of the scat sample DNA sequence with tiger in the phylogenetic tree. The result confirms tiger presence in Manipur.

Campus Development

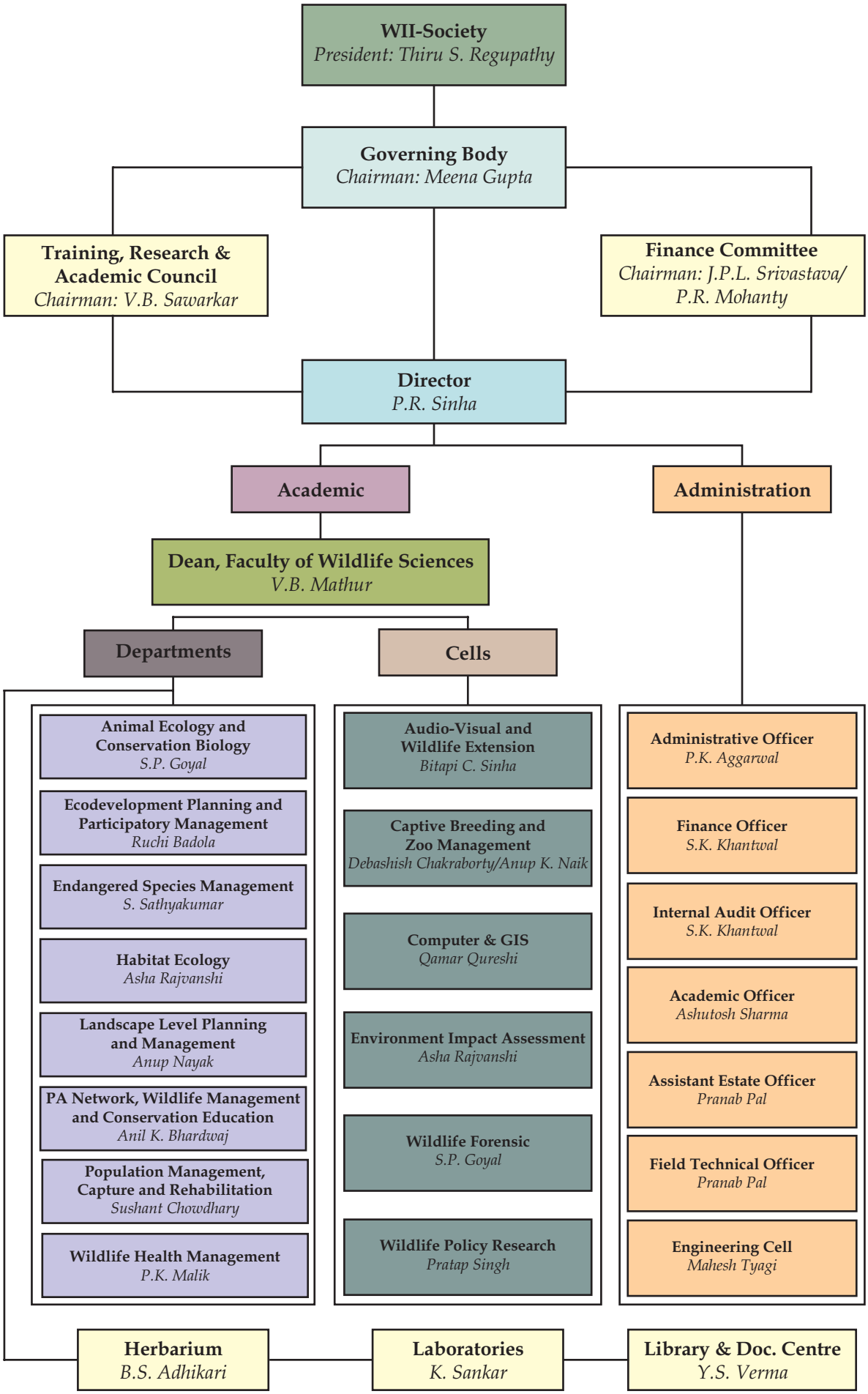
Maintenance works have been completed in administrative, teaching and library blocks, construction of scooter shed for Type I, II Houses and construction of spillway for pond near New Hostel block.

Work is in progress for maintenance work in Old Hostel and New Hostel block of providing false ceiling and aluminum partition in library block and office building. Repair works of various electrical services, supplying and installation of 800 KVA transformer and 1X320 KVA generator set are also in progress.

Work is in progress for construction of 5 nos. Type IV quarters in block III. Surveying, consultancy and geo-technical investigation of land for construction of hostel, laboratory building and committee room is in progress.

Governance

Organizational Structure of WII



The Society of Wildlife Institute of India

(According to Rules & Regulations of the WII-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
214, North Avenue,
New Delhi - 110 001

4. Shri Bachi Singh Rawat
Member of Parliament
4, Lodhi Estate,
New Delhi - 110 003

5. Shri Harish Rawat
Member of Parliament
12-A, Canning Lane,
New Delhi.

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	-	Uttarakhand

19. Shri S.K. Patnaik,
Former CCF (Orissa),
81, Fishery Lane, Buddheswari Colony,
Bhubneshwar – 751 006

20. Shri A.S. Negi,
Former CWLW (Uttarakhand),
300, Model Colony, Araghar, **Dehradun**

21. Dr. Erach Bharucha,
Director,
Bharti Vidyapeeth Institute of Environment Education and Research
(Bharti 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 Uttarakhand, "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,
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 (Uttarakhand),
   300, Model Colony, Araghar,
   Dehradun – 248 001

5. Dr. Erach Bharucha,
   Director,
   Bharti Vidyapeeth Institute of Environment Education and Research, (Bharti 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. Shri V.B. Sawarkar
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 representative 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. 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. 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 (WL) & 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 (WL) & Chief Wildlife Warden,
Forest Headquarters, Government of Kerala,
Vazhuthacaud, Thiruvananthapuram - 695 014 (Kerala)

17. Chief Conservator of Forests (WL) & 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 (WL) & Chief Wildlife Warden,
Government of Manipur, Sanjenthong,
Imphal (Manipur)

20. Chief Conservator of Forests (WL) & Chief Wildlife Warden,
Government of Uttaranchal, 87-Rajpur Road, Dilaram Bazar,
Dehra Dun -248 001 (Uttarakhand)

Members

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

23. 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
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
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 Director General of Forests
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

Workshop/Seminar proceedings

Reports

Status Survey Report

Technical Reports

Papers presented

Abstracts Published

Contribution in Training Manuals

Popular articles

Peer Reviewed International Journals

Adhikari B.S., Babu, M.M., Saklani, P.L. and Rawat, G.S. (2007): **Distribution, use pattern and prospects for conservation of medicinal shrubs in Uttaranchal State, India.** Journal of Mountain Science, 4(2): 155-180.

Akhtar N., Bargali H.S. and Chauhan, N.P.S. (2007): **Characteristics of sloth bear (*Melursus ursinus*) day dens and use in disturbed and unprotected habitat of North Bilaspur Forest Division, Chhattisgarh.** Ursus, 18(2): 203-208.

Bhargav, V.K. and Uniyal, V.P. (2008): **Communal Roosting of Tiger Beetles (*Cicindelidae: Coleoptera*) in the Shivalik Hills, Himachal Pradesh, India.** Cicindela, Bloomington, Minnesota, USA. 40 (1-2):1-12.

Chandola, S., R. Badola and S.A. Hussain (2007): **Factors affecting women's participation in conservation programme in and around Rajaji National Park, India.** Journal of Indian Anthropological Society, 42: 11-21.

Dhaila-Adhikari, S. and Adhikari, B.S. (2007): **Veneration of a deity by restoration of sacred grove in a village Minar, Kumaun Region of Uttarakhand: A case study.** Journal of American Science, 3(2): 45-49.

Ishtiaq F., E. Gering, J.S. Beadel, J.H. Rappole, A.R. Rahmani, Y.V. Jhala, C.J. Dove, C. Milensky, M.A. Peirce, R.C. Fleischer (2007): **Prevalence and diversity of avian haematozoan parasites in Asia: A regional survey.** Journal of Wildlife Diseases, 43(3)382–398.

Johnsingh, A.J.T., Goyal, S.P. and Qureshi, Q. (2007): **Preparations for the re-introduction of Asiatic lion *Panthera leo persica* into Kuno Wildlife Sanctuary, Madhya Pradesh, India.** Oryx, 41(1): 93-96.

Hussain, S.A and R. Badola (2008): **Valuing mangrove ecosystem services: Linking nutrient retention function of mangrove forests to enhanced agro-ecosystem production.** Wetlands Ecology & Management. Springer. DOI:10.1007/ s11273-008-9080-z

Hussain, S.A., R.K. Singh and R. Badola (2008): **An ecological survey of the Trans-Himalayan wetlands of proposed Changthang Biosphere Reserve, Ladakh, India for conservation planning.** Biosphere Conservation. 9 (1): 1-11.

Jalal, J.S., G.S. Rawat and P. Kumar (2008): **An initiative to community based orchid conservation in the Gori Valley, Uttarakhand, Western Himalaya, India.** The McAllen Orchid Society Journal, 9(1): 12–16.

Kumar, P., J.S. Jalal and G.S. Rawat (2008): ***Geodorum attenuatum* Griff. (Orchidaceae): A new record from India.** Richardiana, 8(2): 80–87, France.

Kumar, P., J.S. Jalal and G.S. Rawat (2007): **Orchidaceae, Chhotanagpur, State of Jharkhand, India.** Check List 3(4): 297–304, Brazil.

Naniwadekar, R. and K. Vasudevan (2007): **Patterns in diversity of anurans along an elevational gradient in the Western Ghats, south India**. Journal of Biogeography, 34: 843-852.

Sahajpal, V., Goyal, S.P., Jayapal, R., Yoganand, K. and Thakar, M.K. (2007): **Hair characteristics of four Indian bear species.** Science and Justice (UK), 48 (2008) 8–15.

Sahajpal, V., Goyal, S.P. and Vishali, M. (2007): **Improved system of thin layer chromatography of bear gall bladders.** Journal of Forensic Identification, 57(2): 215-221.

Sahajpal, V. and Goyal, S.P. (2007): **Identification of shed or plucked origin of Indian peafowl (*Pavo cristatutus*) tail feathers: preliminary findings.** Science & Justice, (DOI: 10.1016/j.scijus.2007.08.002).

Taggart, M.A., K.R. Senacha, R.E. Green, Y.V. Jhala, B. Raghavan, A.R. Rahmani, R. Cuthbert, D.J. Pain and A.A. Meharg (2007): **Diclofenac residues in carcasses of domestic ungulates available to vultures in India.** Environ Int, doi:10.1016/j.envint.2007.02.010.

Upamanyu Hore and V.P. Uniyal (2008): **Effect of prescribed fire on spider assemblage in Terai grasslands, India.** Turkish Journal of Arachnology, 1(1):15-36.

Uniyal, V.P. and V. Bhargav (2007): **Assessment of butterflies in Bir Shikargah Wildlife Sanctuary, Haryana.** Tiger Paper, 34(3):13-15.

V.P. Uniyal and Upamanyu Hore (2008): **Spider assemblage in the heterogeneous landscape of Terai Conservation Area, India.** Revista Ibérica de Aracnología, Vol. 15:89-95.

Walters B.B., P. Ronnback, J.M. Kovacs, B. Crona, S.A. Hussain, R. Badola, J.H. Primavera, E. Barbier, F. Dahdouh-Guebas (2008): **Ethnobiology, socio-econonomics and management of mangrove forests: a review.** Aquatic Botany, Elsevier. DOI:10.1016/ j.aquabot.2008.02.009.

Peer Reviewed National Journals

Bhargav, V.K., V.P. Uniyal, S. Kittur, and K. Sivakumar (2007): **Bird Records from Simbalbara Wildlife Sanctuary, Himachal Pradesh.** Indian Forester, 133(10):1411-1418.

Bhattacharya, T. and Sathyakumar, S. (2007): **An ornithological survey of Chenab Valley, Chamoli district, Uttaranchal, including notes on pheasants.** Indian Birds, 3(4)138-145.

Binod, R., L. Lalromawia and K. Sankar (2007): **Infanticide in wild pigs in Sariska Tiger Reserve, Rajasthan.** Indian Forester, 133(10):1422.

Bitapi C. Sinha (2007): **Planning and development of interpretive facilities linking visitors and protected areas: a case study from Panna Tiger Reserve.** Indian Forester, 133(5): 642-646.

Hussain, S.A (2007): **Integrated management of wetlands: A case study on Asan Conservation Reserve, Uttarakhand, India.** Indian Forester, 133 (10):1305-1311.

Jishtu, V., G.S. Goraya and G.S. Rawat (2007): **Flora of Rupi Bhaba Wildlife Sanctuary: A checklist.** Journal of Economic Taxonomic Botany, 31(4):953-970.

Jalal, J.S., G.S. Rawat and Y.P.S. Pangtey (2007): **Rediscovery of a rare orchid (*Androcorys pugioniforme)* Lindl. *ex* Hook. *f.*) K.Y.Lang - Orchidaceae in Uttarakhand from Kumaun Hills.** Indian Journal of Forestry, 30(3):337-338.

Jalal, J.S., G.S. Rawat and Y.P.S. Pangtey (2007): **A note on the occurrence of *Ornithochilus difformis* (Wall. Ex Lindl.) Schltr. (*Orchidaceae*) in Kumaun Himalaya.** Indian Journal of Forestry, 30(4):523-524.

Kailash Chandra and V.P. Uniyal (2007): **On a collection of *Pleurostict Scarabaeidae* (*Coleoptera*) from the Great Himalayan National Park, Himachal Pradesh, India.** Zoos' Print Journal, 22(9):2821-2823.

Mishra, B.K., Ruchi Badola and A.K. Bhardwaj (2007): **Conservation induced displacement and resettlement: a case study of *Gujjar* rehabilitation from Rajaji National Park.** The Indian Forester, 133(10):1341-1349.

Rawat, G.S. (2007): **Pastoral practices, wild mammals and conservation status of alpine meadows in Western Himalaya.** J. Bombay Nat. Hist. Soc., 104 (1):5-11.

Sankar, K. and A.J.T. Johnsingh (2007): **Food habits of three major ungulate species in a semi-arid zone of Rajasthan.** Cheetal, 44(3&4):18-39.

Sathyakumar, S. and Choudhury, A. (2007): **Distribution and Status of Asiatic Black Bear (*Ursus thibetanus*) in India, 2005.** J. Bom. Nat. Hist. Soc., 104 (3). J2812.

Sharma, D.K. and Y.V. Jhala (2006): **Molecular techniques in conservation: the Indian wolves as a case study.** J. Bombay Natural History Society, 103:375-389.

Sridhar, H. and K. Sankar (2008): **Effects of habitat degradation on mixed-species bird flocks in Indian rain forests.** Journal of Tropical Ecology, 24:135-147.

Uniyal, V.P. (2007): **Butterflies in the great Himalayan conservation landscape in Himachal Pradesh, Western Himalaya.** Entomon, 32(2):119-127.

Vasudevan, K., M.S. Chaitra, and R.K. Aggarwal (2007): **Pernicious 'new' frog descriptions from the Western Ghats, India**. Current Science, 92(3):281-282.

Books

Rajvanshi, A., Mathur, Vinod B., Iftikhar, Usman, A. (2007): **Best practice guidance for biodiversity-inclusive impact assessment: A manual for practitioners and reviewers in South Asia**. CBBIA-IAIA Guidance Series. Capacity Building in Biodiversity and Impact Assessment (CBBIA) Project, International Association for Impact Assessment (IAIA), North Dakota, U.S.A.

Sinha, S.P. and Sinha B.C. (2007): **The Great Indian One-horned Rhinoceros *Rhinoceros unicornis* in India and Nepal.** Bombay Natural History Society, Mumbai. pp46.

Book Chapters

Chauhan, Netrapal Singh (2007): **The status of Malayan sun bears in India.** Chapter in book 'Understanding Asian Bears to Secure Their Future'. Pp.20-25. Japan Bear Network, Japan.

Chauhan, Netrapal Singh (2007): **The status of sloth bears in India.** Chapter in book 'Understanding Asian Bears to Secure Their Future'. Pp.28-34. Japan Bear Network, Japan.

Mathur, V.B. and Ambica Paliwal (2007): **Spatial analysis of landscape patterns and their relevance for large mammal conservation in the dry-deciduous forests of Central India**. In: Bruce R.G.H., Jongman, R.H.G., Hojas, L and Weel S. (Eds.) – 25 years Landscape Ecology: Scientific principles in practice. IALE Publication series 4, Wageningen, The Netherlands.

Mishra, B.K., Badola, R. and Bhardwaj, A.K. (2008): **Joining hands for biodiversity conservation.** In: Mallapureddi Vikram Reddy (Editor) Wildlife Biodiversity Conservation, Chapter - 3, p.20-28. Daya Publishing House, Delhi.

Nayak, A.K. (2007): **Status of migratory shorebirds at Bhitarkanika and Chilika wetlands on the east coast of India.** Waterbirds around the world. Eds. G.C. Boere, C.A. Galbraith & D.A. Stroud. The Stationery Office, Edinburg, UK. pp. 305-307.

Nigam, P. (2007): **Managing wild animals in distress: principles and concerns.** In: Arora, B.M. (2007) Rehabilitation in free living wild animals. AIZ&WV, Bytes & Bytes Publishers, Bareily. Pp 48-53.

Nigam, P. and Malik, P.K. (2008): **Managing health of wild animals in captivity: principles and practices.** In: Acharjyo, L.N. and Pattnaik, A.K. (Eds.). Indian Zoo Year Book Volume – V, Published by Indian Zoo Directors' Association and Central Zoo Authority. Pp. 151-160.

Rajvanshi, Asha (2008): **Mitigation and compensation in environmental assessment**. In: (eds. Thomas B. Fischer, Paola Gazzola, Urmila Jha - Thakur, Ingrid Belcakova and Ralf Aschemann) EA Lecturers' Handbook and Curriculum for EA related Master Programmes, Slovak University Press Publication. Pp.166-182.

Sankar, K. (2008): **Ungulate conservation in India.** Pp 37-50. In: Wildlife Biodiversity Conservation, M.V. Reddy (Ed.). Daya Publishing House, New Delhi. Pp 390.

Workshop/Seminar Proceedings

Chowdhury, Sushant (2007): **An overview on landscape level conservation practices and mechanism at local (PA managers)/regional (state level)/national level (country level).** In Indo-Bhutan Workshop, Madarihat, West Bengal, April 4-6, 2007. Pp. 24-26.

Das, G.M., Nigam, P. and Gupta S.K. (2007): **Prevalence of parasitic infection in captive ungulates.** International Congress on "Advances in Zoo and Wild Animals Health and Management" and Symposium on "Impact of Diseases on Conservation of Wild Animals" organized by Faculty of Veterinary Sciences and Animal Husbandry, Sher-e-Kashmir University of Agricultural Sciences and Technology, R.S. Pura, Jammu under the auspices of the Association of Indian Zoo and Wildlife Veterinarians from April 26-27, 2007. Pp 103.

Georgiadis, P., V. Hoffmann, G.S. Rawat and V. Shiva (2007): **Local medicinal flora and associated indigenous knowledge: A method for sustainable development in the Garhwal Himalaya, Uttarakhand, India.** Proc. International Conference on Agricultural Research & Development, University of Gottingen, FRG. Pp. 1-6.

Mathur, P.K. (2007): **Landscape management approach - vital to conservation in India.** In: Bruce R.G.H., Jongman, R.H.G., Hojas, L. and Weel S. (Eds). 25 years Landscape Ecology: Scientific Principles in Practice. Proceedings of the 7th IALE World, July 8-12, 2007, Wageningen, The Netherlands, IALE Publication series 4:p.321-322.

Midha, N. and P.K. Mathur (2007): **Channel and vegetation changes in the Sharda River – conservation implications for swamp deer population in Kishanpur Wildlife Sanctuary, Uttar Pradesh, India.** In: Bruce R.G.H., Jongman, R.H.G., Hojas, L. and Weel S. (Eds). 25 years Landscape Ecology: Scientific Principles in Practice. Proceedings of the 7th IALE World, July 8-12, 2007, Wageningen, The Netherlands, IALE Publication series 4: p.519.

P. Pal (2007): **Role of Solid Waste Management in Enhancing Environmental Values.** Paper published in the proceedings of the National Conference on

Environmental Pollution and Health Problem and Solution held during April 19-20, 2007 at Indian International Centre, Delhi. Pp. 48-55.

P. Pal (2007): **The Management of Biological Diversity pf India.** Paper published in the proceedings of the National Conference on Environmental Education held during August 23-25, 2007 at Goa**.** Pp. 21-32.

P. Pal (2007): **Anthropogenic Causes of Biodiversity Loss.** Paper published in the proceedings of the International Conference on Global Warning – Boon or Bane held at Jamia Hamdard University Delhi during December 27-29, 2007. Pp. 16-18.

P. Pal (2008): **Environmental Degradation and Threat to Biodiversity Loss.** Paper published in the proceedings of the International Conference on "Biodiversity Conservation and Management" held at Cochin during February 3-6, 2008. Pp. 97-98.

Rawat, G.S. (2007): **Wildlife conservation in the higher Himalaya: Park-people interface and management strategies.** Proceedings of the national seminar on 'Management Strategies for the Indian Himalaya: Development and Conservation. HNB Garhwal University, Srinagar, Garhwal. Pp. 179-189.

Thakur, Urmila Jha., Fisher, Thomas and Rajvanshi, A. (2008): **Review of pre-decision considerations of EIA follow-up in open cast mines coal mines in India**. In: the proceeding of the 2nd Asian mining Congress, January 16-19, 2008, Kolkata, India.Pp. 347-361.

Uniyal, Bhagwati, V.P. Uniyal and Vinod Bhatt (2007): **Empowering rural women for sustainable livelihoods through natural resource management in Garhwal Himalaya, Uttaranchal, India.** International conference "Women of the Mountains" Utah Valley State College, USA.

Vasudevan, K., Kar, N.B., Nigam, P. and Torsekar, V. (2007): **A report on anuran deformities and identification of causal mechanism in some protected areas of the central Western Ghats.** International Congress on " Advances in Zoo and Wild Animals Health and Management" and Symposium on "Impact of Diseases on Conservation of Wild Animals" organized by Faculty of Veterinary Sciences and Animal Husbandry, Sher-e-Kashmir University of Agricultural Sciences and Technology, R.S. Pura, Jammu under the auspices of the Association of Indian Zoo and Wildlife Veterinarians from April 26-27, 2007. Pp 72.

Reports

A.K. Bhardwaj (2007): **Management Plan for Kishtwar High Altitude National Park, J&K (2007-2008 to 2012-13).** Report submitted to Chief Wildlife Warden, J & K.

A.K. Bhardwaj (2007): **Management plan for Hemis National Park, J&K (2007-08 to 2011-2012).** Report submitted to Chief Wildlife Warden, J & K.

Akhtar, N. and Chauhan, N.P.S. (2007): **Status of human-wildlife conflict and mitigation strategies in Assam.** Report submitted to Wildlife Institute of India, Dehradun.

Bhardawaj, A.K. and Badola, R. (2007): **An assessment of eco-development initiatives in Periyar Tiger Reserve.** Final Report submitted to Wildlife Institute of India, Dehradun.

Chauhan, N.P.S. (2007): **Status and distribution of Malayan sun bear in North-Eastern region (Manipur), India.** Report submitted to Wildlife Institute of India, Dehradun. Pp. 13.

Mathur, V.B. and Hitendra Padalia (2007): **Gap analysis in Andaman and Nicobar Islands, India: Recent experiences.** Pp. 94-96. Closing the Gap. Creating Ecologically Representative Protected Area Systems: A Guide to conducting the Gap Assessments of Protected Area Systems for the Convention on Biological Diversity. Secretariat of the Convention on Biological Diversity, Montreal, Technical Series no. 24, vi+108 pages.

Uniyal, V.P. and Sivakumar, K. (2007): **Ecological study of tiger beetles (*Cicindelidae*) as indicator for biodiversity monitoring in Shivalik landscape.** (Final Project Report) Department of Science & Technology (SERC), New Delhi. Pp. 76.

Uniyal, V.P. and Hore, Upamanyu (2008): **Effect of management practices as spider diversity in Terai Conservation Area (TCA).** Wildlife Institute of India, Dehradun. Pp. 26.

WII (2007): **Monitoring insect fauna after relocation of G*ujjars* in Rajaji National Park.** Wildlife Institute of India, Dehradun.

Technical Reports

Appaya M.K and Chowdhury Sushant (2007): **Proposal for creation of elephant reserves in Chhattisgarh.** Report submitted to Project Elephant, Ministry of Environment & Forests, Government of India, New Delhi.

Dave, C., Bopanna, I.P., A. Rajvanshi, Y.V. Jhala and V.B. Mathur (2007): **Review of the mitigation measures proposed for the widening of NH-14 through Balaram-Ambaji Wildlife Sanctuary, Gujarat State.** Wildlife Institute of India – EIA Technical Report 33. Pp. 39.

Jhala, Y.V., Q. Qureshi and R. Gopal (2007): **Monitoring tigers, co-predators, prey and their habitat in central Indian landscape.** A preliminary report. National Tiger Conservation Authority, Govt. of India & Wildlife Institute of India, Dehradun. Pp. 18.

Jhala, Y.V., R. Gopal, and Q. Qureshi (eds.) (2008): **Status of the tigers, co-predators and prey in India.** National Tiger Conservation Authority, Government of India, New Delhi, and the Wildlife Institute of India, Dehradun. TR 08/001 pp-151.

Jhala, Y.V. (2007): **Conservation of the Indian wolf.** Final Report to the United States Fish & Wildlife Service. Wildlife Institute of India, Dehradun, 531pp.

Mathur, V.B., B.C. Choudhury, Ashok Verma and Sunayan Sharma (2007): **Management effectiveness evaluation of Keoladeo National Park, Rajasthan.** Submitted to UNESCO World Heritage Centre, Paris. Pp. 94.

Mathur, V.B., B.C. Choudhury, Ashok Verma and S.N. Buragohain (2007): **Management effectiveness evaluation of Kaziranga National Park, Assam**. Submitted to UNESCO World Heritage Centre, Paris. Pp. 84.

Mathur, V.B., B.C. Choudhury, Ashok Verma and M.B. Pandey (2007): **Management effectiveness evaluation of Chitwan National Park, Nepal**. Submitted to UNESCO World Heritage Centre, Paris. Pp. 96.

Rajvanshi, A., V.B. Mathur, A. Pragatheesh and Ashish David (2007): **Evaluation of the ecological and socio-economic consequences of setting up of proposed Mathwad Wildlife Sanctuary and Kathiwad Wildlife Sanctuary, Madhya Pradesh**. WII-EIA Technical Report 32. Pp. 43. Wildlife Institute of India, Dehradun.

Rajvanshi, A., V.P. Uniyal, and A. Pragatheesh (2008): **Environmental clearance of Keran limestone mining project, Sundernagar, Himachal Pradesh: A review**. WII-EIA Technical Report 34. Pp. 32. Wildlife Institute of India, Dehradun.

WII (2008): **Evaluation of the Ministry of Environment & Forests, Government of India scheme on conservation and management of wetlands in India.** Tso Moriri. pp. 27

Status Survey Report

Sathyakumar, S. (2007): **Survey for Himalayan Tahr (*Hemitragus jemlahicus*) in Jammu and Kashmir.** Interim report submitted to State Forest Research Institute, Jammu. 18pp.

Technical Manual

Rajesh Gopal, Sinha P.R., Mathur V.B., Jhala Y.V. and Qamar Qureshi (2007): **Guidelines for preparation of Tiger Conservation Plan.** A technical document of the National tiger Conservation Authority, Ministry of Environment and Forests, Government of India. NTCA/01/07.

Uniyal, V.P. and V. Bhargava (2007): **Tiger beetles: A field study in the Shivaliks of Himachal Pradesh.** Field Guide. Pp. 80. Wildlife Institute of India, Dehradun.

Paper Presented: National

Bhattacharya, T., Sathyakumar, S. and Rawat, G.S. (2007): **Studies on animal-habitat interactions in the buffer zone of Nanda Devi Biosphere Reserve.** Paper presented at the 'Workshop on wildlife research in Nanda Devi Biosphere Reserve, and Kedarnath Wildlife Sanctuary, by the Wildlife Institute of India, 2002-2006' held at Joshimath on May 25, 2007. Funded by the Ministry of Environment & Forests, Govt. of India.

Charoo, S.A., Sharma, L.K. and Sathyakumar, S. (2007): **Distribution and relative abundance of Asiatic black bear (*Ursus thibetanus*) in Dachigam National Park.** Paper presented at the national seminar on 'Himalayan biodiversity: Concerns and issues' held at the Centre for Biodiversity Studies, Baba Ghulam Shah Badshah Univeristy, Rajouri, Jammu & Kashmir, and sponsored by Department of Biotechnology, Govt. of India during October 27-29, 2007.

Gupta, S. and Mishra, B.K. (2007): **Quantification of anthropogenic pressure in Kalakad-Mundanthurai Tiger Reserve.** In: International Tropical Ecology Congress, 2007- Symposium on People and Forests. Organized by the International Society for Tropical Ecology during December 2-5, 2007.

Hamid, F. And S.A. Hussain (2007): **Resource dependence and conservation attitude towards Hokersar wetland: A case study from Himalayan wetlands.** National conference on Wetlands, Science and Society – An assessment of their integration during December 11-13, 2007, INSA, New Delhi.

Jhala, Y.V. (2007): **Tiger status and monitoring in central India: Preliminary results.** Seminar at India Habitat Center New Delhi for National Tiger Authority, MoEF and WII during May 23, 2007.

Kittur, S., Sathyakumar, S. and Rawat, G.S. (2007): **Himalayan tahr - livestock interactions at Kedarnath Wildlife Sanctuary.** Paper presented at the 'Workshop on wildlife research in Nanda Devi Biosphere Reserve and Kedarnath Wildlife Sanctuary, by the Wildlife Institute of India, 2002-2006' held at Joshimath on May 25, 2007. Funded by the Ministry of Environment & Forests, Govt. of India.

Mathur, V.B. (2007): **Management Effectiveness Evaluation (MEE) of protected areas in India.** Presentation in the meeting of Chief Wildlife Wardens of States in New Delhi on November 29, 2007.

Mathur, V.B. (2007): **Developing capacity for conserving island ecosystems.** Presentation in the Consultative Meeting organized by Tata Institute of Social Sciences (TISS), Mumbai at Port Blair during December 16-17, 2007.

Mishra, B.K., Badola, R. and Bhardwaj, A.K. (2007): **Social issues and concerns in biodiversity conservation - experiences from Indian protected areas.** In: International Tropical Ecology Congress, 2007 - Symposium on biodiversity conservation in the tropics: Issues, concerns and strategies. Organized by the International Society for Tropical Ecology during December 2-5, 2007.

Rajvanshi, A. (2007): **Building capacity for biodiversity-inclusive impact assessment in the regional context.** Papers presented in the 27th annual conference of the International Association for Impact Assessment (IAIA) at Seoul, Korea during June 3–8, 2007.

Rajvanshi, A. (2007): **Review of current EIA processes and practices in South Asia**. Paper presented in the WII-PENTA collaborative workshop, Dehradun during September 24–26, 2007.

Rajvanshi, A. (2007): **Building capacity in EA: Experience of WII.** Paper presented in the WII-PENTA collaborative workshop, Dehradun during September 24–26, 2007.

Rajvanshi, A. (2008): **Tsunami, biodiversity and people: Strategic framework for disaster management and preparedness.** Paper presented in the second international conference on Health and Biodiversity (COHAB) at Galway, Ireland during February 25–28, 2008.

Rajvanshi, A. (2008): **Best practice guidance for biodiversity-inclusive EA: a South-Asian initiative.** Paper presented in the second international conference on Health and Biodiversity (COHAB) at Galway, Ireland during February 25–28, 2008.

Rajvanshi, A. (2008): **Best practices in impact assessment of hydropower projects with reference to information related to biodiversity.** Paper presented in the workshop on Environmental Impact Assessment of Hydropower Projects organised by National Hydroelectric Power Corporation Ltd. at Ghalib Conference Hall, Scope Convention Centre, New Delhi during January 10, 2008.

Sathyakumar, S. (2007): **Biodiversity monitoring expedition to Nanda Devi, 2003.** Paper presented at the 'Workshop on Wildlife Research in Nanda Devi Biosphere Reserve, and Kedarnath Wildlife Sanctuary, by the Wildlife Institute of India, 2002-2006' held at Joshimath on May 25, 2007. Funded by the Ministry of Environment & Forests, Govt. of India.

Sathyakumar, S. (2007): **Monitoring techniques for the wildlife of western Himalaya.** Paper presented at the 'Workshop on Wildlife Research in Nanda Devi Biosphere Reserve and Kedarnath Wildlife Sanctuary, by the Wildlife Institute of India, 2002-2006' held at Joshimath on May 25, 2007. Funded by the Ministry of Environment & Forests, Govt. of India.

Sharma, L.K., Charoo, S.A., and Sathyakumar, S. (2007): **Use of non-invasive and camera trap technique for population estimation and molecular tracking of problematic Asiatic Black Bear (*Ursus thibetanus*) in Dachigam National Park.** Paper presented at the National Seminar on 'Himalayan biodiversity: Concerns and issues' held at the Centre for Biodiversity Studies, Baba Ghulam Shah

Badshah Univeristy, Rajouri, Jammu & Kashmir, and sponsored by the Department of Biotechnology, Govt. of India during October 27-29, 2007.

Paper Presented: International

Badola, R. and Hussain S.A. (2007): **Valuation of mangrove ecosystems: A case of the Bhitarkanika mangrove ecosystem, India.** Paper presented in the 4th biennial conference of the United States Society for Ecological Economics (USSEE) **"**Creating Sustainability within our midst: Challenge for the 21st Century". New York, June 23-27, 2007.

Fernandes, M., Mukesh, Sathyakumar, S., Kaul, R., Kalsi, R.S. and Sharma, D. (2007): **Conservation of Red Junglefowl (*Gallus gallus*) in India – A collaborative research initiative.** Paper presented at the IV Internal galliformes symposium, Chengdu, China, October 14-21, 2007.

Hussain, S.A., Badola, R. and Thapliyal, S. (2007): **Protected areas from the perspective of ecological economics: A case of Corbett Tiger Reserve, India.** Paper presented in the 4th biennial conference of the United States Society for Ecological Economics (USSEE) "Creating Sustainability within our midst: Challenge for the 21st century". New York, June 23-27, 2007.

Hussain, S.A. (2007): **The status of small-clawed otter *Aonyx cinereus* in Asia.** Paper presented in X International Otter Colloquium, Hwacheon, South Korea, October 10-17, 2007.

Jhala, Y.V. (2007): **Tiger status and monitoring methodology in India.** Seminar at WWF – Washington DC USA on July 19, 2007.

Jhala, Y.V. and Q. Qureshi (2007): **Tiger, co-predators, prey and habitat monitoring methodology & results for central India.** Seminar at Patuxent Wildlife Research Center, USGS Laurel, USA on July 15, 2007.

Jhala, Y.V. and Q. Qureshi (2007): **Status of tigers in India – Methodology and results.** Seminar at Directorate of Science & Conservation, National Zoological Park, Smithsonian Institution, Washington DC, USA on July 14, 2007. Video conference arranged with scientists at the Conservation and Research Center at Front Royal, Virginia.

Jhala, Y.V. and Q. Qureshi (2007): **Monitoring and evaluating tiger population and habitat in India.** Technical presentation at the International Tiger Symposium, Global Tiger Forum, Kathmandu, Nepal, during April 16-18, 2007.

K. Sankar (2007): **Cervids conservation in India.** Paper presented during the 'First international conference on the Genus Cervus' at Primiero Trentino, Italy, September 14-17, 2007.

K. Sankar (2007): **Home range and habitat use of radio-collared ungulates in Sariska Tiger Reserve, Rajasthan.** Paper presented during the 'First international conference on the Genus Cervus' at Primiero Trentino, Italy, September 14-17, 2007.

Mathur, V.B. (2007): **Nominating natural heritage properties on the tentative list.** Presentation in the Training Workshop on World Heritage Management organized by UNITAR, Japan, April 15-20, 2007.

Mathur, V.B. (2007): **Integrating environmental and biodiversity concerns in development planning through enabling policy and regulatory framework.** Presentation in the International Association of Impact Assessment (IAIA) conference in Seoul, Korea, June 3-9, 2007.

Mathur, V.B. (2007): **Protected Area Management in India: Issues and Challenges.** Paper presented in the V Brazilian Congress on Protected Areas in Brazil, June 17-21, 2007.

Mathur, V.B. (2007): **Environmental assessment: What PENTA project can offer?** Presentation in the PENTA-WII Collaborative Workshop on Environmental Assessment Curriculum in Dehradun, September 24-26, 2007.

Mathur, V.B. (2007): **Shortcomings in EIA Practice: The practitioners' perspective.** Presentation in the PENTA-WII Collaborative Workshop on Environmental Assessment Curriculum in Dehradun, September 24-26, 2007.

Mathur, V.B. (2007): **Natural heritage conservation: From tentative list to nomination dossiers.** Presentation in the 3rd Session of the International Conference on World Natural Heritage at Sichuan Province, China, November 6-8, 2007.

Mathur, V.B. and Asha Rajvanshi (2007): **Best practice guidance for biodiversity - inclusive EA: A South Asian initiative.** Presentation in the second international conference on Health and Biodiversity (COHAB-2) in Galway, Ireland, February 25-28, 2008.

Mathur, V.B. and Asha Rajvanshi (2007): **Tsunami, biodiversity & people: Strategic framework for disaster management & preparedness.** Presentation in the second international conference on Health and Biodiversity (COHAB-2) in Galway, Ireland, February 25-28, 2008.

Nigam, P. and Malik, P.K. (2007): **Wildlife Investigations: Zoonotic Concerns.** International Congress on "Advances in Zoo and Wild Animals Health and Management" and Symposium on "Impact of Diseases on Conservation of Wild Animals" organized by Faculty of Veterinary Sciences and Animal Husbandry, Sher-e-Kashmir University of Agricultural Sciences and Technology, R. S. Pura, Jammu under the auspices of the Association of Indian Zoo and Wildlife Veterinarians from April 26-27, 2007.

Rathore, B.C. and Chauhan, N.P.S. (2007): **Predatory behaviour and interactions of Himalayan brown bear with nomadic shepherds in Pir Panjal Himalayan Range, India.** 18th international conference on Bear Research and Management, Monterrey, Nuevo Leon, Mexico, November 4-11, 2007.

Rathore, B.C. and Chauhan, N.P.S. (2007): **Food habits of Himalayan brown bear in Kugti Wildlife Sanctuary, Himachal Pradesh, India and conservation implications.** 18th international conference on Bear Research and Management, Monterrey, Nuevo Leon, Mexico, November 4-11, 2007.

Abstracts Published

Hussain, S.A. (2007): **Prospects of creating Transboundary Protected Areas in South Asia with India as the focal country.** Parks, Peace and Partnerships Conference 2007. Abstract published. September 9-12, 2007. Waterton Lakes National Park, Alberta, Canada

Bulletins

Bhattacharya, T., Sathyakumar, S., and Rawat, G.S. (2007): **Impact of anthropogenic pressures on galliformes at Bedini-Ali, Nanda Devi Biosphere Reserve, Uttarakhand.** (IN) Sathyakumar, S & Sivakumar, K. (Eds.) Galliformes of India. ENVIS 10(1): 2007. Wildlife Institute of India, Dehradun. Pp. 155-162.

Chauhan, Netrapal Singh (2007): **Wild pigs.** Pp. 203-218. In: K. Sankar and S.P. Goyal (Eds.) Ungulates of India. ENVIS Bulletin: Wildlife and Protected Areas, 7(1):203-218. Wildlife Institute of India, Dehra Dun, India. Pp 448.

Choudhury, B.C., Sathyakumar, S., and Sylvia, C. (2007): **An assessment of the current status of the Indian Peafowl (*Pavo cristatus*) in India based on questionnaire surveys.** (IN) Sathyakumar, S & Sivakumar, K. (Eds.) Galliformes of India. ENVIS 10(1): 53-60. Wildlife Institute of India, Dehradun.

Fernandes, M, Mukesh, Sathyakumar, S., Kaul, R., Kalsi, R.S., and Sharma, D. (2007): **Conservation of Red Junglefowl (*Gallus gallus*) in India: Towards mapping abundance and genetic diversity.** (IN) Sathyakumar, S & Sivakumar, K. (Eds.) Galliformes of India. ENVIS. 10(1): 61-68. Wildlife Institute of India, Dehradun.

Jayapal, R., Sivakumar, K., Sathyakumar, S., and Mathur, V.B. (2007): **Distribution of galliformes vis-à-vis Biogeographic zones and protected area network in India.** (IN) Sathyakumar, S. & Sivakumar, K. (Eds.) Galliformes of India. ENVIS. 10(1): 83-94. Wildlife Institute of India, Dehradun.

Kalsi, R.S., Kaul, R., and Sathyakumar, S. (2007): **The Himalayan quail – Extinct or evasive.** Sathyakumar, S & Sivakumar, K. (Eds.) Galliformes of India. ENVIS. 10(1): 79-82. Wildlife Institute of India, Dehradun.

Pasha, K., K. Sankar, Q. Qureshi and G. Areendran (2004): **Indian Bison or gaur (*Bos gaurus*).** In: K. Sankar and S.P. Goyal (Eds.). Ungulates of India. ENVIS Bulletin: Wildlife and Protected Areas, 7(1):91-102. Wildlife Institute of India, Dehra Dun. Printed in 2007.

Sankar, K., A.J.T. Johnsingh and B. Acharya (2004): **Blue bull or nilgai (*Boselaphus tragocamelus* P. 1976).** In: K. Sankar and S.P. Goyal (Eds.). Ungulates of India. ENVIS Bulletin: Wildlife and Protected Areas, 7(1):29-40. Wildlife Institute of India, Dehra Dun. Printed in 2007.

Sankar, K., and B. Acharya (2004): **Sambar (*Cervus unicolar*).** In: K. Sankar and S.P. Goyal (Eds.). Ungulates of India. ENVIS Bulletin: Wildlife and Protected Areas, 7(1):163-170. Wildlife Institute of India, Dehra Dun. Printed in 2007.

Sankar, K. and B. Acharya (2004): **Spotted deer or chital (*Axis axis*).** In: K. Sankar and S.P. Goyal (Eds.). Ungulates of India. ENVIS Bulletin: Wildlife and Protected Areas, 7(1):171-180. Wildlife Institute of India, Dehra Dun, India. Printed in 2007.

Sathyakumar, S. and Kalsi, R.S. (2007): **Partridges, quails, francolins and snow cocks.** (IN) Sathyakumar, S & Sivakumar, K. (Eds.) Galliformes of India. ENVIS. 10(1): 3-31. Wildlife Institute of India, Dehradun.

Sathyakumar, S. and Kaul, R. (2007): **Pheasants.** (IN) Sathyakumar, S & Sivakumar, K. (Eds.) Galliformes of India. ENVIS. 10(1): 33-51. Wildlife Institute of India, Dehradun.

Sathyakumar, S., Kaul, R., Kalsi, R.S., and Sivakumar, K. (2007): **Techniques for monitoring galliformes.** (IN) Sathyakumar, S & Sivakumar, K. (Eds.) Galliformes of India. ENVIS Vol.10(1): 177-182. Wildlife Institute of India, Dehradun.

Popular articles

Hussain, S.A. (2007): **Hot weather - cold treatment: Climate change issues and our response.** WII Newsletter, 14 (1):4-7.

Talks

From WII

Shri A.K. Bhardwaj (April 16, 2008): **A Journey of change in protected area management - A case study of Periyar.** Indira Gandhi National Forest Academy, Dehradun.

Shri P.R. Sinha (April 17, 2007): **Perspectives in tiger conservation.** Advance Forest Management Training Course for IFS Officers of 1986 Batch at Indira Gandhi National Forest Academy, Dehradun.

Dr. Asha Rajvanshi (April 18, 2007): **Environmental Legislation in India – Interpretation and Implementation**. Engineering Staff College, Hyderabad.

Dr. Ruchi Badola (May 3, 2007): **Ecodevelopment planning.** Lecture to the participants of the NNRMS Course. Indian Institute of Remote Sensing, Dehradun.

Dr. Y.V. Jhala (May 7, 2007): **Monitoring tigers and their prey.** Talk to the Smithsonian Course Participants.

Shri A.K. Bhardwaj (May 10, 2007): **Biodiversity conservation issues and mitigation through community participation.** Indira Gandhi National Forest Academy, Dehradun.

Dr. V.B. Mathur (May 11, 2007): **GIS for wildlife management.** Forest Survey of India, Dehradun.

Dr. Ruchi Badola (May 11, 2007): **Integrating costs and benefits of ecosystem services into conservation.** Lecture to the participants of the Advanced Forest Management Training course for IFS officers of 1990 batch. Indira Gandhi National Forest Academy, Dehradun.

Shri P.R. Sinha (May 16, 2007): **Perspectives in Tiger Conservation.** Advance Forest Management Training course for IFS Officers of 1990 Batch. Indira Gandhi National Forest Academy, Dehradun.

Shri P.R. Sinha (May 23-25, 2007): Deliberations on topics: **(i) Need to formulate appropriate strategies for enhancing investment in forestry sector – a way ahead. (ii) Need for strengthening ecotourism outside protected areas.** Senior Foresters' Workshop for 1977 batch of IFS. Indira Gandhi National Forest Academy, Dehradun.

Dr. V.P. Uniyal (May 24, 2007): **Status and conservation of pollinators in India,** delivered to participants of Biodiversity Festival at Navdanya farm Ramgarh, Dehradun.

Dr. Y.V. Jhala (May 25, 2007): **Tiger conservation problems and prospects.** Talk to 1977 IFS batch, Indira Gandhi National Forest Academy, Dehradun.

Shri A.K. Bhardwaj (June 1, 2007): **Biodiversity conservation through community participation.** Indira Gandhi National Forest Academy, Dehradun.

Dr. Parag Nigam (June 4, 2007): **Management of wild animals in distress - rescue and rehabilitation measures.** Three-week AFM course for the officers of

10th year of service (1997 IFS Batch) at Indira Gandhi National Forest Academy, Dehradun.

Shri A.K. Bhardwaj (June 5, 2007): **Biodiversity conservation through community participation.** Indira Gandhi National Forest Academy, Dehradun.

Dr. Ruchi Badola (June 7, 2007): Lecture on **'Ecodevelopment planning'** to the participants of the NNRMS Course. Indian Institute of Remote Sensing, Dehradun.

Shri A.K. Bhardwaj (June 11, 2007): **Strengthening of institutional mechanism for capacity building in forestry sector.** Forest Research Institute University, Dehradun.

Dr. Asha Rajvanshi (June 14, 2007): **Application of remote sensing and GIS in Environmental Impact Assessment**. Indian Institute of Remote Sensing, Dehradun.

Shri Dhananjai Mohan (June 19, 2007): **NWFPs of animals origin.** IFS compulsory course at NWFP Division, Forest Research Institute University, Dehradun.

Shri A.K. Bhardwaj (June 27, 2007): **Ecotourism: Principles and role in conservation.** State Forest Service College, Dehradun.

Shri A.K. Bhardwaj (July 3, 2007): **A journey of change in protected area management - A case study of Periyar.** Indira Gandhi National Forest Academy, Dehradun.

Dr. Asha Rajvanshi (July 5, 2007): **Relevance of biodiversity in EIA.** Indira Gandhi National Forest Academy, Dehradun.

Dr. V.B. Mathur (July 6, 2007): **Role of remote sensing & GIS in EIA.** IIRS, Dehradun.

Shri P.R. Sinha (July 11, 2007): **Tiger Conservation in India.** AFMT Course for IFS Officers of 1986 batch at Indira Gandhi National Forest Academy. Indira Gandhi National Forest Academy, Dehradun.

Dr. V.B. Mathur (July 27, 2007): **Management effectiveness evaluation of protected areas.** Indira Gandhi National Forest Academy, Dehradun.

Dr. V.B. Mathur (July 30, 2007): **Management effectiveness evaluation of protected areas.** Indira Gandhi National Forest Academy, Dehradun.

Dr. Asha Rajvanshi (July 31, 2007): **Relevance of integrating biodiversity in impact assessment**. Pollution Control Research Institute (PCRI), BHEL, Haridwar.

Dr. Ruchi Badola (August 20-31, 2007): Lectures on '**Natural resources systems and practices'** to the students of PG Diploma in Natural Resources Management, I Semester. Forest Research Institute University, Dehradun.

Dr. V.B. Mathur (August 13, 2007): **Conservation in a changing world: Challenges, opportunities & way forward.** State Forest Service College, Dehradun.

Dr. V.B. Mathur (August 21, 2007): **Management effectiveness evaluation of protected areas.** Indira Gandhi National Forest Academy, Dehradun.

Dr. Asha Rajvanshi (August 21, 2007): **Retooling EIA for integration of biodiversity in development planning in key sectors**. Indira Gandhi National Forest Academy, Dehradun.

Shri Dhananjai Mohan (August 21, 2007): **Overview of wildlife management in India.** Professional skill upgradation course at Indira Gandhi National Forest Academy, Dehradun.

Shri A.K. Bhardwaj (August 23, 2007): **A journey of changes in protected area management - Case study of Periyar.** Indira Gandhi National Forest Academy, Dehradun.

Shri A.K. Bhardwaj (August 24, 2007): **Biodiversity conservation through community participation.** Indira Gandhi National Forest Academy, Dehradun.

Dr. S. Sathyakumar (August 27, 2007): **Wildlife conservation in high altitudes and high latitudes**. Talk at the Rotary Club, Dehradun–West.

Dr. Asha Rajvanshi (August 29, 2007): **Understanding EIA from screening to decision making**. Centre for Science and Environment (CSE), New Delhi.

Dr. V.B. Mathur (August 30, 2007): **Protected area network in India: Issues & challenges.** Indira Gandhi National Forest Academy, Dehradun.

Dr. Y.V. Jhala (September 3, 2007): **Application of modern technology in wildlife research.** Talk at Indira Gandhi National Forest Academy, Dehradun.

Dr. Y.V. Jhala (September 3, 2007): **Monitoring of large carnivores (Skill Up gradation Course).** Talk at Indira Gandhi National Forest Academy, Dehradun.

Dr. Parag Nigam (September 6, 2007): **A lecture-cum-demonstration on managing wild animals in distress.** For ten-week Professional Skill Up-gradation course for IFS officers inducted into IFS from SFS cadre at Indira Gandhi National Forest Academy, Dehradun.

Dr. B.K. Mishra (September 12, 2007): **Ecodevelopment planning in India - Basic concepts, issues and peoples participation.** Indian Institute of Remote Sensing, Dehradun.

Dr. Parag Nigam (September 13, 2007): **Management of wild animals in distress - rescue and rehabilitation measures.** Three-week AFM course for the officers of 10^{th} year of service (1997 IFS Batch) at Indira Gandhi National Forest Academy, Dehradun.

Dr. Ruchi Badola (September 13, 2007): Lecture on **'Stakeholder Analysis for conflict resolution in natural resource management'** to the participants of the P.G. Diploma Course. Indian Institute of Remote Sensing, Dehradun.

Shri A.K. Bhardwaj (September 14, 2007): **Biodiversity conservation through community participation.** Indira Gandhi National Forest Academy, Dehradun.

Dr. Asha Rajvanshi (September 18, 2007): **Relevance of Environmental Impact Assessment for biodiversity conservation**. Indira Gandhi National Forest Academy, Dehradun.

Dr. V.P. Uniyal (September 18, 2007): **Role of pollinators in biodiversity conservation.** Lecture delivered to stakeholders from different Indian States and abroad at Navdanya Farm Ramgarh, Dehradun.

Dr. Ruchi Badola (September 21, 2007): **Integrating costs and benefits of ecosystem services into conservation.** Lecture delivered to the participants of the Indian Institute of Remote Sensing, Dehradun.

P.Pal (September 29, 2007): **Environmental awareness and plantation programme.** Sai Grace Academy International, Dehradun.

Dr. G.S. Rawat (September 2007): Two lectures on **Techniques of inventory and survey of NTFP with special reference to medicinal plants.** Indira Gandhi National Forest Academy, Dehra Dun.

Shri A.K. Bhardwaj (October 3, 2007): **Joint forest management and sustainable rural development.** State Forest Service College, Dehradun.

Dr. Ruchi Badola (October 3, 2007): Lecture on '**Stakeholders in joint forest management'** to the participants of two week course on JFM and sustainable development for in-service SFS officers. SFS College, Dehradun.

Dr. Ruchi Badola (October 3, 2007): Lecture on **'Gender issues in joint forest management'** to the participants of two week course on JFM and sustainable development for in-service SFS officers. SFS College, Dehradun.

Shri Dhananjai Mohan (October 8, 2007): **Migration and habitat analysis of wildlife (flora and fauna).** PG Diploma in Biodiversity conservation at Forest Research Institute, University, Dehradun.

Dr. B.K. Mishra (October 11, 2007): **Participatory biodiversity conservation in India-Basic concepts and issues.** Forest Research Institute, University, Dehradun.

Dr. V.B. Mathur (October 12, 2007): **Improvements in the working of Forest Departments.** Indira Gandhi National Forest Academy, Dehradun.

Dr. Sushant Chowdhury (October, 17, 2007): **Wildlife census techniques, wildlife habitat and elephant conservation issues in India including breeding biology and demography.** Gurukul Kangri University, Hardawar.

Dr. S. Sathyakumar (October 23, 2007): **Endangered species conservation in the Himalayan Region: Legal issues and challenges**. Lecture for the SAARC Young Lawyers' Course in Environmental Law & Policy, organised by M.C. Mehta Environmental Foundation at Eco-Ashram, Rishikesh.

Dr. Ruchi Badola (October 24, 2007): **Integrating costs and benefits of ecosystem services into conservation.** Lecture to the participants of the Advanced Forest Management Training course for IFS officers of 1986 batch. Indira Gandhi National Forest Academy, Dehradun.

Dr. V.B. Mathur (October 26, 2007): **Management effectiveness evaluation: Recent experiences.** Indira Gandhi National Forest Academy, Dehradun.

Shri Dhananjai Mohan (October 27, 2007): **Field visit on distribution and identification of bird species in New Forest Campus.** State Forest Service College, New Forest, Dehradun.

Dr. Asha Rajvanshi (October 29, 2007): **Environmental Impact Assessment**. Indira Gandhi National Forest Academy, Dehradun.

Dr. K. Sankar (October 2007): **Census techniques.** Lecture delivered to the probationers at Indira Gandhi National Forest Academy, Dehradun.

Shri A.K. Bhardwaj (November 2, 2007): **Ecotourism and its role in biodiversity.** Indira Gandhi National Forest Academy, Dehradun.

Shri A.K. Bhardwaj (November 5, 2007): **Environmental protection and livelihood opportunities.** Forest Research Institute, University, Dehradun.

Shri A.K. Bhardwaj (November 15, 2007): **Ecotourism and resource conservation.** State Forest Service College, Dehradun.

Dr. S. Sathyakumar (November 18, 2007): Moderated an **Online chat on the Himalayan Musk Deer** for the Indian Wildlife Club, New Delhi. (http://www.Indianwildlifeclub.com/)

Dr. B.K. Mishra (November 23, 2007): **Ecodevelopment for biodiversity conservation - basic concepts and issues.** Forest Research Institute University, Dehradun.

Dr. B.K. Mishra (November 23, 2007): **Community participation and typology of participation.** Forest Research Institute University, Dehradun.

Dr. Ruchi Badola (November 23, 2007): **Participatory resource management.** Lecture to the students of PG Diploma in Natural Resources Management, I Semester, Forest Research Institute University, Dehradun.

P.Pal (November 26, 2007): **Biodiversity conservation.** National Children's science at Jaswant Modern Sr. Sec. School, Dehradun.

Dr. G.S. Rawat (November 2007): **Fundamentals of habitat ecology, evaluation and monitoring.** Three lectures to the students of M.Sc. Environmental Science, Forest Research Institute University, Dehradun.

Dr. Ruchi Badola (December 3, 2007): **Ecodevelopment planning and sustainability analysis.** Lecture to the students of PG Diploma in Natural Resources Management, I Semester, Forest Research Institute University, Dehradun.

Dr. V.P. Uniyal (December 3-6, 2007): **Natural resource management and sustainable development: Environmental impact.** Six lectures under refresher course in Environmental Sciences organized by UGC Academic Staff College, Goa University.

Dr. K. Sankar, Dr. S. Sathyakumar and Shri D. Mohan (December 3-7, 2007): **Wildlife Techniques, Data analysis & Interpretation.** IFS Probationers Course 2006 Batch, Indira Gandhi National Forest Academy, Dehradun. Wildlife Techniques Tour, Kanha National Park.

Dr. V.B. Mathur (December 13, 2007): **Environmental conservation: Issues, challenges & sustainability.** Orientation Module on Natural Resource Management for Indian Police Service Probationers (December 13-15, 2007). Indira Gandhi National Forest Academy, Dehradun..

Dr. Y.V. Jhala (December 14, 2007): **Importance, need and problems of tiger conservation.** Orientation Module on Natural Resource Management for Indian Police Service Probationers (December 13-15, 2007). Indira Gandhi National Forest Academy, Dehradun.

Shri Dhananjai Mohan (December 14, 2007): **Biodiversity of New Forest.** Orientation Module on Natural Resource Management for Indian Police Service Probationers (December 13-15, 2007). Indira Gandhi National Forest Academy, Dehradun.

Dr. Ruchi Badola (January 7-11, 2008): **Ecodevelopment Planning.** Lectures to the students of M.Sc Forestry 4th Semester. Forest Research Institute University, Dehradun.

Dr. V.B. Mathur (January 16, 2008): **Mainstreaming conservation with development: Need, process and experiences.** Training programme for IAS officers. Amity School of Natural Resources, Noida.

Dr. V.B. Mathur (January 17, 2008): **Interactive dialogue on wildlife – Livestock interaction.** IIM, Ahmedabad.

Dr. B.K. Mishra (January 21, 2008): **Wildlife management and ecodevelopment**. Forest Research Institute University, Dehradun.

Dr. Ruchi Badola (January 21 to February 5, 2008): Lectures on '**Natural resource economics**' to the students of PG Diploma in Natural Resources Management, Forest Research Institute University, Dehradun.

Dr. Y.V. Jhala (February 16, 2008): **Conservation crisis of large carnivores.** Talk at Jamnabai Narsee School, Juhu, Mumbai.

Dr. B.K. Mishra (February 19, 2008): **Conflict resolution mechanisms.** Forest Research Institute, University, Dehradun.

Dr. B.K. Mishra (February 20, 2008): **PRA process, tools and techniques.** Forest Research Institute University, Dehradun.

Dr. G.S. Rawat (February 28, 2008): **Alpine medicinal plants of Western Himalaya: Conservation status and research needs.** Dolphin Institute of Paramedical Sciences and Biotechnology, Dehradun.

Dr. K. Sankar (January and February, 2008): **Mammals of India and census techniques.** M.Sc. Forestry students at Forest Research Institute, Dehra Dun.

Dr. V.B. Mathur (March 8, 2008): **Natural resource management: Challenges & issues.** Orientation Module on Natural Resources Management for Indian Revenue Service Probationers at Indira Gandhi National Forest Academy, Dehradun.

Dr. Y.V. Jhala (March 8, 2008): **Importance, need and problems of tiger conservation.** Orientation Module on Natural Resources Management for Indian Revenue Service Probationers at Indira Gandhi National Forest Academy, Dehradun.

Shri Dhananjai Mohan (March 11, 2008): **Biodiversity of New Forest.** Orientation Module on Natural Resources Management for Indian Revenue Service Probationers at Indira Gandhi National Forest Academy, Dehradun.

P.Pal (March 16, 2008): **Evaluation of biodiversity conservation particularly threatened species.** India Quality Foundation and Vivekananda Study Circle, Delhi.

Dr. Asha Rajvanshi (March 20, 2008): **Application of remote sensing and GIS in Environmental Impact Assessments**. Indian Institute of Remote Sensing, Dehradun.

Dr. Ruchi Badola (March 20, 2008): **Ecodevelopment and its relevance.** Lecture to the participants of the P.G. Diploma Course. Indian Institute of Remote Sensing, Dehradun.

Dr. Asha Rajvanshi (March 31, 2008): **Environmental Impact Assessment (EIA).** State Forest Service College (SFS), Dehradun.

To WII

Dr. Subrat Kar, Indian Institute of Technology, New Delhi on June 22, 2007. **Use of smart wireless sensor networks for mitigating man-animal conflicts.**

Dr. Shaun Russell, University of Bangor, UK on July 20, 2007. **Current Advances in Natural Resource Management: Training needs and opportunities.**

Dr. Alan Rodgers, Former Chief Technical Adviser, UNDP, Tanzania on September 19, 2007. **Wildlife Research – Management Interface: Global experience.**

Dr. R. Kannan, Professor, University of Arkansas, USA on October 16, 2007. **Great Hornbill in Western Ghats & an Indian rainforest and the Ivory-billed Woodpecker in the North America: The Rediscovery and Controversy.**

Dr. Bruce Marcot, USDA Forest Service, USA on October 26, 2007. **Vocabulary of range of natural variation.**

Dr. Vibhu Prakash, Principal Scientist, BNHS on October 29, 2007. **Vulture crisis.**

Dr. Andrew Balmford, Professor of Conservation Science, Department of Zoology, University of Cambridge, UK on November 7, 2007. **Why conserving wild nature makes economic sense.**

Accounts

Separate Audit Report of the Comptroller and Auditor General of India on the Accounts of Wildlife Institute of India for the year ended 31 March 2008

We have audited the attached Balance Sheet of Wildlife Institute of India, Dehradun (WII) as on 31 March 2008, the Income & Expenditure Account and the Receipts & Payment Account for the year ended on that date under Section 19(2) of the Comptroller & Auditor General's (Duties, Powers & Conditions of Service) Act, 1971 read with Section 38G of the Wildlife (Protection) Act, 1972. These financial statements are the responsibility of the WII's management. Our responsibility is to express an opinion on these financial statements based on our audit.

2. This Separate Audit Report contains the comments of the Comptroller and Auditor General of India (CAG) on the accounting treatment only with regard to classification, conformity with the best accounting practices, accounting standards and disclosure norms, etc. Audit observations on financial transactions with regard to compliance with the law, rules & regulations (propriety and regularity) and efficiency-cum-performance aspects, etc., if any, are reported through Inspection Reports/CAG's Audit Reports separately.

3. We have conducted our audit in accordance with auditing standards generally accepted in India. These standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatements. An audit includes examining, on a test basis, evidences supporting the amounts and disclosure in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as

evaluating the overall presentation of financial statements. We believe that our audit provides a reasonable basis for our opinion.

4. Based on our audit, we report that:

(i) We have obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purpose of our audit;

(ii) The Balance Sheet, Income & Expenditure Account and Receipt & Payment Account dealt with by this report have been drawn up in the format approved by the Ministry of Finance.

(iii) In our opinion, proper books of accounts and other relevant records have been maintained by the Wildlife Institute of India as required under Section 38G of the Wildlife (Protection) Act, 1972 in so far as it appears from our examination of such books.

(iv) We further report that:

A. Balance Sheet

Understatement of Assets

1. In the Balance Sheet an amount Rs. 1,65,40,888 is depicted as investments in FDR and Rs. 13,34,370 as interest accrued in FDR relating to the GPF account. This amount excluded FDR amounting to Rs. 10,51,240 and accrued interest amounting to Rs. 9,38,242. Thus, there was understatement of assets by Rs. 19.89 lakh.

Understatement of Liabilities

1. Funds amounting to Rs. 2,11,92,566 received for Consultancy Projects during the financial year, were wrongly shown under the head "Other Income" (Schedule 18) in Income & Expenditure Account. The funds received for expenditure on specific purpose/ project should be booked under Liabilities and expenditure incurred for the purpose/

project should have been deducted from such liability. This resulted in overstatement of income and understatement of Earmarked fund to the extent of Rs 2.12 crore.

B. Income and Expenditure Account

Overstatement of income

1. The institute did not disclose prior period (2006-07) income of Rs 8,16,930 distinctly in the accounts. Accrued income of Rs.7,30,970 and Rs. 85,960 received towards interest on research projects for the year 2006-07, were wrongly booked as Income in the Income and Expenditure Account for the current year. The transaction has inflated the income by Rs. 8.17 lakh. The institute accepted the observation for future compliance (October 2008).

C. Receipt and Payment Account

Understatement of receipts

1. As per the Receipt and Payment Account, funds amounting to Rs.21,69,526 were transferred to Corpus Fund, whereas the Corpus Fund has shown a receipt of Rs. 46,90,837 leading to a difference of Rs.25,21,311 between the funds transferred and the funds received in the Corpus Fund. The difference was due to transfer of funds of Rs.25,01,609, Rs.19,352 and Rs.350 relating to surplus of HP Forest Project, interest on saving account of Corpus Fund and Miscellaneous receipts of the fund respectively. This has understated the receipts by Rs.25.21 lakh. Separate Receipt and Payment Account for transactions relating to the Corpus Fund may be maintained so as to maintain transparency in the Corpus Fund. While accepting the observation, the institute stated (October 2008) that the difference was due to transfer of funds through ledgers.

2. The revenue receipts generated by the institute during the financial year on account of Miscellaneous receipts, EMD forfeited, recovery of rent from guest house/ HLF, Bus charges from staff, sale of institute products and electricity and water bills recovered etc., amounting to Rs.23,62,509 were not booked in Receipt and Payment Account. Out of these revenue receipts, funds amounting to Rs. 21,62,735 were transferred to Corpus Fund through ledger itself and receipts of Rs. 1,99,774 on account of recovery of Electricity and water charges from staff were deducted from the expenditure head 'Electricity and water expenses' of the institute. This has led to understatement of income and receipts to the extent of Rs.23.63 lakh. The institute stated (October 2008) that revenue receipts of House Licence Fee, Bus charges and Misc. receipts etc were shown in Schedule 14 and 16 of Income and Expenditure account as 'Other income' and regarding recovery of Electricity and Water charges it accepted the observation for future compliance. The reply of the institute is not tenable as the receipts amounting to Rs.21.63 lakh were deducted from ledger itself and thus were not accounted for in annual account.

Overstatement of receipts

1. The advances paid for expenses like Forest/Travel advances during the earlier year amounting to Rs. 12,66,531/- under the head "Advance for expenses" in Consultancy account were wrongly shown as "Receipts" in Receipt & Payment Account. The transaction has resulted in overstatement of the Receipts for 2007-08 to the extent of Rs. 12.67 lakh. The institute stated (October 2008) that in the previous year's accounts, the outstanding Travel Advances were booked as expenditure instead of Current Assets and due to the observations made by Audit during the previous year the correction was made.

2. Accrued interest of Rs.53,17,924 receivable during the year, was wrongly booked in Receipt and Payment Account of Pension Account. This has led to overstatement of receipts.

D. General

1. The closing balance of fixed assets included 'Materials and Supplies' valuing (after depreciation) Rs.20,60,074 which was actually non existent in stock. The stock register for the item was not maintained. The item had been carried over in the Balance Sheet since 2002-03 and the same was being depreciated. Despite being pointed out in earlier audit reports, the institute had not taken any remedial action.

2. Current Assets Schdule-11 included closing balance of Steel and Cement valuing Rs.1,31,275 which was actually non-existent in stock. The item had been carried over in the Balance Sheet since 2002-03. Despite this being pointed out in earlier audit reports, the institute had not taken any remedial action to rectify the error.

3. The institute has not been preparing the separate Income and Expenditure Account in respect of corpus, GPF, and pension fund as a result of which the total income generated out of these funds could not be ascertained in audit.

E. Grants-in-aid

Out of the grants-in-aid of Rs. 14.00 crore received during the year, the organization utilized a sum of Rs. 14.00 crore as on 31 March 2008.

(i) Subject to our observations in the preceding paragraphs, we report that the Balance Sheet, Income & Expenditure Account and Receipt & Payment Account dealt with by this report are in agreement with the books of accounts.

(ii) In our opinion and to the best of our information and according to the explanations given to us, the said financial statements read together with the Accounting Policies and Notes on Accounts, and subject to the significant matters stated above and other matters mentioned in Annexure to this Audit Report give a true and fair view in conformity with accounting principles generally accepted in India.

a. In so far as it relates to the Balance Sheet, of the state of affairs of the Wildlife Institute of India as at 31 March 2008; and

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

For and on behalf of the C&AG of India

Principal Director of Audit (SD)

Place: New Delhi

Date : 17/12/08

WILDLIFE INSTITUTE OF INDIA, DEHRADUN
Receipt & Payment Accounts for financial year 2007-2008

RECEIPTS				PAYMENT			
Particulars	**Plan**	**Non Plan**	**Total**	**Particulars**	**Plan**	**Non Plan**	**Total**
(A) GRANT-IN-AID							
To Opening Balance				By Salaries & Allowance	26,894,996.00	10,000,000.00	36,894,996.00
Cash in Hand	**272,932.00**		**272,932.00**	By Honorarium	67,809.00		67,809.00
Cash in Bank	**4,802,036.00**		**4,802,036.00**	By Fellowship	859,058.00		859,058.00
To Recovery of Loans & Advance to Staff		521,914.00	521,914.00	By Wages	1,091,033.00		1,091,033.00
To Interests on Loan & Advance		285676.00	285,676.00	By Travel Expenses	2,674,020.00		2,674,020.00
To Grant -In-Aid From MoEF	130,000,000.00	10000000.00	140,000,000.00	By Postage & Telegram	320,051.00		320,051.00
Interest on Research Project A/c(06-07)		85,960.00	85,960.00	By Electricity & Water	3,382,360.00		3,382,360.00
Transferred from Research Project	1,506,568.00		1,506,568.00	By Conveyance Charges	4,607.00		4,607.00
To Grants for Other Projects	898,265.00		898,265.00	By Medical Expenses	3,142,397.00		3,142,397.00
To M.Sc. Course Fee	202,700.00		202,700.00	By Operational Expenditure	2,811,073.00		2,811,073.00
To CGEGIS		895.00	895.00	By OTA	674,377.00		674,377.00
To EPF Contribtuion		585.00	585.00	By POL for Vehicle/DG Set	2,828,985.00		2,828,985.00
To GPF Contribution payable			0.00	By Repair and maintenance of Veh.	1,195,236.00		1,195,236.00
To TDS		4643.00	4,643.00	By Publicaton, Film etc.	664,620.00		664,620.00
To Leave Salary & Pension Contribution		38,782.00	38,782.00	By Stationery & Computer Consumables	1,960,614.00		1,960,614.00
To workshop & Seminars	44,903.00		44,903.00	By Repair & Maintenance of Equipment & Furniture	376,751.00		376,751.00
				By Computer & Assessories	3,931,069.00		3,931,069.00
To Interest on saving a/c Research Project (2007-08)		37,652.00	37,652.00	By Sales Tax/Trade Tax/Professional Tax	0.00	124,959.00	124,959.00
To Consultancy		171,335.00	171,335.00	By Furniture & Fixtures	752,575.00		752,575.00
Rent		546916.00	546,916.00	By Journals & Periodicals	5,038,417.00		5,038,417.00
Bus Charges		95797.00	95,797.00	By Advance for expenses to Staff	244,022.00		244,022.00
To WII Product		164544.00	164,544.00	By Lab Expenses (Research Lab)	1,019,286.00		1,019,286.00
T o Interest on Bank Deposit		661191.00	661,191.00	By Lab Equipment (Research Lab)	943,985.00		943,985.00
To Misc. Receipts		228293.00	228,293.00	By Office Equipment	753,062.00		753,062.00
				By Training Equipment	438,670.00		438,670.00
				By Cable Charges	2,100.00		2,100.00
				By Library Book	505,999.00		505,999.00
				By Refund of Hostel Caution Money	0.00	109,450.00	109,450.00
				By EMD release	0.00	35,310.00	35,310.00
				By AMC of Computers	1,123,523.00		1,123,523.00
				By Annual Research Seminar	589,524.00		589,524.00

				By Bonus	315,867.00		315,867.00
				By Estate Maintenance/Management	1,458,905.00		1,458,905.00
				By Pension Contribution	54,693.00		54,693.00
				By Estate Security	5,209,203.00		5,209,203.00
				By Leave Salary & Pension Contribution	1,447,716.00		1,447,716.00
				By Legal Expenses	275,550.00		275,550.00
				By LTC	428,195.00		428,195.00
				By M. Sc. Course Expenditure	999,685.00		999,685.00
				By Printing & binding	30,941.00		30,941.00
				By Sports Goods	93,866.00		93,866.00
				By Telephone & Tc	669,976.00		669,976.00
				By Transferred to Training Account for Exp	4,714,033.00		4,714,033.00
				By Workshop/ Seminar	412,813.00		412,813.00
				By Corpus Fund	2,169,526.00		2,169,526.00
				By Advance to CPWD for Civil Works	25,786,644.00		25,786,644.00
				By Lab Equipment (Forensic Lab)	1,780,128.00		1,780,128.00
				By Lab Expenses (Forensic Lab)	2,566,036.00		2,566,036.00
				By Govt. Contribution to Pension Fund	5,000,000.00		5,000,000.00
				By Sharing of cost of Kendriya Vidyalaya	1,107,280.00		1,107,280.00
				Forests Advance (Research Project)	1,742,335.00		1,742,335.00
				Travel Advance (Research Project	357,280.00		357,280.00
				By Office Equipment (Research Project)	620,606.00		620,606.00
				By Camp Expenses (Research Project)	505,299.00		505,299.00
				By Contigencies/ Misc. (Research Project)	2,339,276.00		2,339,276.00
				By Fellowship & Wages (Research Project)	5,217,735.00		5,217,735.00
				By POL & Maintenance of Vehicle (Research Project)	2,116,188.00		2,116,188.00
				By Travel Expenses (Research Project)	1,210,031.00		1,210,031.00
				By Camp Equipment (Research Project)	3,077,969.00		3,077,969.00
				By GPF	5,040.00		5,040.00
				Loan to A/c No. 60	170,043.00		170,043.00
				By Closing in Bank	***3,913,684.00***		**3,913,684.00**
				By Closing in Hand	***215,106.00***		**215,106.00**
A' Total	**137,727,404.00**	**12,844,183.00**	**150,571,587.00**	**A' Total**	**140,301,868.00**	**10,269,719.00**	**150,571,587.00**

(B) TRAINING ACCOUNT

RECEIPTS				PAYMENT			
Particulars	**Plan**	**Non Plan**	**Total**	**Particulars**	**Plan**	**Non Plan**	**Total**
To Opening Balance in Bank		**6,214,456.00**	**6,214,456.00**	By Training Equipment		542105.00	542,105.00
Interest Received on Saving A/c		233,784.00	233,784.00	By Contigency & Misc. Expenses		2222563.00	2,222,563.00
To Receipt for Training Exp		4714033.00	4,714,033.00	By Honorarium/ TA/DA to Guest Faculty		191132.00	191,132.00
To Misc Receipts		2025028.00	2,025,028.00	By Training Allowance		598996.00	598,996.00
Receipts for 2006-07		50000.00	50,000.00	By Travelling Allowance		1099879.00	1,099,879.00
				By Pol/Maintenance of Vehicle		389922.00	389,922.00
				By Office Equipment		237167.00	237,167.00
				By Furniture & Fixture		203703.00	203,703.00
				By Advance for Expenses		653655.00	653,655.00
				By Transfer to Consultancy A/c		93119.00	93,119.00
				By Closing in Bank		**7005060.00**	**7,005,060.00**
B' Total		**13,237,301.00**	**13,237,301.00**	**C' Total**		**13,237,301.00**	**13,237,301.00**

(C) CONSULTANCY PROJECTS

RECEIPTS				PAYMENT			
Particulars	**Plan**	**Non Plan**	**Total**	**Particulars**	**Plan**	**Non Plan**	**Total**
To Opening Balance in Bank		**7,556,596.00**	**7,556,596.00**	By Camp Equipment		1645413.00	1,645,413.00
Grant Received		21,192,566.00	21,192,566.00	Office Equipment		494323.00	494,323.00
To Misc. Receipts		153,398.00	153,398.00	By Camp Expenses		108020.00	108,020.00
To Misc Receipt from Training A/c		93,119.00	93,119.00	By Cont./ Misc.		3016355.00	3,016,355.00
To EMD Received		6,000.00	6,000.00	By Fellowship & Wages		5091558.00	5,091,558.00
Advance for Expenses		1,266,531.00	1,266,531.00	By Travel Expenses		2189530.00	2,189,530.00
Interest Earned on Saving A/c		191,790.00	191,790.00	By POL & Maintenance of vehicle		3409356.00	3,409,356.00
				By Publication		501909.00	501,909.00
				By GIS of office Data		1351490.00	1,351,490.00
				By Closing in Bank		**12652046.00**	**12,652,046.00**
C' Total		**30,460,000.00**	**30,460,000.00**	**E' Total**		**30,460,000.00**	**30,460,000.00**

(D) PENSIONS

RECEIPTS				PAYMENT			
Particulars	**Plan**	**Non Plan**	**Total**	**Particulars**	**Plan**	**Non Plan**	**Total**
To Opening Balance in Bank		**143,795.00**	**143,795.00**				
To Interest received		27,122.00	27,122.00	By Investment in FDR		11,617,924.00	11,617,924.00
To WII Contribution		7,432,140.00	7,432,140.00	By Pension/ Family Pension		1,185,110.00	1,185,110.00
To interest accrued		5,317,924.00	5,317,924.00	***By Closing in Bank***		**117947**	***117,947.00***
D' Total	**0.00**	**12,920,981.00**	**12,920,981.00**	**D' Total**	***0.00***	**12,920,981.00**	**12,920,981.00**

(E) GPF

RECEIPTS				PAYMENT			
Particulars	**Plan**	**Non Plan**	**Total**	**Particulars**	**Plan**	**Non Plan**	**Total**
To Opening Balance in Bank		**2,222,385.00**	**2,222,385.00**				
To GP Fund Contribution		5,014,264.00	5,014,264.00	By Final Payment		456,634.00	456,634.00
To Interest on Bank Deposit		62,498.00	62,498.00	By Investment in FDR		1,000,000.00	1,000,000.00
To Encashment of FDR		0.00	0.00	By Advance/withdrawl		3,457,175.00	3,457,175.00
				By Closing in Bank		**2,378,258.00**	**2,378,258.00**
				By Closing in Cash		**7,080.00**	**7,080.00**
E' Total	**0.00**	**7,299,147.00**	**7,299,147.00**	**F' Total**		**7,299,147.00**	**7,299,147.00**
Grand Total (A+B+C+D+E)		**76,761,612.00**	**214,489,016.00**	**Grand Total (A+B+C+D+E)**	**140,301,868.00**	**74,187,148.00**	**214,489,016.00**

(S.K. Khantwal)
Finance Officer

(P.R. Sinha)
Director

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATION)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
BALANCE SHEET AS ON 31 MARCH 2008

Amount (Rs.)

CORPUS /CAPITAL FUND AND LIABILITIES	Schedule	Current Year	Previous Year
CORPUS /CAPITAL FUND	**1**	279156087.00	249801203.00
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**	416356.00	416356.00
DEFERRED CREDIT LIABILITIES	**6**	0.00	0.00
CURRENT LIABILITIES AND PROVISION	**7**	107041395.00	113541898.00
TOTAL (A)		**386613838.00**	**363759457.00**
ASSETS			
FIXED ASSETS	**8**	199591680.00	197268680.00
INVESTMENTS- FROM EARMARKED / ENDOWMENT FUNDS	**9**	0.00	0.00
INVESTMENTS- OTHERS	**10**	130148016.00	111010582.00
CURENT ASSETS, LOANS, ADVANCES ETC.	**11**	56874142.00	55480195.00
MISCELLANEOUS EXPENDITURE (to the extent not written off or adjusted)			
TOTAL (B)		**386613838.00**	**363759457.00**

(S.K. Khantwal)
Finance Officer

(P.R. Sinha)
Director

Financial Statement (Non-Profit Organization)

Wildlife Institute of India, Dehradun

SHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2008

			Amount (Rs.)	
			Current Year	Previous Year
SCHEDULE 1: CORPUS/ CAPITAL FUND				
Balance as at the begninig of the year			224348008.00	259585645.55
Add: Contribution towards Corpus/ Capital fund			36999763.00	30850704.00
Add/(Deduct) : Balance of net income (expenditure) transferred from			-15939630.00	-66088341.55
TOTAL	**A**		**245408141.00**	**224348008.00**
Corpus Fund				
Opening Balance			25453195.00	
Received during the year			4690837.00	
Add Accrued Interest			2709288.00	
Add Previous year balance which is not accounted for			894626.00	
Total	**B**		**33747946.00**	25453195.00
TOTAL A+B			**279156087.00**	**249801203.00**
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			378235.00	378235.00
Loans			38121.00	38121.00
TOTAL			**416356.00**	**416356.00**
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		1225099.00		24507927.00
(2.2) Payment outstanding for Training A/C		1030.00		
(2.3) Payment outstanding for Cons Project		59884.00		

(2.4) Payment outstanding for Supply of items(2005-06)	100346.00		
(2.5) Payment outstanding for 2005-06	500000.00		
(2.6) Other Payments outstanding(Grant-in-aid) (07-08)	3095350.00	4981709.00	
(3) Advances Received			
Hostel Caution Money		27710.00	137160.00
(4) Interest accrued but not due on			
(1) Secured Loans/Borrowings			
(2) Unsecured Loans/Borrowings			
(5) Statuary Liabilities			
(1) Overdue			
(2) Others (Specify)			
Pension Fund		73597061.00	62004985.03
GP Fund		27684597.00	26111421.05
(6) Others (Specify)			
EMD Received		709158.00	744468.00
TOTAL (A)		**107000235.00**	**113505961.08**
(B) Provisions			
(1) For Taxation			
Income Tax Salary			0.00
TDS		25832.00	21189.00
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			
CM Relief Fund			
CGEGIS			-1135.00
Cable		0.00	2100.00
GPF		2460.00	7500.00
SP & FB Fund			
Car/Scooter Adv. (Transferrable)			
Sale Tax/Trade Tax/Prof.Tax/ Com. Tax		0.00	0.00
EPF Contribution (Training A/c)			
House Licence Fee (Consultancy A/c)			
EPF Subscription		5564.00	4979.00
EMD Const. Project		7000.00	1000.00
TOTAL (B)		**41160.00**	**35937.00**
TOTAL (A+ B)		**107041395.00**	**113541898.08**

SCHEDULE 8 : FIXED ASSETS

Particulars	Gross Block					DEPRECIATION				NET BLOCK	
	Cost as at the beginning of the year	Addition during the year Upto 30-Sep	Addition during the year After 30-Sep	Deduction during the year	Cost as at the end of the year	As at the beginning of the year	For the year	Deduction during the year	At the end of the year	As at the current year-end	As at the previous year-end
LAND											
BLOCK: 0%											
Avenue Plantations	3438280.00	0.00	0.00	0.00	3438280.00	0.00	0.00	0.00	0.00	3438280.00	**3438280.00**
Land	6607214.58	0.00	0.00	0.00	6607214.58	0.00	0.00	0.00	0.00	6607214.58	**6607214.58**
Trees	2432709.00	0.00	0.00	0.00	2432709.00	0.00	0.00	0.00	0.00	2432709.00	**2432709.00**
TOTAL	**12478203.58**	**0.00**	**0.00**	**0.00**	**12478203.58**	**0.00**	**0.00**	**0.00**	**0.00**	**12478203.58**	**12478203.58**
BUILDINGS											
BLOCK: 10%											
Architectural & Supervision Fee	5292548.06	0.00	0.00	0.00	5292548.06	588060.90	529254.81	0.00	529254.81	4763293.25	**5292548.06**
Auditorium	7925431.68		0.00	0.00	7925431.68	880603.52	792543.17	0.00	792543.17	7132888.51	**7925431.68**
Boundary Fencing	482982.72	0.00	0.00	0.00	482982.72	53664.75	48298.27	0.00	48298.27	434684.45	**482982.72**
Boundary Wall	853967.03	0.00	0.00	0.00	853967.03	94885.23	85396.70	0.00	85396.70	768570.33	**853967.03**
Building Complex	87538504.40	0.00	12340558.00	0.00	99879062.40	9312540.66	9370878.34	0.00	9370878.34	90508184.06	**87538504.40**
Campus Development	8498385.05	0.00	3263532.00	0.00	11761917.05	824042.78	1013015.10	0.00	1013015.10	10748901.95	**8498385.05**
Materials and Supplies	2288972.12	0.00	0.00	0.00	2288972.12	254330.24	228897.21	0.00	228897.21	2060074.91	**2288972.12**
Tennis Court	313462.93	0.00	0.00	0.00	313462.93	34829.21	31346.29	0.00	31346.29	282116.64	**313462.93**
Sports Complex	198624.80	0.00	0.00	0.00	198624.80	22069.42	19862.48	0.00	19862.48	178762.32	**198624.80**
BLOCK: 20%									0.00		
Road & Culvert	749377.64	0.00	0.00	0.00	749377.64	187344.41	149875.53	0.00	149875.53	599502.11	**749377.64**
Staff Quarters	1040554.39	0.00	529921.00	0.00	1570475.39	260138.60	261102.98		261102.98	1309372.41	**1040554.39**
TOTAL	**115182810.82**	**0.00**	**16134011.00**	**0.00**	**131316821.82**	**12512509.72**	**12530470.88**	**0.00**	**12530470.88**	**118786350.94**	**115182810.82**
PLANT MACHINERY & EQUIPMENT											
BLOCK: 20%											
Vehicle	1860305.63	0.00	0.00	0.00	1860305.63	465076.41	372061.13	0.00	372061.13	1488244.50	**1860305.63**
Development of Forensic Laboratory	5594960.42	695937.00	1084191.00	0.00	7375088.42	1271361.10	1366598.58	0.00	1366598.58	6008489.84	**5594960.42**
Training Equipment	9095710.05	0	438670	0.00	9534380.05	2273927.51	1863009.01	0.00	1863009.01	7671371.04	**9095710.05**
Correction during the year Training Eq.	-7845798.18	0.00	0.00	0.00	-7845798.18	0.00	-1569159.64	0.00	-1569159.64	-6276638.54	**-7845798.18**
BLOCK: 25%					0.00				0.00		
AC Plant	2074479.03	0.00	0.00	0.00	2074479.03	691493.01	518619.76	0.00	518619.76	1555859.27	**2074479.03**
Camp Equipment (project)	563969.70	0.00	0.00	0.00	563969.70	187989.90	140992.43	0.00	140992.43	422977.27	**563969.70**
DG Set	467567.60	0.00	0.00	0.00	467567.60	155855.87	116891.90	0.00	116891.90	350675.70	**467567.60**
EPABX	243474.61	0.00	0.00	0.00	243474.61	81158.20	60868.65	0.00	60868.65	182605.96	**243474.61**
Correction during the year for EPABX	154687.50	0.00	0.00	0.00	154687.50	0.00	38671.88	0.00	38671.88	116015.62	**154687.50**
Lab Equipment	8495374.33	418696.00	525289.00	0.00	9439359.33	2478072.94	2294178.71	0.00	2294178.71	7145180.62	**8495374.33**
Office Equipment	4748538.97	390219.00	362843.00	0.00	5501600.97	1565392.16	1330044.87	0.00	1330044.87	4171556.10	**4748538.97**
Training Equipment	1171792.38	47426.00	494679.00	0.00	1713897.38	390597.46	366639.40	0.00	366639.40	1347257.98	**1171792.38**
Correction during the year for Train. Eq.	7355435.79	0.00	0.00	0.00	7355435.79	0.00	1838858.95	0.00	1838858.95	5516576.84	**7355435.79**
Office Equipment (Project)	27540.00	0.00	0.00	0.00	27540.00	9180.00	6885.00	0.00	6885.00	20655.00	**27540.00**
Camp Equipment (Conslt. Project)	10019944.73	1167245.00	478168.00	0.00	11665357.73	3339981.58	2916339.44	0.00	2916339.44	8749018.29	**10019944.73**
Office Equipment (Research Project)	2458027.02	191077.00	429529.00	0.00	3078633.02	798866.84	715967.14	0.00	715967.14	2362665.88	**2458027.02**
Correction during the year for (Res. Project-Office Eq.)	-43857.56	0.00	0.00		-43857.56	0.00	-10964.39	0.00	-10964.39	-32893.17	**-43857.56**
Camp Equipment (Research Project)	3722889.59	2045803.00	1032166.00	0.00	6800858.59	906348.20	1571193.90	0.00	1571193.90	5229664.69	**3722889.59**
TOTAL	**50165041.59**	**4956403.00**	**4845535.00**	**0.00**	**59966979.59**	**14615301.18**	**13937696.72**	**0.00**	**13937696.72**	**46029282.87**	**50165041.59**

FURNITURE, FIXTURES											
BLOCK : 15%											
Furnitures & Fixtures	9539742.83	282035.00	674243.00	0.00	10496020.83	1706527.56	1523834.90	0.00	1523834.90	8972185.93	**9539742.83**
Correction during the year for Furniture & Fixture	-742888.63	0.00	0.00	0.00	-742888.63	0.00	-111433.29	0.00	-111433.29	-631455.34	-742888.63
Furniture & Fixture	9795.30	0.00	0.00	0.00	9795.30	1728.58	1469.25	0.00	1469.25	8326.05	**9795.30**
TOTAL	**8806649.50**	**282035.00**	**674243.00**	**0.00**	**9762927.50**	**1708256.14**	**1413870.86**	**0.00**	**1413870.86**	**8349056.64**	**8806649.50**
OFFICE EQUIPMENT											
BLOCK : 20%											
Office Equipment (Training A/c)	9461.76	237167.00	0.00	0.00	246628.76	2365.44	49325.76	0.00	49325.76	197303.00	**9461.76**
Office Equipment (Conslt. Project)	122001.61	357086.00	137237.00	0.00	616324.61	40667.20	109541.23	0.00	109541.23	506783.38	**122001.61**
TOTAL	**131463.37**	**594253.00**	**137237.00**	**0.00**	**862953.37**	**43032.64**	**158866.99**	**0.00**	**158866.99**	**704086.38**	**131463.37**
COMPUTER/PERIPHERALS											
BLOCK : 20%											
Computer and Periphrals	1916102.86	0.00	0.00	0.00	1916102.86	479025.72	383220.57	0.00	383220.57	1532882.29	**1916102.86**
BLOCK : 60%					0.00				0.00	0.00	**0.00**
Computer & Accessories	3770792.30	2299715.00	1631354.00	0.00	7701861.30	3316537.95	4131710.58	0.00	4131710.58	3570150.72	**3770792.30**
TOTAL	**5686895.16**	**2299715.00**	**1631354.00**	**0.00**	**9617964.16**	**3795563.67**	**4514931.15**	**0.00**	**4514931.15**	**5103033.01**	**5686895.16**
LIBRARY BOOKS											
BLOCK : 10%											
Journals & Periodicals	2855644.20	3711025.00	1227953.00	0.00	7794622.20	317293.80	718064.57	0.00	718064.57	7076557.63	**2855644.20**
Correction during the year for Journals & Periodicals	-167381.00	0.00	0.00	0.00	-167381.00	0.00	-16738.10	0.00	-16738.10	-150642.90	**-167381.00**
Library Books	839551.50	410862.00	95137.00	0.00	1345550.50	93283.50	129798.20	0.00	129798.20	1215752.30	**839551.50**
TOTAL	**3527814.70**	**4121887.00**	**1323090.00**	**0.00**	**8972791.70**	**410577.30**	**831124.67**	**0.00**	**831124.67**	**8141667.03**	**3527814.70**
GRAND TOTAL	**195978878.73**	**12254293.00**	**24745470.00**	**0.00**	**232978641.73**	**33085240.65**	**33386961.27**	**0.00**	**33386961.27**	**199591680.46**	**195978878.73**

SCHEDULE :10 INVESTMENT - OTHERS		
(1) In the Govt. Securities		
(2) Other approved Securities		
(3) Shares		
(4) Debentures and Bonds		
Investment in RBI Bond (GPF)	7416000.00	7416000.00
Investment in RBI Bond (Pension)	19308000.00	19308000.00
(5) Subsidaries and Joint Ventures		
(6) Others (Specify)		
Investment in FDR (Pension Fund)	48853190.00	42553190.00
Interest Accrued in FDR (Pension Fund)	5317924.00	0.00
Investment in FDR (GPF)	16540888.00	16473035.79
Interest Accrued in FDR (GPF)	1342370.00	0.00
FDR Corpus Fund	28660356.00	25260356.00
Interest Accrued in FDR (Corpus Fund)	2709288.00	0.00
TOTAL	**130148016.00**	**111010581.79**
SCHEDULE :11 CURRENT ASSETS, LOANS, ADVANCES ETC.		
(A) CURRENT ASSETS		
(1) Inventories		
Closing Stock of Steel & Cement	131275.00	131274.90
Advance paid for Journals (Grant in Aid)	99439.00	0.00
Grant-in-Aid accrued but not received	0.00	20000000.00
Closing Balance of WII Publication	1086471.00	1086471.00
CGEGIS	240.00	
(2) Sundry Debtors		
(1) Debts Outstanding for a period exceeding six months	227338.00	0.00
(2) Others (Specify)		0.00
(3) Cash balances in hand (including cheques/drafts and imprest)		
Grant-in-Aid A/c	215106.00	274372.00
Research Project A/c	0.00	76.00
Training A/c	0.00	0.00
Consultancy A/c	0.00	0.00
Pension Fund A/c	0.00	0.00
GPF A/c	7080.00	0.00
(4) Bank Balances		
(1) With Scheduled Banks		
Grant-in-Aid A/c	3913684.00	4802036.00
Research Project A/c	0.00	1506567.85
Training A/c	7005060.00	6214455.99
Consultancy A/c	12652046.00	7556596.00
Pension Fund A/c	117947.00	143795.00
GPF A/c	2378259.00	2222385.26
Corpus fund No 4032	2378302.00	192839.00
(2) With Non-Scheduled Banks		
(5) Post Office-Savings Accounts	0.00	0.00
TOTAL (A)	**30212247.00**	**44130869.00**

(B) LOANS, ADVANCES AND OTHER ASSETS			
(1) Loans			
(1) Staff			
	Loan & Advances to Staff	1537130.00	883364.00
	Advance for expenses to Staff	1492851.00	1512453.00
	Advance for Expenses to Staff (Training A/c)	1385602.00	0.00
	Advance for expenses (Research Projects)	3131204.00	1105467.00
	Advance for expenses (Conslt. Project)	1144285.00	427161.00
(2) Other entities engaged in activities /objectives similar to			
(3) Others (Specify)			
	Adv for civil work to CPWD	14505631.00	4852998.00
	Loan to Other A/c To A/c No. 4032	15774.00	0.00
	Loan to A/c No. 60	170043.00	0.00
	Advance paid to firms for Training A/c	158000.00	
(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	0.00	948538.00
(3) Income Accrued			
(1) On Investments from Earmarked / Endowment Funds		0.00	0.00
(2) On Invesments -Others		0.00	0.00
(3) On Loans and Advances		0.00	0.00
(4) Others (Specify)		0.00	0.00
	Training Cost Accrued But not Received	838375.00	888375.00
	Amount sanctioned but not received(Consultancy project)	0.00	0.00
	Pre-receipted bill issued but not received	730970.00	730970.00
(4) Expenses Payable towards Capital/ Fixed Assets			
1)	Research Projects	798855.0	
2)	Grant in Aid A/c	753175.0	
TOTAL (B)		**26661895.00**	**11349326.00**
TOTAL (A+B)		**56874142.00**	**55480195.00**

(S.K. Khantwal)
Finance Officer

(P.R. Sinha)
Director

FINANCIAL STATEMENTS(NON-PROFIT ORGANISATION)

Wildlife Institute of India, Dehradun

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR 2007-08

(Amt. Rs.)

	Schedule	Current Year	Previous Year
INCOME			
Income from Sales/Services	12	0.00	0.00
Grants/Subsidies	13	83000237.00	99149296.00
Fees/Subscriptions	14	9519148.00	9637657.00
Income from Investments (Income on Invest from earmarked/endowment	15	0.00	0.00
Funds transferred to Funds)			
Income from Royalty, Publication etc	16	1035550.00	1938540.00
Interest Earned	17	1496053.00	707926.00
Other Income	18	22337348.00	29873140.73
Increase/decrease) in stock of Finished goods and works-in-progress	19	0.00	0.00
TOTAL (A)		**117388336.00**	**141306559.73**
EXPENDITRUE			
Establishment Expenses (Plan & Non Plan)	20	56262329.00	78463800.00
Other Administrative Expenses (Plan & Non Plan)	21	43678676.00	95845860.65
Expenditure on Grants, Subsidies etc.	22	0.00	0.00
Interest	23	0.00	0.00
Depreciation (Net Total at the year end - corresponding to Schedule 8)		33386961.00	33085240.63
Total (B)		**133327966.00**	**207394901.28**
Balance being excess of Income over Expenditure (A-B)		-15939630.00	-66088341.55
BALANCE BEING SURPLUS (DEFICIT) CARRIED TO CORPUS/CAPITAL FUND		**-15939630.00**	**-66088341.55**

(S.K. Khantwal)
Finance Officer

(P.R. Sinha)
Director

Form of Financial Statement (Non Profit Organization)

Wildlife Institute of India, Dehradun

SCHEDULE FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR 2007-08

			Amount (Rs.)	
			Current Year	Previous Year
SCHEDULE :13 GRANTS/SUBSIDIES				
(1) Central Government				
Grant -in- Aid from MoEF		140000000		
Less Received for 2006-07		-20000000		
Amt capitalized	(-)	-36999763		
Total		**83000237**	**83000237.00**	99149296.00
(2) State Government(s)				
(3) Government Agencies				
(4) Institutions/Welfare Bodies				
(5) International Organisations				
(6) Others (Specify)				
WII Contribution (Pension A/c)				
TOTAL			**83000237.00**	**99149296.00**
SCHEDULE :14 FEES/ SUBSCRIPTIONS				
(1) Entrance Fees				
M.Sc.Course Fee			202700.00	0.00
(2) Annual Fees/ Subscriptions				
(3) Seminar/ Program Fees				
Seminar/ Workshop Fees			44903.00	0.00
(4) Consultancy Fees				
Consultancy refund			171335.00	0.00
(5) Others (Specify)				
Other Receipt (Training)				
Receipt for Training courses			4714033.00	6414800.00
Add Transferred from Research Project			1630179.00	0.00
Pre-receipted bill issued but not received			730970.00	730970.00
Misc. Receipts (Training A/c)			2025028.00	2491887.00
Receipt for Training Cost				
TOTAL			**9519148.00**	**9637657.00**
SCHEDULE :16 INCOME FROM ROYALTY, PUBLICATION ETC.				
(1) Income from Royalty				
(2) Income from Publications				
(3) Others (Specify)				
Misc. Receipts			228293.00	1938540.00
WII Products			164544.00	
House Licence Fee			546916.00	0.00
Bus Charges			95797.00	0.00
Lab Testing Charges			0.00	0.00
TOTAL			**1035550.00**	**1938540.00**

SCHEDULE :17 INTEREST EARNED		
(1) On Term Deposits		
(1) With Scheduled Banks		
Int. on Bank Deposit	0.00	0.00
Interest on FDR	0.00	
Interest on Investment	0.00	
(2) With Non-Scheduled Banks	0.00	
(3) With Institutions	0.00	
(4) Others (Specify)	0.00	
Int. on Investment(Training)	0.00	458275.00
Interest (Training)	0.00	249651.00
(2) On Savings Account		
(1) With Scheduled Banks		
Int. on Savings Account	661191.00	
Interest on Saving A/c (Training A/c)	233784.00	
Interest on Saving A/c (Research Project)	123612.00	
Interest Earned on Consultancy A/c	191790.00	
(2) With Non-Scheduled Banks		
(3) Post Office Savings Account		
(4) Others (Specify)		
(3) On Loans		
(1) Interest on Loan & Advance	285676.00	
(2) Others		
(4) Interest on Debtors and Other Receivables		
TOTAL	**1496053.00**	**707926.00**
SCHEDULE :18 OTHER INCOME		
(1) Profit on Sale/Disposal of Assets		
(1) Owned Assets	0.00	
(2) Assets acquired out of grants, or received free of cost	0.00	
(2) Export Incentives realized	0.00	
(3) Fees for Misc. Services	0.00	
(4) Others (Specify)		
Misc. Receipts	0.00	
Consultancy Project Received during the year	21192566.00	11610000.00
EMD Forfeited	0.00	0.00
Research Project	0.00	0.00
Rent	0.00	0.00
WII Products	0.00	0.00
Misc. Receipts (Penal Int. on Car Advance)	0.00	0.00
Misc. Receipts & (Consultancy A/c)	246517.00	3763025.73
Receipt for Project	898265.00	0.00
Misc. Receipts for Research Project	0.00	14500115.00
TOTAL	**22337348.00**	**29873140.73**
SCHEDULE :19 INCREASE/DECREASE IN STOCK OF FINISHED GOODS		
(1) Closing Stock		
(1) Finished Goods		
Closing Stock of WII Publication	0.00	0.00
(2) Work-in-progress		
(2) Less : Opening Stock		
(1) Finished Goods	0.00	0.00
(2) Work-in-progress	0.00	0.00
TOTAL	**0.00**	**0.00**

		Amount (Rs.)		
		Current Year		Previous Year
		Plan	Non Plan	
SCHEDULE :20 ESTABLISHMENT EXPENSES				
(1) Salaries and Wages				
Fellowship		859058.00		858997.00
Honorarium		67809.00		80650.00
Medical		3142397.00		3576639.00
Salaries & Allowances		26894996.00	10000000.00	32094411.00
Stipend		172800.00		0.00
Wages		1091033.00		1067031.00
Fellowship & Wages (Consl. Project)		0.00	5091558.00	6794584.00
Fellowship & Wages (Research Project)		5217735.00		5389464.00
(2) Allowances and Bonus				
Bonus		315867.00		315966.00
OTA		674377.00		676837.00
LTC		428195.00		614288.00
Corps Fund (Training)		0.00		13591632.00
Honorarium (Training A/c)		0.00	191132.00	183580.00
(3) Others (Specify)				
Trans to Project A/C				12500000.00
Transferred to Consultancy Account			93119.00	0.00
(4) Contribution to Other Fund (Specify)				
Leave Salary and Pension Contr. (1447716-38782)		1408934.00		0.00
(5) Staff Welfare Expenses				
Uniforms		0.00		0.00
Employer Contribution to EPF(Training)		0.00		0.00
(6) Expenses on Employees Retirement and Terminal Benefits				
Final Payment		0.00		0.00
Leave Encashment		0.00		0.00
Leave Salary and Pension Contribution		0.00		0.00
(7) Others (Specify)				
Camp Expenses (Consl. Project)		0.00	108020.00	118738.00
Camp Expenses (Research Project)		505299.00		600983.00
TOTAL		**40778500.00**	**15483829.00**	**78463800.00**
SCHEDULE :21 OTHER ADMINISTRATIVE EXPENSES				
AMC of Computers		1123523.00		238146.00
Annual Research Seminar		589524.00		561310.00
Auditors Remuneration		0.00		0.00
Consultancy Charges		0.00		1011338.00
Consultancy project Exp.		0.00		0.00
Cont./Misc. (Conslt. Project)	(3016355 - 307750 for 2006-07)	0.00	2708605.00	2621861.00
Contingencies/Misc. (Project)		0.00		0.00
Contingencies/Misc. (Research Project)	(2339276 - 277443 for 2006-07)	2061833.00		1921405.40
Conveyance Charges		4607.00		5755.00
Cont./Misc.(Training Account)	(2064563 - 57754 for 2006-07)	0.00	2006809.00	3571563.00
Electricity and Water Charges		3382360.00		2753591.00
Entertainment Charges		0.00		0.00
EPF Contribution		0.00		0.00
Estate Maintenance		1458905.00		2073029.00
Estate Security		5209203.00		3698849.00
GIS of Office Data (Conslt. Project)		0.00	1351490.00	2298115.00
Govt. Contribution to Pension Fund		5000000.00		5000000.00
IUCN Contribution		0.00		0.00
Lab Expenses (Research lab)		1019286.00		2553149.00
Lab Expenses (Forensic Lab)		2566036.00		0.00

Legal Expenses	275550.00		163643.00
Library Expenses	0.00		529823.00
Misc Receipts transferred to Corpus Fund	0.00		2003626.00
Misc Receipts transferred to Corpus Fund(Conslt. Project)	0.00		6095388.00
M.Sc. Course Expenditure	826885.00		1140794.00
Operational Expenses	2811073.00		5661741.00
Cable Charges	0.00	2100.00	0.00
Pension Contribution	54693.00		633136.00
POL & Maintenance of Vehicle (Research Project)	2116188.00		2114780.25
POL & Maintenance of Vehicle (Conslt. Project)	0.00	3409356.00	2891753.00
POL & Maintenance of Vehicle (Training A/c)	0.00	389922.00	0.00
POL for Vehicles/DG Set	2828985.00		2575226.00
Postage & Telegrams	320051.00		347258.00
Printing & Binding	30941.00		254163.00
Publication (664620 - 519749 for 2006-07)	144871.00		542756.00
Publication(Conslt. Project)	0.00	501909.00	359495.00
Repair & Maintenance of Vehicles	1195236.00		1397423.00
Repair & Maintenance furniture & Fixture	376751.00		0.00
Sharing of cost of Kendriya Vidyalaya	1107280.00		500000.00
Sports Goods	93866.00		228133.00
Stationery	1960614.00		474894.00
Sales Tax/Trade Tax Expenses	0.00	124959.00	0.00
Training Allowance	0.00	598996.00	620342.00
Telephone & TC	669976.00		636672.00
Training Cost Expenditure	4714033.00		6297637.00
Travel Exp. (Grant in Aid)	2674020.00		2213304.00
Travel Exp. (Consl. Project)	0.00	2189530.00	1620123.00
Travel Exp. (Research Project)	1210031.00		2172010.00
Travelling Expenses (Training A/c)	0.00	1099879.00	2215725.00
Workshop/Seminar	412813.00		1817907.00
Payment outstanding for Grant-in-Aid, Research Projects/Training etc.	2829333.00		
Total of Other Administrative Expenses	**49068467.00**	**14383555.00**	**73815863.65**
Less payment towards civil works/fixed assets accounted for in other administrative expenses in 2006-07			
Payment towards capital Expenditure for 2006-07 (Civil Works)	-17648700.00		20886009.00
Payment towards Computer & Accessories (Fixed Assets) for 2006-07(1772612 + 938038	3666415.00		0.00
Payment towards equipments(Fixed Assets) of Research Project (2006-07)	-258231.00		1143988.00
TOTAL	**29295121.00**	**14383555.00**	**95845860.65**

(S.K. Khantwal)
Finance Officer

(P.R. Sinha)
Director

WILDLIFE INSTITUTE OF INDIA
P.O. Box # 18, Chandrabani
Dehradun - 248 001 (Uttarakhand)
Tele: (0135) 2640111-115; Fax: 0135-2640117
Website: www.wii.gov.in; Email: wii@wii.gov.in