



ANNUAL REPORT
1998-99



भारतीय वन्यजीव संस्थान
Wildlife Institute of India

CONTENTS

Director's Note	1
The Year at a Glance	2
Main Work Programme 1998-99	4
Background	5
WII's Objectives	6
Institutional Infrastructure	7
Academic	9
Training Progammes	9
Short Courses	9
Education Programme	11
Workshops, Seminars, Conferences and Meetings	12
Courses, Training and Study Tours	18
Research	19
Completed Projects	19
Ongoing Projects	20
Externally Funded Projects	25
Project Initiated	32
Organization	33
Development Collaboration	33
Services	34
Other Consultancies	35
Teaching Inputs	37
Facilities	37
Perspective 1999-2000	42
Publications	43
Members	46
Accounts	50

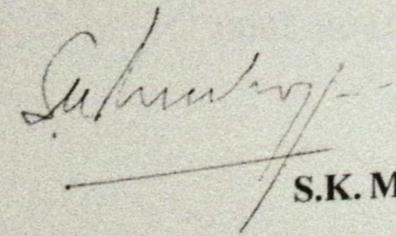
YEAR AT A GLANCE

DIRECTOR'S NOTE

In his significant and forward looking initiative at the Annual General Meeting of WII-Society, The President, WII-Society approved our request to evaluate the work done by WII since its inception. The President in an attempt to give the WII a fresh mandate appointed a High Power Committee to look into every aspect of the Institute's works vis-a-vis further support required for the Institute. Further, during his maiden visit to the Institute Shri Suresh Prabhu, Hon'ble Union Minister for Environment & Forests dedicated the WII Campus at Chandrabani to the Nation on 20th December, 1998 and thereby bestowed more responsibility on our shoulders. This clearly reflects the WII's continuous progress towards fulfilment of its charter and the confidence it enjoys from the Ministry of Environment and Forests and other users.

The year has also witnessed the increasing recognition of the Institute as a Centre dedicated to human resource development for PA management and in conduct of field research for environmental conservation. Institute's collaboration with states and organisations has given us much needed support towards meeting our goals.

The non-official members of the WII-Society and Governing Body of the Institute completed their full five year tenure and I take this opportunity to thank them for their guidance and help for development of the Institute. At the same time I also welcome the new non-official members of the WII-Society and the Governing Body and hope that their guidance will help Institute reach new heights.



S.K. MUKHERJEE

Moving steadily towards the close of this millennium the Wildlife Institute of India made a mark for itself for its role in conservation, nationally as well as globally. During the reporting year the institute made progressive academic strides in the field of teaching, training and research in Wildlife Management and Biodiversity Conservation. WII was geared to meet the challenge of working for conservation coupled with sustainable development. In addition to catering to its requirement of the ongoing activities, the institute was hardpressed for time to meet the ever increasing demand of different clients including the state forests departments in providing training, research academic and advisory inputs. With the result, the year 1998-99 was increasingly busy than before.

Having restructured the PG Diploma Course in Wildlife Management in the modular format three years back it has been constantly under review. Though it has been received well by the participating officer trainees and those from other countries, some necessary changes in concurrency of running different modules, system of evaluation in certain modules and the contents of a few modules were made, based on the feedback of the trainees and the experience of the teaching faculty. To bring out the creativity among the participants they were encouraged to present a skit on conservation education, which lead to the production of a training film enacted by the participants and produced by the institute. In order to improve their presentation skills, the trainees were required to present their observations at the end of the management tour and also on completion of their term paper exercise before an assembly of faculty members and their colleagues. Like the last two years a special diploma course was conducted for the Wildlife managers from Sri Lanka. Apart from this, regular courses like the certificate course in wildlife management for park managers and those from abroad, Capsule Course for IFS officers, endangered species and zoo management course, course on wildlife law and forensic science, wetland research methodology, course on interpretation and conservation education and other client driven courses were held during the period under report. A significant addition in this sphere of activities was organising of a 'Training of Trainers' course in Forestry and Wildlife Management for college teachers at the behest of and sponsored by UGC. The organising of such course aims at integrating the concepts of conservation in the college level curricula. As a part of its education programme the VI M.Sc. (Wildlife) underwent its second year of the post graduation as per schedule.

Research is one of significant activities of the Institute as per its mandate. WII completed five projects this year and one new project on conservation genetics of olive ridley turtles was initiated. So far, working right from the alpine areas to the coastal zone of this country WII has completed 73 projects. A total of eleven projects are on going and further thirteen with foreign collaboration are in their different stages of completion. Two research reports and the first module of the EIA track was released by Shri Vinod Vaish, Additional Secretary, Ministry of Environment and Forests, during the National Seminar on Wildlife Conservation, Research and Management, held at Dehradun.

A computer aided decision support system EIA-TRACK (EIA-Training Research Advisory and Consultancy Kit) has been developed by the EIA Cell of the Institute with professional support from Tata Consultancy Services Limited (TCS) Gurgaon. The software is a tool for EIA Practitioners, Decision Makers and Project Planners.

During October 1998, under the provisions of the Co-operative agreement between the WII and USFWS, a mid term scientific review of progress of each of the sub project was taken up. Project investigators and researchers presented their research progress and findings to a panel of Indian and US Scientists, select conservationists of India as well as officials of the Ministry of Environment and Forests, Government of India. The deliberations and suggestions generated comments and constructive suggestions from a wide spectrum of participants. Mid term Review Workshop was also conducted for the USDA project during the reporting period. The workshop was attended by Project Investigators and USDA Forest Service counterpart scientists.

Scientists and Researchers of the Institute were invited to attend and present paper at National as well as International Workshops and Seminars. Eight scientists and two researchers presented their paper in international symposiums and seminars.

The Institute established a leased line internet connectivity with VSNL through microwave link. A router was procured and installed to provide internet services to over hundred nodes on the Local Area Network. The institute installed its own Pentium based web server and mail server operating under windows. The WII website was officially inaugurated by Shri Vishwanath Anand, Chairman, Governing Body of WII and Secretary, Ministry of Environment and Forests, Govt. of India on 28th July 1998. Information on the activities of the institute is being regularly updated on the web server.

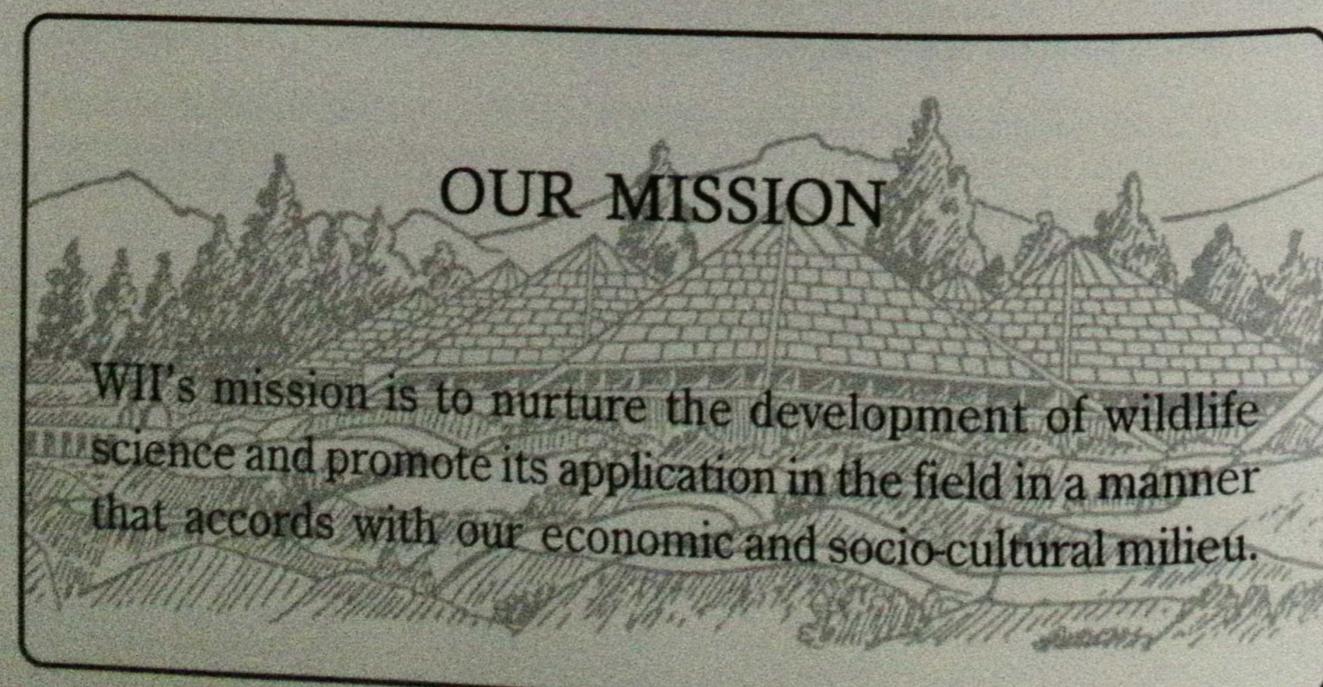
To further promote extensions and outreach activities of the institute it participated in an exhibition 'Agrasar' at India Gate lawns in New Delhi on the occasion of 'Fifty Years of India's Independence' to promote the theme of conservation of natural resources. The pavilion of the Ministry of Environment & Forests, of which WII formed a part, was awarded first prize in the exhibition.

WII's team participated in the 7th All India Forest Sports meet held at Lucknow on 10-14 February, 1999. The WII cricket team also participated in two renowned tournaments of Dehradun viz. Dehradun District Cricket League and High Power Cricket tournament and performed well. This year WII participated in the Second Annual Flower Show Competition organised by Dehradun Club and won 2 trophies and a large number of prizes for its exhibits.

In order to meet the growing activities, the institute continued to progress infrastructurally as well. Construction of additional modular institutional block is in progress. The buildings have been so designed to merge with the surroundings and relate with the existing civil structures which is architecturally Egyptian cut pyramid having sloping roofs.

WII received a large number of both national and international visitors during the year, significant amongst them were delegations from Nepal, Morocco, Bhutan and Sri Lanka. Honourable Minister for Environment and Forests, Shri Suresh P. Prabhu and Prof. U.R. Rao, Member, Space Application Centre were other important dignitaries who visited WII during the year.

Though Wildlife Institute of India had been functioning for over a decade, it was dedicated to the nation by Shri Suresh P. Prabhu, Honourable Minister of Environment and Forests, Government of India on 20th December 1998. He approved the vision of the institute to expand its activities beyond the boundaries of the country to make conservation a worldwide phenomenon.



MAIN WORK PROGRAMME : 1998-99

REGULAR TRAINING COURSES

- XIX P.G. Diploma Course in Wildlife Management (September 1997-May 1998)
- XX P.G. Diploma Course in Wildlife Management (September 1998-May 1999)
- XIV Certificate Course (May 1, 1998-July 31, 1998)
- VIM. Sc. Wildlife (July 97-June 99)

SHORT COURSES

- Interpretation and conservation education course (June 22, 98-July 1, 1998)
- Endangered species and Zoo Management Course for Zoo Directors (September 1-12, 1998)
- One week Capsule Course in Wildlife Management for IFS officers (September 21-25, 1998)
- Short course on Wildlife Protection, Law and Wildlife Forensic for Group-A Probationers of Indian Customs and Central Excise Services (October 21-30, 1998)
- Course on Wetland Research Methodology (January 5-12, 1999)

WORKSHOPS

- Meeting of Regional Training on Networking for curricula and Training Materials Development in Protected Area Management (April 20-24, 1998)
- Workshop on GIS for Field Researchers and Wildlife Managers (May 1-10, 1998)
- National Workshop on Documentation of Ecodevelopment Initiatives. (Nov.24-26, 1998)
- Workshop on Control of Illegal Wildlife Trade for Enforcement Agencies (February 23-25, 1999)

SEMINAR

- National Seminar on Wildlife Conservation, Research and Management (August 10-11, 1998)

MEETINGS

- XXXII Governing Body Meeting (July 28, 1998)
- Training, Research and Academic Council (TRAC) Meeting (August 13, 1998)
- XXXIII Governing Body Meeting (November 30, 1998)
- ISAP-I Committee Meeting (February 5-7, 1999)
- XXXIV Governing Body Meeting (March 17, 1999)

WII's OBJECTIVES

BACKGROUND

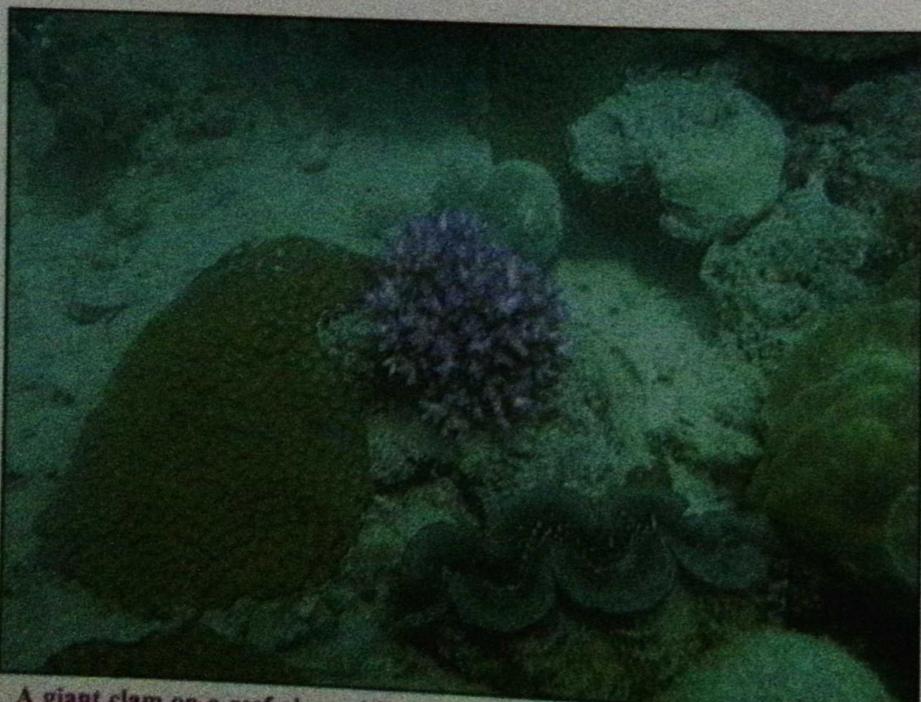
Human civilization has exploited natural resources for its survival and comfort. It did not care about the flora and fauna that came earlier than human being on earth. As the civilization developed, the existence of the living creatures of the world was threatened. Many species have vanished from the earth and many more became rare. When the natural forests are disturbed the habitat for many species is affected. In total, cycle of nature is disturbed which results in natural calamity. The proverb of nature being able to balance itself is true only in the absence of biotic interference.

In this country flora and fauna are worshipped since ancient time, but conservation of this resource was not the focussed activity, since the economic considerations prevailed. It is at this juncture a need was felt to have ambitious conservation management strategy. The focus shifted from pure economics to a holistic look at our natural resources primarily aimed at conservation and also to protect the interest of the people who are dependent on this resource. Such a strategy led to the setting up of Wildlife Institute of India (WII) at Dehradun in 1982 with a mandate to train the stakeholders in conservation, carry out research and advise on matters of conservation and management of wildlife resources. The task was easier spelled out than

done in the absence of past experience and changing the orientation of professional foresters trained with a different mindset. This apparent disadvantage of starting on a clean slate ultimately became the institute's strength because the fresh look of the approach gave it a strong foundation and prevented its programme from becoming mere academic exercises.

WII's programmes being mainly field based and conducted all along the country helps in keeping abreast with the latest and incorporate the same in teaching and training programmes. This helps in seeking an integration of biological, ecological, socio-economic and human dimensional aspects over large regional landscapes.

While working through bilateral cooperation and collaborations with national and international agencies, the institute's horizon has become broad based. This has resulted in a strong institutional infrastructure, abreast with thorough knowledge and latest technology. This recognition of the institute's growing potential has encouraged UNESCO to declare WII as a regional training centre and the neighbouring countries from South and South-East Asia to send their professionals for training in natural resource management.



A giant clam on a reef alongwith different species of corals - an increasingly rare sight

Sarang Kulkarni

- * Train managers and biologists for protected area management and wildlife research;
- * Train education and extension specialists for protected areas so as to get public support for wildlife conservation;
- * Provide orientation courses for those involved in landuse management ;
- * Conduct and coordinate applied wildlife research and evolve relevant techniques suited to Indian conditions;
- * Create a database for building up a wildlife information system employing modern computerized analytical techniques; and
- * Provide advisory and consultancy services to central and state governments, universities, research institutions and other official and non-official agencies.



Cyathea spinulosa - A tree fern. Frequent in the low & mid elevation evergreen forests and ravines of eastern Himalaya, North-East India and Western Ghats. A species of horticultural and botanical interest.

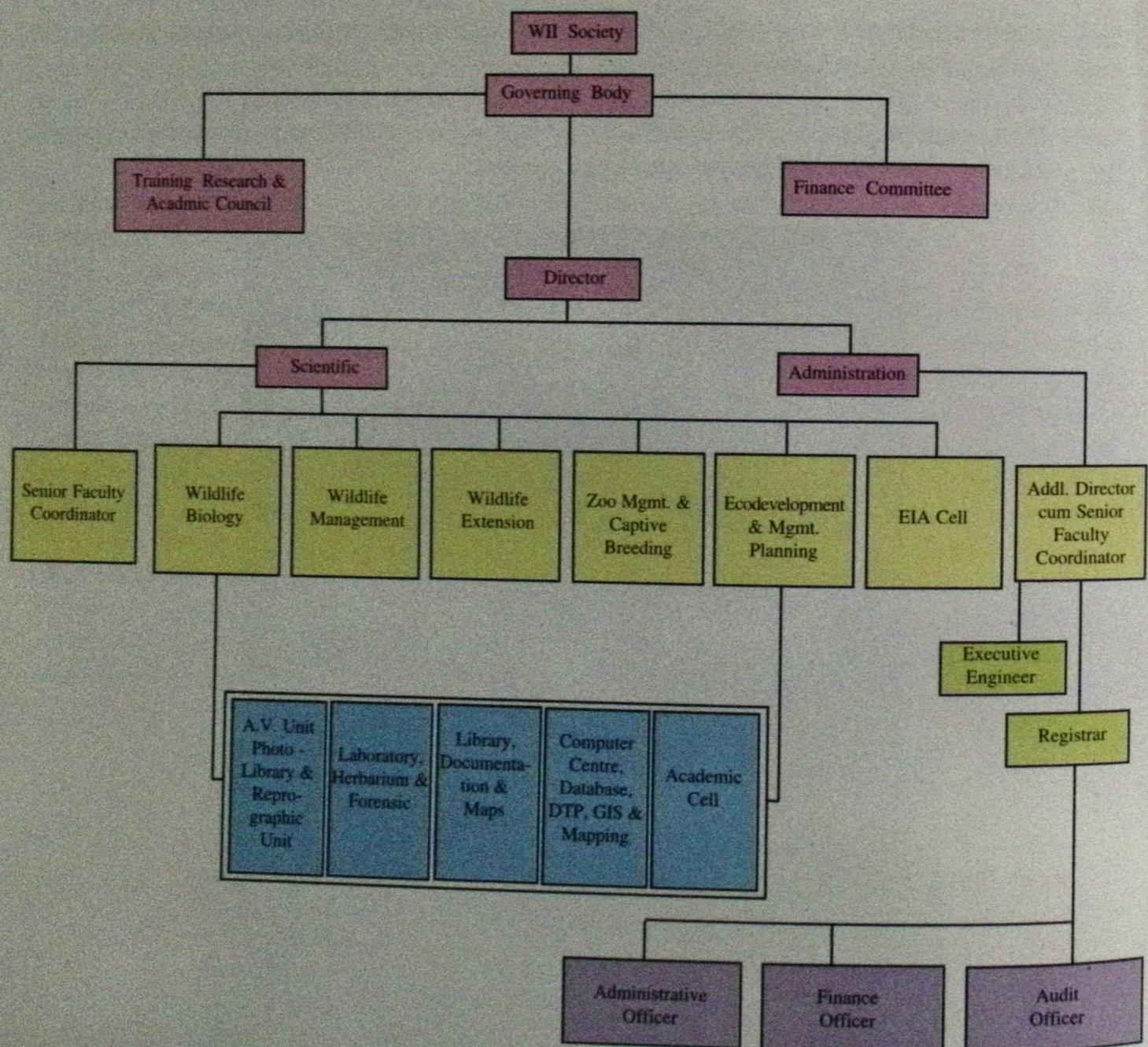
Priyakash Dash

INSTITUTIONAL INFRASTRUCTURE

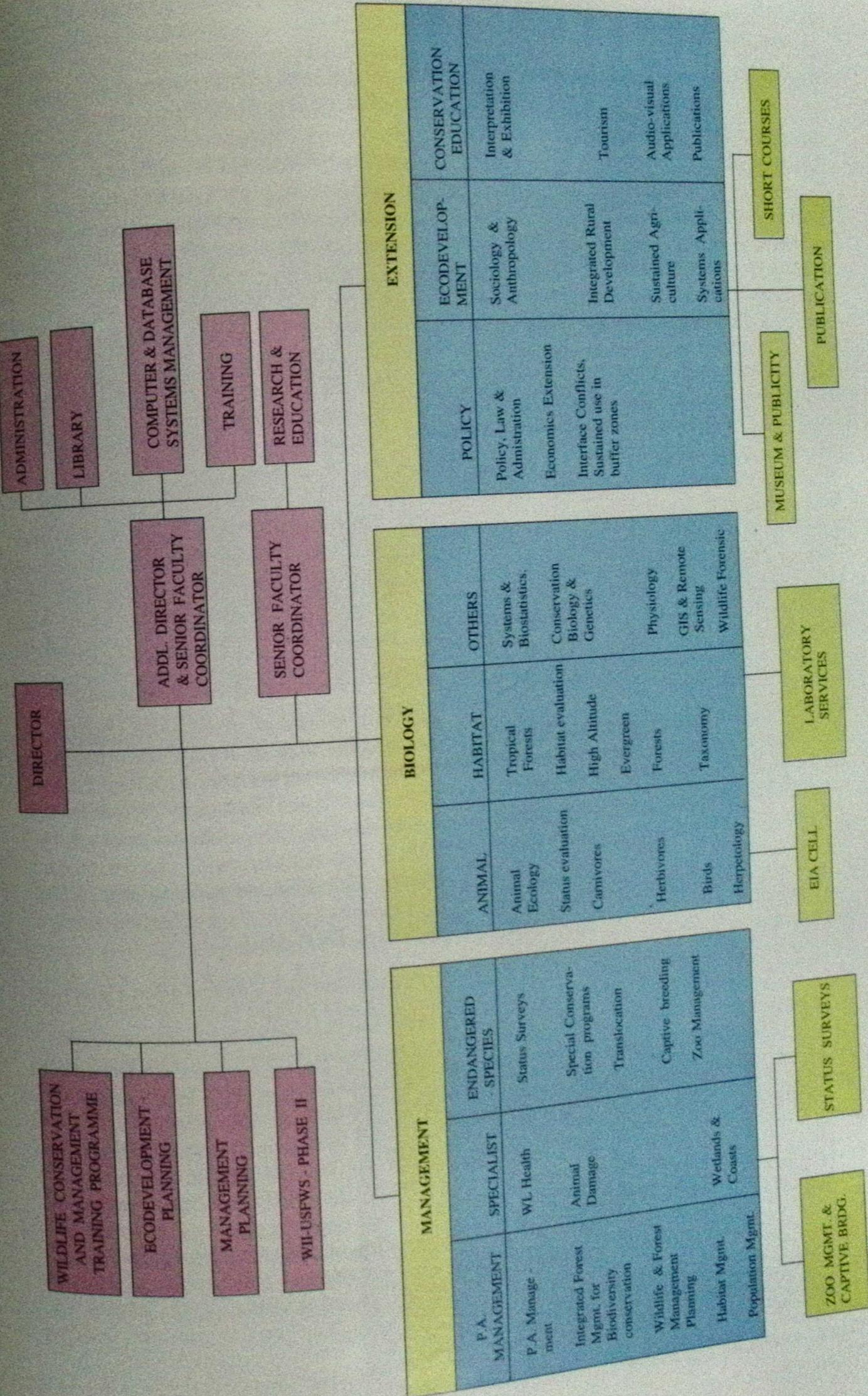
There are three faculty divisions at WII - Wildlife Biology, Wildlife Management and Wildlife Extension, besides two units, namely Ecodevelopment Cell and the EIA Cell. Providing support are Library and Documentation Centre, Computer Centre, Laboratory, Herbarium and an Audio-Visual Unit.

The charts below depict WII's organisational and scientific infrastructure.

ORGANISATIONAL STRUCTURE - ADMINISTRATIVE



ORGANISATIONAL STRUCTURE - SCIENTIFIC



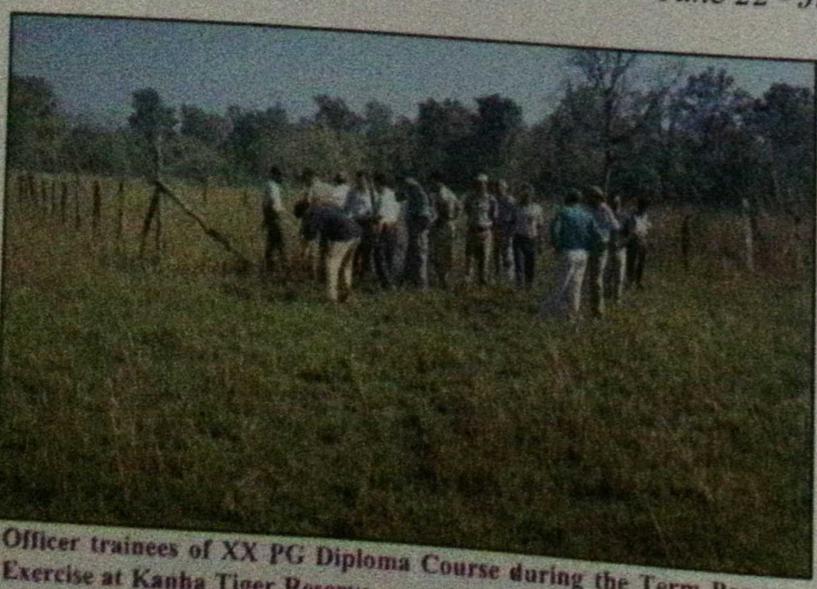
ACADEMIC

TRAINING PROGRAMMES

Post -Graduate Diploma Courses in Wildlife Management

The XIX Post-Graduate Diploma course commenced from September 1, 1997 and concluded on May 31, 1998. The course was attended by 23 trainees of which 14 forest officers were from different Indian States/UTs and 9 were foreign nationals - 5 from Sri Lanka, 2 from Vietnam, 1 from Myanmar and 1 from Nepal. Top honours and institute's gold medal was jointly bagged by J.A.D.S.S. Jayakody and A. Shankaran. Both of them were also declared as joint recipient of the Wildlife Preservation Society Medal. The N. R. Nair Memorial Medal was bagged by A. Shankaran. The other awards viz. Director's award for "Second Top Trainee", Award for top Trainee for 'Wildlife Ecology and Behaviour', and award for Top trainee for 'Wildlife Management' were bagged by Awtar Singh, Jayakody and A. Shankaran respectively.

The XX Post Graduate Diploma Course commenced from September 1, 1998 in which 20 officer trainees (13 forest officer from different states/UTs within the country and 7 foreign nationals - 6 from Sri Lanka and 1 from Nepal) participated. The Orientation-cum-Techniques tour was conducted at Sariska Tiger Reserve and Management tour was conducted in selected protected areas in South India. The Management Term Paper Exercise was conducted at Kanha



Officer trainees of XX PG Diploma Course during the Term Paper Exercise at Kanha Tiger Reserve.

Tiger Reserve. The course is scheduled to conclude on May 31, 1999.

Certificate Course in Wildlife Management

The three month certificate course in Wildlife Management (XIV batch) that trains the in-service Forest Range Officers and equivalent ranks started from May 1, 1998 in which 15 Range Forest Officers from Maharashtra, Andhra Pradesh, Kerala, Lakshdweep, Andaman & Nicobar Islands, Mizoram & Dadra and Nagar Haveli alongwith two foreign trainees from Nepal participated. The foreign trainees were supported by Global Tiger Forum.

The course started with a basic grounding in wildlife biology and field techniques and later addressed all major aspects of practical wildlife management including the very important human dimensions. Much time was devoted to practical work both on campus and on field tours.

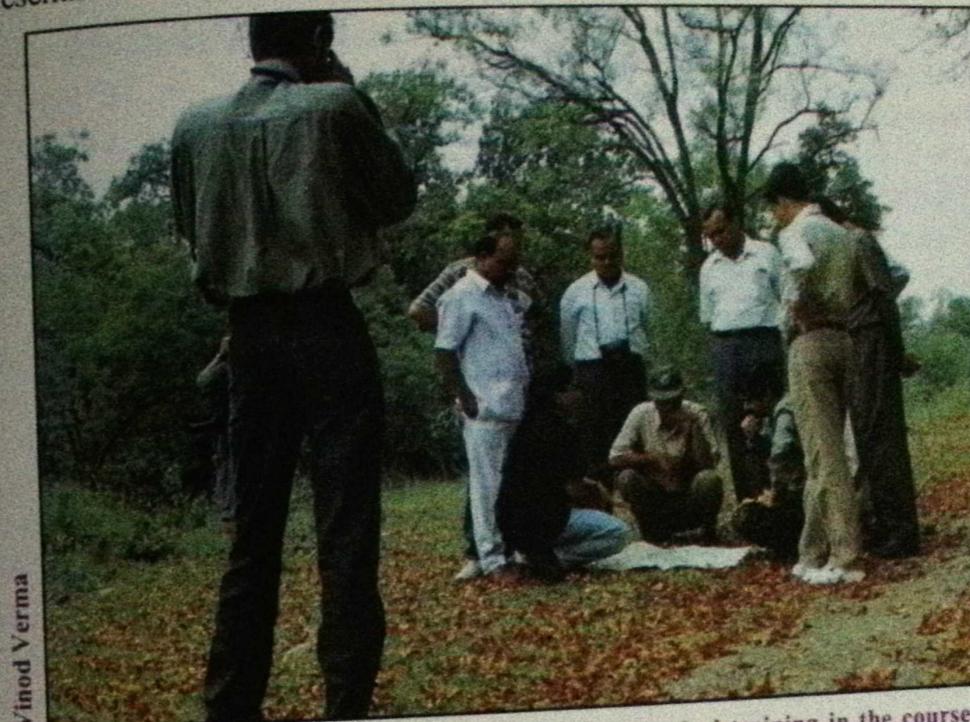
The field visits comprised of an Orientation/ Techniques tour to Rajaji National Park, Management Tour to Dudhwa National Park and Kishanpur Wildlife Sanctuary. The trainees were also taken to the National Zoological Park New Delhi to acquaint them with captive breeding aspects. The course concluded on July 31, 1998.

SHORT COURSES

Interpretation and Conservation Education June 22 - July 1, 1998

The course is designed to meet the needs of personnel from National Parks, Sanctuaries, Zoos, Environmental and Development Projects, Wildlife Tourism Agencies and NGOs requiring assistance in the development of education and awareness raising programmes. The course was attended by eleven participants, of which seven were from Forest Department, one from Bombay Natural History Society and three from NGOs. The participants were given opportunity

to learn and practice a number of approaches used to present ideas and information enabling them to acquire skills and confidence necessary for effective communication. The course involved participants in interactive teaching methods, lectures with audio-visual support, question time, mini-workshops, case studies, field visits to Rajaji NP and Malsi Deer Park and participants presentations.



Strong emphasis is given to field visits and practical training in the courses organised by WII.

The IX Endangered species & Zoo Management Course September 1-12, 1998

The IX Endangered species & Zoo Management Course conducted by the Wildlife Institute of India & sponsored by the Central Zoo Authority, for Zoo Directors was held at Arignar Anna Zoological Park, Chennai between September 1-12, 1998. This course was conducted to train Zoo professionals in modern techniques and concepts pertaining to 'ex-situ' management of animals, especially endangered species. This course was attended by 19 trainees from 11 state Forest Departments, 2 private Zoos and one from Nepal. Besides lectures and discussions field visits were organised to Madras Crocodile Bank, Madras Snake Park, Shri Chamarajendra Zoological Gardens, Mysore, Nehru Zoological Park, Hyderabad and Vanthali Deer Park, Hyderabad. The valedictory function was held at the Nehru Zoological Park, Hyderabad on September 12, 1998.

One week capsule course in Wildlife Management for IFS Officers September 21-25, 1998

The one week capsule course in "Wildlife Management" was organised by the Wildlife Institute of India at its Chandrabani campus. The course was sponsored by the Ministry of Environment & Forests, Government of India under its compulsory training programme. The course was meant to give an orientation towards wildlife and related issues of conservation to the forest officers who had not undergone any formal training in wildlife management. The main objective of the course was to make the participants understand the basics of the wildlife science, critical management issues, interface conflicts between PAs and surroundings and biodiversity conservation effectively towards

conservation of wildlife resources. Eighteen officers from seven states participated in the course.

There were eighteen sessions conducted in the course including a day visit to Rajaji National Park (Haridwar area). A session on "Wildlife Forensic Science" and a panel discussion on "Improvement in the working of Forest Departments and need for Career Development through training and Improvement of Skills" was held during the course. Three new sessions including lecture-cum-slide show on "Communication Skills", "Group Dynamics, Team Building & Leadership Styles" and "Time Management-Esprit-de-Corps, Personality Development & Social Skills."

Special course in Wildlife Protection, Law and Forensic Science October 21-30, 1998

The second specially designed short term course was conducted, primarily to sensitize the custom officials during their initial phase of training, so that they can effectively enforce laws related to control of trade in wildlife and wildlife products specially

CITES, EXIM Policy of GOI and Wildlife (Protection) Act, 1972. In all 23 probationers joined the course and the training was imparted through classroom inputs, laboratory work and field tour to Dudhwa National Park.

Course on wetland research methodology

January 5-8, 1999

Wetlands are among the most important ecosystems on earth. As a part of its ongoing wetlands ecology, conservation and management programme, WII is in the process of consolidating wetland research methodology and intends to develop a cadre of wetland biologist. Keeping this in view the Institute organised a one week Training workshop on Wetland Research Methodology during January 5-12, 1999 at Rambha (Chilika) with a field trip to Bhitar-Kanika WL sanctuary, Orissa.

The overall objective of this workshop was to provide the participants, knowledge and skill necessary for measuring wetland variables, especially biodiversity. Fifteen research scholars from ten Universities and Research Institutions participated in the workshop.

UGC Sponsored "Training of Trainers" (TOT) Course in Vocational Subject of Forestry and Wildlife Management May 25 - June 23, 1998

In pursuance of National Policy on Education, 1986, the UGC had initiated a joint programme with ICAR to introduce career oriented courses. Consequent to this, two colleges selected by the UGC decided to introduce the vocational cum career oriented Course in Forestry and Wildlife Management. These two participating colleges were: Dimoria College at Khetri in Kamrup District of Assam and MKP (PG) College, Dehra Dun in Uttar Pradesh.

On a request of the UGC, the Institute organised a TOT Course in Forestry and Wildlife Management of one month duration. The Course commenced on May 25, 1998 and concluded on June 23, 1998. There were altogether five participants in the Course. A mixed approach for imparting training through interactive theory sessions, demonstrations, use of AV programmes, visits to various forestry institutions, museums and

field sites was used. Field visit to Rajaji NP, different nurseries and plantation sites near Yamunanagar were also organised. Course participants were able to visit various facilities at the ICFRE, FRI, FSI, IIRS and Centre for Soil and Water Conservation Training and Research Institute, Dehradun. During the course, the participants were given short assignments to develop themes for the proposed field visits, practicals and planning for on the job training during the 3-year B. Sc. Course.

Training Programme (Wildlife Tourism) for the tourist guides in U. P. Hills October - November, 1998

On the request of U. P. Tourism (Hills) WII conducted two short orientation courses (two weeks each) in Wildlife Tourism and conservation in Almora and Uttarkashi during October-November. Twelve selected unemployed graduates attended each course from the hill districts. The participants were given orientation in the identification of common flora and fauna of the region, importance of protected areas, basics of field craft and nature conservation.

EDUCATION PROGRAMME

VI M. Sc. (Wildlife)

A decade back WII started a M.Sc. course in Wildlife Science, when the subject was in its infancy in the university education system. The intake for the course has been restricted to every alternate year implying the following course is started only on completion of the earlier course. The M.Sc. course was started in the institute with the objective to train and provide wildlife scientists to work for the cause of conservation for the country.

The VI M.Sc. began in July 1997 with nine students. Six of these students were supported by the Grant in Aid fellowships of WII. The remaining candidates have received fellowship support from the "Eye of the Tiger," "Save the Tiger Fund" of National Fish and Wildlife Foundation. Save the Tiger Fund's grants were to support the research on tiger and its habitat. Beside these fellowships, the Central Zoo Authority provided a grant to support one of the dissertations.

The semester III, included theory papers on physiology, nutrition, advanced statistics, captive breeding and wildlife utilization, Forest and Wildlife Management and Management planning, Coastal and Wetland Ecology and elective topics in habitat ecology and management.

The field tours being an important component of the M.Sc. course, the students were taken to Kanha, Bandhavgarh and Panna National Parks and Chambal Wildlife Sanctuary as part of their conservation field training and advance techniques tour. During the tour students were exposed to management practices and to various specialized research techniques used in the wildlife research. The exam for the Semester III was conducted from November 6-11, 1998.

By the end of the Semester III, students presented their topics for their dissertation in an open seminar before the faculty and researchers. Later, project proposals were finalized with the help of respective supervisors. After, permissions were granted field work was initiated by the students in the month of November 1998.

The dissertation topics were :

1. "Habitat utilization by hog deer". Study site -Jaldapara Wildlife Sanctuary, WB (Tanushree Biswas).
2. "Health and sexual signals of male Asian elephants" Study site- Nagarhole National Park, Karnataka (Cheryl D. Nath)
3. "Environmental influences on space utilization and the activity budget of captive leopards". Study sites-five Zoos in India. (Avanti Mallapur)
4. "A seroepizootiological study of some important infectious viral diseases in Asiatic Lions". Study site - Gir N.P. Gujarat. (R. Anand)
5. "Effect of habitat utilization on herpetofaunal assemblages of evergreen forest in Mizoram. Study site - Mizoram. (Samrat Pawar)

6. "Determinants of butterfly species diversity, plant diversity and resource richness across vegetation types". (Krushnamegh Kunte).

7. "Food habits of tigers in Pench National Park, Madhya Pradesh. (Sayantan Biswas)

8. "Habitat occupancy by tiger prey species across anthropogenic disturbance regimes in Panna National Park (Madhya Pradesh). (Manu V. Mathai)

9. "Habitat use by rodents in a sandy habitat around Sam, western Rajasthan". (Shomen Mukherjee).

The final results of this course are likely to be announced by September 1999 and nine qualified wildlife scientists would be then be ready to seek a career in wildlife research and conservation.

WORKSHOPS, SEMINARS, CONFERENCES AND MEETINGS

Organised by WII

Meeting on Regional Training Centres on Networking for Curricula and Training Materials Development in Protected Area Management, Dehra Dun April 20-24, 1998.

The Wildlife Institute of India in collaboration with the Ministry of Environment and Forest, Govt. of India conducted a meeting of Regional Training Centres involved in training of Protected Area Management personnel. The United Nations Educational, Scientific and Cultural Organisation (UNESCO) provided part funding for organising this meeting from the World Heritage Fund.

Specific recommendations were made on curriculum development, approach to training material development and networking.

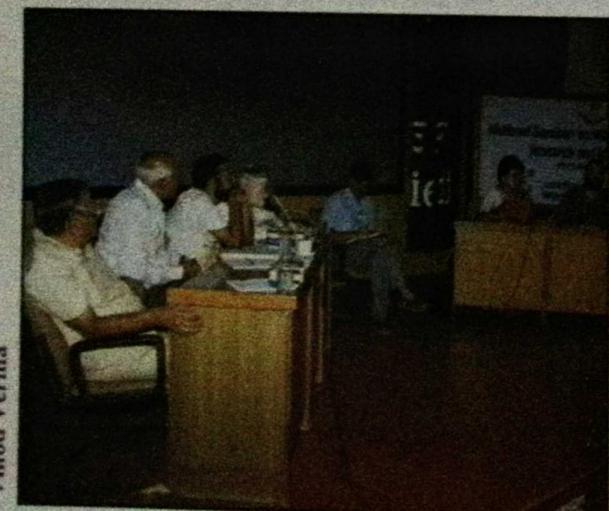
It was also recommended that the Regional Centres review the recommendation and let the World Heritage Centre (WHC) know, the contributions they can make for the recommendations to be meaningful and to request WHC for support.

GIS and Remote Sensing May 1-10, 1998

A training workshop on the "Application of GIS and Remote Sensing in Wildlife Conservation", was organised. There were five participants from the Maharashtra Forest Department and two graduate students from Turkey. The participants were provided hands-on training in visual interpretation and digitization. They were also exposed to Desk Top GIS, habitat characterization using remote sensing and GIS and Hyper Text Mark up Language (HTML) procedures.

National Seminar on Wildlife Conservation, Research and Management and Internal Research Seminar August 10 - 11, 1998

To commemorate the Golden Jubilee Anniversary of India's Independence, the WII decided to host a National Seminar. The National Seminar was inaugurated on August 10, 1998 by Shri Vinod Vaish, IAS, special secretary to Ministry of Environment and Forests, Government of India. Shri J.C. Daniel, Chairman, TRAC, was the Chairperson of the National Seminar. In the National Seminar 40 research papers were



Vinod Verma

Panelist of the discussion on Wildlife Research : Science & Conservation organised during the National Seminar.

accepted for presentation after a review of the abstracts. Two panel discussions on (i) Endangered species : The debate on how best to conserve them (ii) Wildlife Research : Science and conservation, were also held. This seminar was attended by more than 250 delegates from all over the country. Two delegates came from Nepal. Twelve of the presentations were made by researchers and faculty members of WII which were based on nine research projects of WII. A

session of poster papers was also organised. All WII presentations were judged by a panel of judges. The following were adjudged as the top five presentations :

- (1) Bivash Pandav - Ecological status and impact of anthropogenic activities on the olive ridley sea turtles along the Orissa coast.
- (2) Shomita Mukherjee - Food habits of small carnivores in Sariska Tiger Reserve with special reference to rodent prey.
- (3) Karthikeyan Vasudevan - The distribution of stream amphibians in the rain forest of two hill ranges in the southern-western ghats.
- (4) K. S. Gopi Sundar - Preliminary results of the survey to determine distribution and status of the Indian Sarus Crane (*Grus antigone antigone*) in North India.
- (5) Christy Williams - The population Characteristics of the Ganga-Yamuna elephant population in north-west India.

As in 1997, Shri Antesh donated Rs. 5000/- (Rana Mahesh Singh, Conservation Award) to be distributed among the top five presentations in addition to prize money offered by the institute. He also gave five gold medals to be given to the researchers. All five researchers are entitled to book awards amounting to Rs. 1750/-.

National Workshop on Ecodocumentation November 24-26, 1998

A National Workshop on ecodocumentation was organised at WII during November 1998. The main objective of the workshop was to look at the country wide field-experience and capture the same in terms of lessons learnt till date in ecodocumentation programme. In this workshop eighty participants representing field managers, scientists, NGOs, researcher etc. participated. This workshop resulted into a number of pragmatic recommendations. One of the major follow-up actions is a workshop to be conducted by WII and Lal Bahadur Shastri National Academy of Administration, Mussoorie during June, 1999.

Control of Illegal Wildlife Trade February 23-25, 1999

A workshop titled "Control of Illegal Wildlife Trade in India - with special reference to CITES & its implementation" for enforcement agencies was organized to discuss the issues to curb illegal wildlife trade in India. On the completion of 25 years of Convention on International Trade in Endangered Species of Wild fauna and flora (CITES), a special focus was given on its implementation. Forty officers attended the workshop. The participants were from the Directorate of Revenue Intelligence, Foreign Post, Forest Officers from the states of Uttar Pradesh, Andhra Pradesh, Orissa, Botanical Survey of India, Zoological Survey of India, Wildlife Protection Society of India, Traffic-India and Forest Officers undergoing training at WII. Chief Guest Shri S.C. Sharma, Additional Inspector General of Forests (Wildlife)/Director of Wildlife Preservation gave a keynote address and an overview about CITES.

Regional Research Techniques March 3-9, 1999

WII conducted a "Regional Research Techniques Workshop on Pheasants" at the Great Himalayan National Park, Kullu District, Himachal Pradesh. This workshop was funded by the World Pheasant Association (WPA) Council, U.K. and the Himachal Pradesh, Forest Department. The workshop aimed at reviewing research techniques on pheasants by interaction with biologists working in Asia who have been involved with pheasant research.

This workshop was officially launched by Shri Roop Singh, Honourable Minister for Forests, Government of Himachal Pradesh on 27 February, 1999 at the Wildlife Institute of India, Dehradun in the presence of Shri S. K. Pande, I. F. S, Principal Chief Conservator of Forests, Government of Himachal Pradesh; S. K. Mukherjee, Director, WII and faculty members of WII. In total, 8 resource persons, fifteen research scholars and 5 officers and staff of the H.P. Forest Department participated in this workshop. There were three researchers from

other Asian countries viz., Nepal, Indonesia and Vietnam.

The field visit to GHNP was conducted during March 6-8, 1999. The workshop concluded with a formal vote of thanks and distribution of certificates to participants.

Workshops, Seminars, Meetings

Attended

Workshop on Biodiversity Conservation in Maharashtra - Vision Beyond 2000, Nagpur, September 3-5, 1998.

The workshop addressed long term strategies and plans for biodiversity conservation in Maharashtra. V.B. Sawarkar attended the workshop and presented a paper on the ecological, managerial and administrative rationale for P. A. networking. While doing so he presented an overview of WII's recommendations for Maharashtra state and stressed the need for looking beyond the PAs at the landscapes to accomplish conservation planning. The major issues which were discussed, and recommendations made thereon were - (i) protection within PAs (ii) management of habitats (iii) research and monitoring (iv) man-animal conflict (v) training of staff (vi) enforcement of laws and wildlife trade (vii) staff norms for PA management (viii) wildlife management outside PAs (ix) funding for biodiversity conservation.

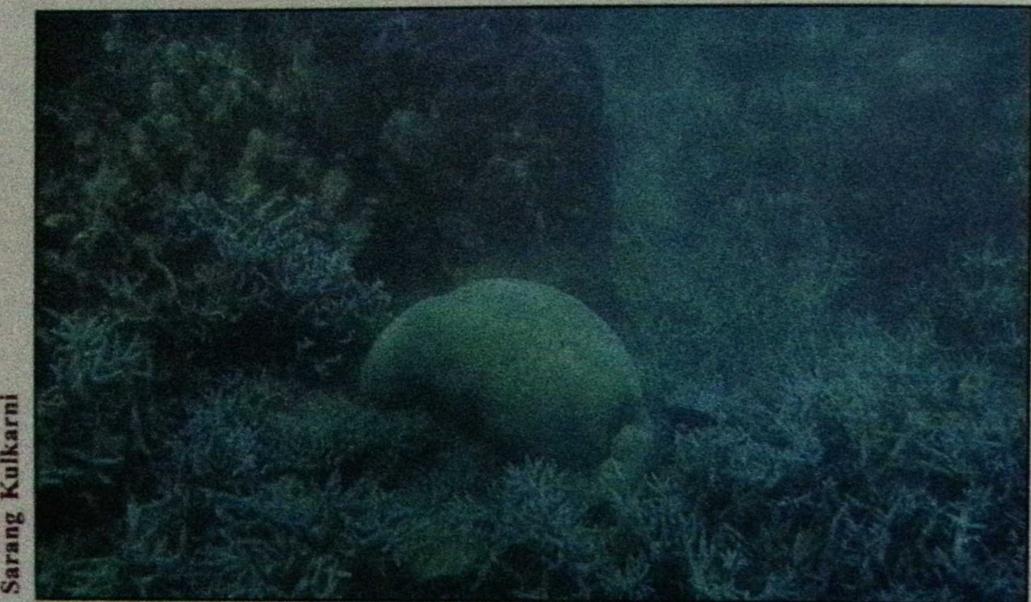
National Workshop on 25 years of Project Tiger, Vigyan Bhavan, New Delhi November 19-21, 1998.

The workshop was organized by the Central Directorate of Project Tiger, Government of India to discuss achievements and concerns for conservation of tiger. It was attended by S.K. Mukherjee, V.B. Sawarkar, A.J.T. Johnsingh, K. Sankar and Sugato Dutt.

Management of Coral reef ecosystem of A&N Islands, Port Blair November 23, 1998.

Ajai Saxena attended as a resource person the

project inception workshop of the UNDP funded project titled "Management of coral reef ecosystem of A&N Islands." The project is taken up by ZSI.



Sarang Kulkarni

Healthy coral reef of MG Marine National Park, Wandoor, Andamans.

International Workshop on Environment Governance at Indira Gandhi Institute of Development Research (IGIDR) Mumbai, December 8-10, 1998

This workshop was conducted by the IGIDR and included wide ranging subjects such as India's capacity 21 program, policy planning and governance, policy issues and instruments, common property resources, gender and environment, biodiversity and wetlands, air and water quality, monitoring and indicators, NGOs and stakeholders and a round up discussion on Direction for Environmental Governance for the 21st Century. The countries represented were Sri Lanka, Kenya, Bangladesh, People's Republic of China, Japan, Fiji, Cambodia, Nepal, Philippines, Ethiopia, Norway and Laos PDR. V.B. Sawarkar chaired the session on Biodiversity and wetlands and was a panel member for discussion on Environmental Governance-Directions for the 21st Century.

Workshop on "Biostatistics and Biometry" at Department of Zoology, BHU, Varanasi, December 21-31, 1998.

R.K. Singh SRF attended a week long training workshop on "Biostatistics and Biometry". The

focal theme of the workshop was on the use of Biostatistics and Biometry for analysis of pollution data. He presented a paper on "Water Pollution and Riverine Habitat Use Pattern by Elephant in Singhbhum Forest, Bihar".

Strategy Planning Workshop at Keoladeo National Park March 12-13, 1999.

Bitapi C. Sinha, Scientist-SE, Extension participated in the Strategy Planning Workshop at Keoladeo

NP. The workshop was organised by WWF (India) to discuss and finalize the timeframe and components of the establishment of Salim Ali Visitor Interpretation Centre at Keoladeo NP.

Workshop on Grassland Ecology and Management in Protected Areas of Nepal: Royal Bardia National Park Nepal March 15-19, 1999

The workshop was jointly organized by the Department of National Parks and Wildlife Conservation (DNPWC), HMG Nepal, the International Centre for Integrated Mountain Development (ICIMOD) and the WWF Nepal. V.B. Sawarkar, P.K. Mathur, G.S. Rawat and Harish Kumar, research fellow Terai Conservation Area (TCA) of WII's collaborative project with USDA Forest Service were invited to present papers on different aspects of grassland ecology and management. Sawarkar addressed the landscape approach for managing the terai ecosystems while Mathur dwelt on status of research and monitoring in PAs of Indian terai. Rawat presented an ecological review of alpine vegetation of north western India and Harish Kumar presented a part of his work being conducted in Dudhwa tiger reserve on effects of management practices on grassland vegetation and response of ungulates. Sawarkar also chaired the

session of Himalayan Forests and Rangelands. The workshop was attended by more than 50 participants representing managers, University Faculty, NGOs and decision makers.

Workshop on information management into WL Training Institution at WCMC, Cambridge U.K. March 23-25, 1999.

S.K. Mukherjee, Director WII, participated in Integrated Project Development Workshop on Information management into Wildlife Training Institution at World Conservation Monitoring Centre, Cambridge U.K. This workshop was second in the series supported by UNESCO, the first being at WII last year in the month of April. The input of WII in networking through electronic media and development of curriculum including that of frontline staff for various states in India was presented as a case study.

National Seminar on Integrated Coastal Zone Management Organised by Bidhan Chandra Krishi Viswavidhyalaya (BCKV) Kalyani, West Bengal April 9-11, 1998.

Ajai Saxena presented a paper "Management of Mahatma Gandhi Marine National - Park - An Integrated Management Approach" at the seminar. The seminar focused on our coastal resources, utilisation patterns and their processes; coastal environment the people and integrated management.

National Seminar on "Biodiversity Conservation-Challenges and Opportunities," FRI, Dehradun, October 9-10, 1998

A. K. Bhardwaj and Ruchi Badola participated in this workshop which was held in FRI, Dehradun.

A paper titled "Sharing benefits of Conservation, Emerging Scenarios in People-Protected Area Relationships" was presented in the workshop which was co-authored by B.M.S. Rathore, Anil Bhardwaj and Ruchi Badola.

Seminar on "National Consultation on Wood Energy in Curricula of Forestry Education", IGNFA, Dehradun, December 15-18, 1998

Ajai Saxena attended the Seminar "National Consultation on Wood Energy in Curricula of Forestry Education" organised by IGNFA in collaboration with IIFM and FAO. Detailed discussions were held on the existing curricula of forestry training institutes and universities. Based on deliberations, recommendations were made for the required modification in forestry curricula at different levels, to address the bio-energy needs of the country.

11th International Conference on Bear Research and Management held at Gatlinburg, Tennessee, USA, April 19-24, 1998.

K. Sankar, Scientist-SE was awarded a fellowship of International Association for Bear Research and Management, to attend "the 11th International Conference on Bear Research and Management," held at Gatlinburg, Tennessee, USA. He presented a poster paper on "Assessment of Sloth bear - human conflict in North Bilaspur Forest Division, Madhya Pradesh" in the Conference. The Conference was attended by over 450 participants from all over the world.

Society for Ecological Restoration International Conference, Austin, Texas, USA, September 28-30, 1998.

The theme for the conference was "Making Connection among governmental agencies, private corporations and communities and the ecological systems".

S.P. Goyal presented a paper titled "Habitat Reconstruction of Grasslands in the Salt Desert Ecosystem - a need to mitigate Indian wild ass - people conflict and conserve biodiversity" which was jointly authored by S.P. Goyal and Bitapi C. Sinha.

Third ESRI/ERDAS user conference conducted by ESRI-India, NIIT GIS Ltd. at New Delhi November 17-18, 1998.

Third ESRI/ERDAS user conference was conducted by ESRI-India, NIIT GIS Ltd at New Delhi. This conference was attended by Rajesh Thapa, Navneet Gupta, Panna Lal and Yogesh Dubey from the Institute. Yogesh Dubey, SRF, received award for his paper presentation titled "Fire Hazard Mapping in Spatial Domains in Tadoba Andhari Tiger Reserve".

The Millennium Tiger conference, Vigyan Bhawan, New Delhi March 3-5, 1999.

The Institute was given the responsibility of preparing and finalizing the proceedings of this International Conference inaugurated by His Excellency the Vice President of India who also delivered the keynote address. The conference was attended by S.K. Mukherjee, V. B. Sawarkar, A.J.T. Johnsingh, Ajai Saxena and Sugato Dutt. Representatives of the tiger range countries presented country papers. International cooperation for management of the species in its variety of aspects- ecological, social, economical, cultural, legal, and national came under sharp focus. The Global Tiger Forum (GTF) was joined by a non tiger range country, UK and this was announced by the Hon'ble Deputy Prime Minister of UK who made a brief but notable appearance to issue a statement on behalf of his country.

Symposium on "conservation of Royal Bengal Tiger in South Asia" in Chitwan, Nepal December 12-14, 1998.

S.K. Mukherjee, attended the Regional Symposium on Conservation of Royal Bengal Tiger in South Asia in Chitwan, Nepal. This symposium was organised by King Mahendra Trust of Nepal. The Indian experience pertaining to research in tiger ecology and management of key habitat for the tiger in India and the required human resource development was highlighted in the symposium by the WII delegate.

19th International Sea Turtle Symposium held at South Padre Island, Texas, USA March 2-5, 1999.

Bivash Pandav and B. C. Choudhury participated in the 19th International Sea Turtle Symposium held at South Padre Island, Texas, USA and presented two scientific papers based on the research work of the project titled "An ecological analysis of critical sea turtle habitats along the Orissa coast for development of a scientific sea turtle management strategy.

Meeting of Crocodile Specialist Group of IUCN July 13-17, 1998.

S.K. Mukherjee and B.C. Choudhury were invited by the Crocodile Specialist Group of IUCN to participate in the XIV Meeting of Crocodile Specialist Group of IUCN organised at Singapore. A paper was presented in the said meeting highlighting the need for conservation of crocodilian species in India and the reasons for no commercial harvest of crocodilian species in India.

Meeting of the Steering Committee of Sal Borer at Jabalpur, MP August 8-12, 1998.

V.B. Sawarkar, was appointed as member by Government of India on the Steering Committee of Sal Borer to assess the sal borer crisis in Madhya Pradesh and advice on its mitigation. He attended a meeting of the Steering Committee held at Jabalpur. A field visit to the affected areas was included in the agenda.

Regional meeting of IUCN at Sabah September 28-October 2, 1998

S.K. Mukherjee attended this regional meeting of IUCN organised at Sabah (Malaysia). This meeting was organised by IUCN mainly to discuss regional issues in respect of conservation of nature and natural resources to meet the objective of IUCN. In this meeting the WII delegate highlighted the need for specialised training and human resource development for conservation of natural resources.

Meeting of the Core group for Competence Based Training (CBT) curricula development, Bandhavgarh NP March 30-April 2, 1999.

The meeting was conducted to review the issues pertaining to implementation of the first CBT programme for forest guards in Madhya Pradesh. After having completed the preparation of CBT curriculum for the frontline staff, the WII had volunteered to pilot the first training course. Accordingly several Faculty members had joined the identified trainers from MP in implementing the core modules. This meeting took stock of the issues arising and made further recommendations on patterns of assessment, augmenting learning resources and rescheduling modules on the basis of experience. V.B. Sawarkar, B.M.S. Rathore and S.A. Hussain represented the WII core group at the meeting.

Courses, training and study tours

* A. K. Bhardwaj and Pratap Singh attended a short training programme in the field of National Parks and Wildlife Management under Australian Development Co-operation Scholarship for 3 -weeks at the University of New England, Armidale. The programme covered inputs regarding the wildlife management of endangered flora and fauna accompanied by field visit.

* Ruchi Badola attended World Bank sponsored capacity building programme on

'Economic valuation of environmental and forest resources and natural resource accounting for sustainable development' at Indian Institute of Forest Management, Bhopal, February, 22-26, 1999.

C.P. Sharma, Technician of the Wildlife Forensic Lab was sent for a two week training in *Wildlife Forensics* at the National Fish and Wildlife Forensic Lab Ashland, USA on November 7-21, 1998. Financial assistance was provided by the Global Tiger Forum, New Delhi and WWF-US to meet his partial training cost.

B.M.S. Rathore undertook a field visit to Laos Plateau and in the basin of Yellow river (China) for the study of water harvesting and sustainable agriculture practices as a part of LEAD programme during October 5-16, 1998.

WII participated in multi-disciplinary expedition to Panchchuli group of peaks by the Sapper Adventure Foundation, Corps of Engineers, Indian Army during April 12 -May 7, 1998. Two scientists from WII (G.S. Rawat and S. Sathyakumar) participated in the expedition and collected valuable information on the mammals, birds and their habitats from the region.

RESEARCH

COMPLETED PROJECTS

* **Bird Survey in selected localities of Arunachal Pradesh**

Faculty : Pratap Singh

This survey was funded by Oriental Bird Club. Five visits were made to Arunachal Pradesh during 1997 and 1998. A total of 477 bird species were recorded during the survey, which include 18 new bird records for the state, 10 globally-threatened species and 13 restricted range species. There were several cases of range extensions within the state.

Recommendations were made for creation of new PAs in the state for protection of pheasants, and also of reducing human activities such as shifting cultivation, timber harvesting and tea plantations. Further surveys focussing on individual rare species are also recommended as information on many such species is scarce.

* **Developing area specific management guidelines for conservation of biodiversity in Satpura Conservation Area, taking into account the forestry objectives and local people's needs.**

*Faculty : V. B. Sawarkar & P.K. Mathur
Researchers : Prachi Mehta & Azra Musavi*

The project was under its period of extension by 5 months, which was staggered, with two months, August & September, 1998 falling within the period under report.

Prachi Mehta completed her task as per WII's framework. Researcher addressed the investigation to a variety of silvicultural treatments. A number of 1 km length variable width transects were monitored for bird species diversity at specific intervals. Vegetation data were collected on these transects at 50 m interval points by variable size plots. Foliage height was measured in 8 height

classes. Twenty individuals of fleshy and non fleshy fruit bearing trees were tagged and monitored every month for phenological characteristics. Landscape heterogeneity was assessed subjectively in 10 categories of each transect.

Although during logging the bird species richness, diversity and density declined, it reached prelogging level after logging. However the composition of the community changed. Forest specialists declined in numbers and some generalists increased. Unlogged stands near logged sites were vital as they provided the necessary refuge to the bird communities. Several management suggestion have emerged. Azra Musavi had sought leave of absence during the period but as she had completed her field work, she continued to work on her task and submitted a draft report which is under review.

* **Establishing Computerized Wildlife Database for Conservation, Monitoring and Evaluation in Tadoba-Andhari Tiger Reserve (ATR)**

*Faculty : V.B. Mathur
Researcher : Yogesh Dubey*

The project was initiated in January, 1994. The two main objectives of the project were (i) To assist the protected area in setting up of a computerized database on spatial as well as non-spatial attributes using ecological, management and socio-economic data in order to enhance the management planning, evaluation and monitoring capabilities. (ii) To train, motivate and involve field staff in conservation monitoring. A total of 11 habitat types were delineated. Data on ungulate density was gathered using vehicle based transects. Density estimates reveal an increasing trend in population of Sambar, wild pig and gaur. Data on habitat utilization was collected through direct and indirect methods. Based on the results obtained, distribution and abundance maps for ungulate species occurring in the reserve were generated. Distribution of large carnivores viz. Tiger and leopard was mapped based on the compartment surveys. Food habits of tiger were investigated. Results suggest that Chital

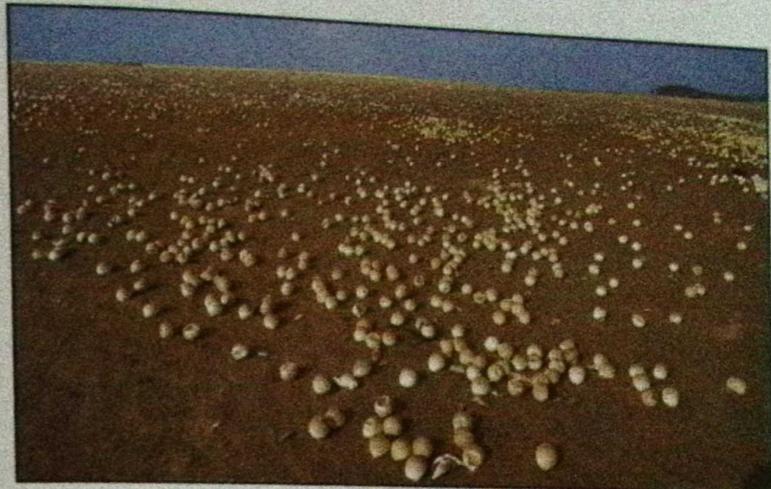
and Sambar formed the major diet of tiger. Unique habitats like caves, cliffs, talus and culverts were mapped using GPS and were monitored for their use by wild animals. Though small in extent these features constitute important microhabitats. Results suggest high use of these features by a wide range of animal groups. Fire risk analysis and mapping was done using Remote Sensing and GIS. Socio economic data was collected from six villages inside the Tiger Reserve using questionnaire method and field surveys. Resource utilization patterns by local people were studied and collated. This study has provided extensive datasets on ungulate population structure, distribution, abundance and habitat utilization patterns, which will provide scientific basis for management of these species and their habitats. The very comprehensive spatial database in GIS domain created by this study would help the management in informed decision making and monitoring of park resources. The final project report was submitted in February 1999.

ONGOING PROJECTS

* **An ecological analysis of critical sea turtle habitats along the Orissa coast for the development of a scientific sea turtle management strategy**

*Faculty : B. C. Choudhury
Researcher : Bivash Pandav*

For the second consecutive year (1997 and 1998), sea turtle mass nesting failed to occur at Gahirmatha. The rookery near Devi River mouth also witnessed an extremely low density turtle nesting. An all time high in turtle mortality was recorded in Orissa in 1998 with the enumeration of 13,500 dead Olive ridley. Since its inception in 1994, the WII research program has documented death of more than 33,500 Olive ridley in Orissa. The year 1998-99 was marked by a mixed sea turtle nesting season in Orissa with an extremely low nesting in 1998 and March 1999 resulting in a successful mass nesting.



Exposed sea turtle eggs lying scattered at the Naso rookery

Bivash Pandav

The re-commencement of sea turtle mass nesting at Gahirmatha in March 1999 provided the project personnel an additional opportunity to tag large number of nesting turtles. Monitoring of the nesting beaches has revealed the movement of tagged females between different nesting beaches in Orissa. So far, four of the turtles tagged in Orissa have been recaptured from eastern coast of Sri Lanka and one from south Tamil Nadu.

* **Impact of land use changes on habitat and ecology of Sarus Crane (*Grus antigone*) in India.**

*Faculty: B. C. Choudhury
Researchers: Jatinder Kaur & K.S. Gopi Sundar*

The Sarus Crane is a widely distributed species in India and is the only species of resident crane in the country. It is the only species of crane which breeds south of the Himalayas. Three extant subspecies are recognized of which the Indian subspecies, called the Indian Sarus Crane (*Grus antigone antigone*), is the largest and the most populous. In recent times, it is widely believed that the numbers of the crane has plummeted in India.

As the first part of the project, an all-India survey covering the states of Jammu & Kashmir, Himachal Pradesh, Punjab, Haryana, Rajasthan, Gujarat, Uttar Pradesh, Madhya Pradesh, Bihar, West Bengal, and Maharashtra was undertaken between June 1998 and March 1999. The survey was aimed at determining the present distribution range of the species, collecting information on local abundance and calculating encounter rates

at the district level in all the districts visited, macro-level information on cropping patterns and its effect



Jatinder Kaur

Flock of Sarus Crane seen near Viramgam, Gujarat

on the distribution of the species, the attitude of local people towards the species and determine the status of the bird within the country.

Eleven states, 110 districts and 143 points (transects and wetlands) were covered during the survey. The research team found low populations of Sarus Cranes in Jammu & Kashmir, Himachal Pradesh, Maharashtra and West Bengal. The Sarus Crane is probably extinct in Punjab. Uttar Pradesh and Rajasthan were the most Sarus-populated states in the country.

* **Impact assessment of tourism in Corbett National Park, Uttar Pradesh**

Faculty : Bitapi C. Sinha, B.K. Mishra and U. K. Bhattacharya

Researcher : Kaustubh Moghe

Protected areas have great potential for recreation and ecotourism. Not much work has been done on the evaluation of ecotourism potential of such areas in the country. The benefits of tourism to conservation can be considerable but the adverse effects which often accompany the positive need to be addressed by careful planning and effective management. This requires an objective assessment of potential positive and negative impacts and thoughtful analysis of how this potential can be

guided in the right direction. Hence this project was initiated by Wildlife Institute of India in March 1996 to collect information in the present status of tourism and its management in Corbett National Park.

During the current year data was collected on the present status of tourism and its management. Structured questionnaires were administered to the visitors at Dhikala and Bijnari. The garbage left enroute by the visitors was assessed and the visitor movement on flight distance of different animals was recorded.

* **A Study on Pheasant Distributions in Arunachal Pradesh, Eastern Himalaya**

Faculty : Pratap Singh

Researcher : R. Suresh Kumar

This survey was funded by the Wildlife Institute of India. This study was carried out in four districts of Western Arunachal Pradesh Viz., Tawang, East Kameng, West Kameng and Lower Subansiri from February 1998 to November 1998. During the survey, several localities were visited where wildlife surveys had never been carried out before particularly, in the interior and higher area. This study led to the discovery of a new pheasant taxon belonging to the genus *Lophophorus*. Interesting information on the distribution patterns of pheasants mainly belonging to the genus *Lophophorus* was recorded.

* **Developing a scientific Model Management Plan for a Marine Protected Area (M.G. Marine National Park, Wandoor, Andamans) and Draft Guidelines for Coastal and Marine Protected Area Management.**

Faculty : Ajai Saxena and B.C. Choudhury

Researcher : Sarang Kulkarni

This two year project is taken up to develop a model management plan for proper and scientific management of this unique marine national park. During the first year, data on ecological, biological, environmental and socio-economic aspects has been collected and writing work of the part one of the management plan is currently in progress. In addition, extensive surveys of coral reef areas have been carried out using Manta-Tow survey method for rapid assessment of the coral reefs. Permanent Line Intercept Transects (LIT) have also been laid at various depths in the reefs of the park, to study the coral reef structure and their status. Data is also collected on physio-chemical parameters of marine environ, which constitute almost 75% of the park area. Detailed maps in 1:50, 000 scale are being prepared. A digitised map of the national park has been made and data from the available 1989 satellite imageries of the area is interpreted. Acquisition of recent satellite data from NRSA is under way and the same will be interpreted and developed into a spatio-temporal data base for the MGMNP in GIS domain.

* **A study on the conservation status of High Altitude Forests in Garhwal Himalaya with Special Reference to Landuse Practices and Tourism.**

Faculty : G.S. Rawat, & Asha Rajvanshi

Researchers: Sanjay K. Uniyal and Anjali Awasthi

This project primarily aims at collecting baseline information on the structure and composition of different forest types in upper catchment of Bhagirathi Valley for future monitoring and assessing the impacts of landuse practices on the forests and

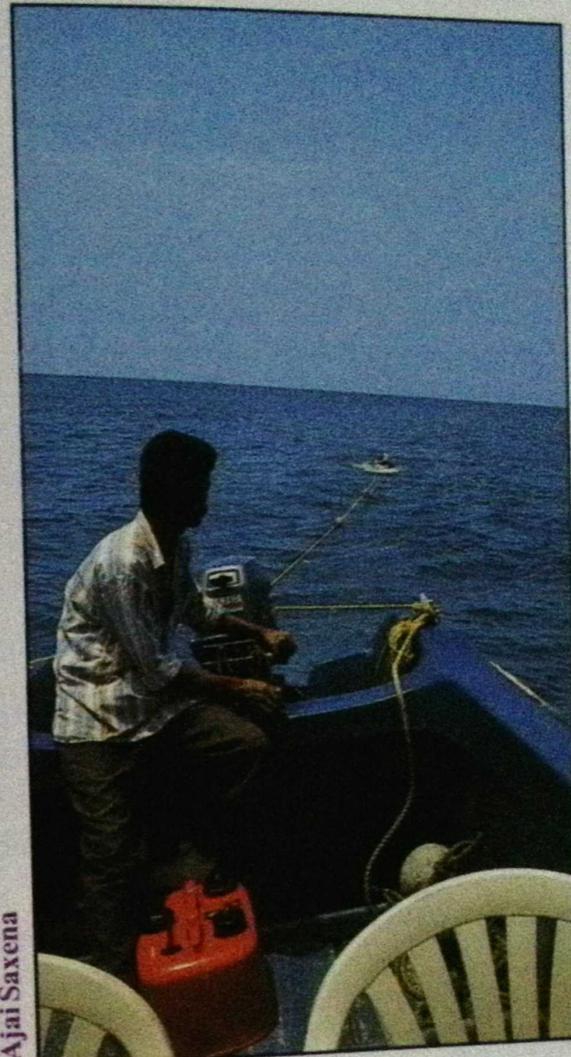
wildlife in this area. During 1998-99 data were collected on the following aspects: (a) Annual cycle of forest biomass utilisation by the resident and migratory villages, (b) Forest structure and composition at Dayara site, (c) Status survey of rare, endangered and endemic plant species, (d) ethnobotanical survey of the area. Analysis of data on the patterns of fuel wood and fodder extraction by the villagers reveal a clear cut spatio-temporal variation. The standing biomass of preferred woody species at low altitude villages and summer settlements were 140.68 ± 26.91 t/ha and 477.46 ± 31.8 t/ha respectively. Average fuel wood consumption per house hold at permanent village was 14.65 ± 0.78 kg/day while it was 36.42 ± 3.35 kg/day at high altitude temporary settlement. Findings on these aspects and their implications for conservation were presented in the national wildlife seminar held at WII in August, 1998. Analysis of data collected for the remaining period is in progress.

* **Ecology of gaur (*Bos gaurus*) in Pench Tiger Reserve, Madhya Pradesh**

Faculty : K. Sankar and Qamar Qureshi

Researchers : Mohd. Khalid Sayeed Pasha and G. Areendran

The ongoing research project aims to collect basic information on gaur ecology in Pench Tiger Reserve, Madhya Pradesh. Gaur can serve the function of a 'Flagship Species'. Thus the ongoing study has the potential of going much beyond the interest of gaur as a species and its conservation.



Ajai Saxena

Manta tow survey being conducted.



Debarking of teak tree by Gaur in Pench Tiger Reserve.

During the reporting year a preliminary vegetation map of the reserve was prepared using IRS LISS III data, vegetation map and ground truthing. In addition, data on quantification of different vegetation types, phenology of major trees, shrubs and grasses and impact of fire on two major vegetation types were collected. The home range, activity pattern, habitat use, food habits, social organisation, predation on gaur and other wild ungulates were also studied. A survey of the villages around the National Park was initiated this year for the estimation of livestock population and prevalent livestock diseases.

One adult male gaur was chemically immobilized and fitted with S9 activity sensor radio-collar during May 1998 in the National Park Area of the Pench Tiger Reserve.

* **An ecological study of sympatric Hornbills and fruiting patterns in a Tropical Forests in Arunachal Pradesh.**

Faculty: G.S. Rawat & Pratap Singh
Researcher: Aparajita Dutta

During April 1998 to March 1999 data were collected on the following aspects of this project: Phenological monitoring of the fruiting species from 21 plots of 0.25 ha, germination experiments with seeds of hornbill food plants, locating potential nest trees by surveying the forest and with the information from tribals on known nest sites, comparison of diets from observations at nest trees and habitat quantification of roost sites and new nest sites. Major findings were presented in the National Wildlife Seminar held at WII in August 1998. The researcher also visited the Bombay Natural History Museum and the Zoological Survey of India Museum at Calcutta to collect morphometric data on hornbills to test certain hypothesis pertaining to frugivory and seed dispersal.

* **Ecology and management of problematic sloth bears (*Melursus ursinus*) in North Bilaspur forest division, Madhya Pradesh, India**

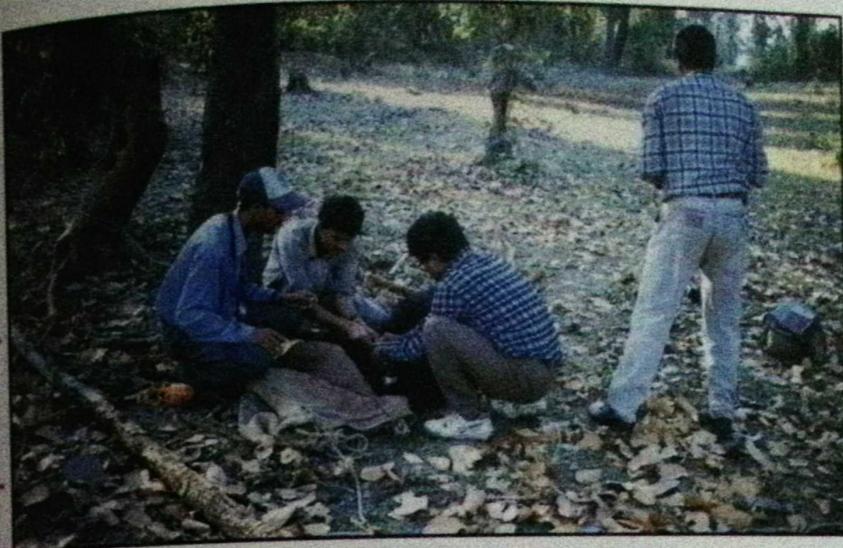
Faculty : N.P.S. Chauhan

Researchers : Harendra Bargali and Naim Akhtar

The project aims to study the ecology and management of problematic sloth bears in North Bilaspur forest division. The objectives of the project are to prepare habitat maps and quantify vegetation composition and structure within each habitat, assess the distribution and population density of sloth bears in the study area, quantify habitat use and ranging pattern of sloth bears using radiotelemetry, assess seasonal changes in the sloth bears dietary intake, evaluate human-bear conflicts and formulate bear conflicts. The study will help developing conservation and management plans for sloth bears in this region. The project was systematically started in February, 1998.

The researchers re-established the base camp at Indira Udyian, Pendra. Following this, field work to collect information on problem areas (villages), human mauling and killing cases, nature and extent of agricultural crop damage, bear denning areas (dongris) within Pendra and Marwahi ranges was started. There are 43 villages which have serious bear menace problem. Based on village interview, 387 cases of human mauling and killing occurred

during the years 1978 to 1998 have been analysed with respect to age and sex classes, time and



Radio collaring of sloth bear in Bilaspur Forest Division.

circumstances. 'Out of these human casualties, 120 incidents occurred in forests, 94 cases were in crop fields and 83 cases were in the vicinity of villages. Seven men and 9 women were killed, out of which 4 men and 2 women were eaten up by sloth bears.'

At this stage, the researchers plan to propose, formation of a Bear Sanctuary encompassing the 26 villages. Most of these affected villages are scattered and small with few families. Eleven villages have very small isolated population of bears. Translocation of these bears to some suitable area e.g. Achanakmar sanctuary, seems to be the only solution which would help conservation of sloth bears and mitigation of human bear conflict in these areas.

Recently, 3 sloth bears have been radio-collared, one bear in Toli village dongri and two bears in Ghuseria village dongri. Their ranging patterns are being monitored.

* **Ecology of tiger: to enable a realistic projection of the requirements needed to maintain a demographically viable population of tigers in India.**

Faculty : R.S. Chundawat
Researcher : Neel Gogate

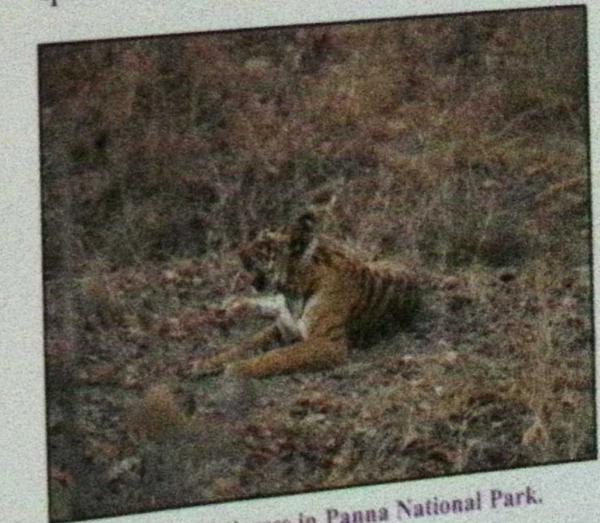
This is the first study in the world on tigers in Dry Tropical Forests, where tigers are most vulnerable. The project is completing its three years. During this period five tigers were radio-collared and were intensively monitored. The data collected

during this period revealed that in dry forests, home ranges of tiger are large. The collared male ranged over 277 km² at its maximum and females home ranges ranged between 40 to 60 km². Such large ranges have not been documented from the sub-continent before. Sparse density of tigers in low prey density sub-optimal habitat with high human pressure make the tiger population highly vulnerable in these habitats.

Monitoring of the collared male tiger revealed that it killed more cattle (84%) than females did. The average time lag between two large kills is long, even for tigress with cubs. The effect is a low reproductive success

of the population. The data on food habits indicate that tigers in Panna preyed more on smaller prey than has been documented by any other study. Nilgai, which is the dominant prey in the area was not preyed in proportion to its availability. This indicates that a high nilgai biomass in a dry forest need not necessarily translate into high prey availability for the tigers.

In dry forest such as Panna Tiger Reserve thermoregulation plays a significant role in the distribution of tiger and its prey and their habitat use. It has been observed that during summer, over 80% of the locations of the collared tigers was within 100m of water. Water hole and cool resting spaces are limited during summer and are the most



Radio collared tigress in Panna National Park.

important factor in the use of habitat by tigers. The monitoring of tiger in Panna has revealed that in dry forest, high cattle predation, small population size, extreme environmental conditions and availability of prey all make this tiger population highly vulnerable. Over 45% of the tiger habitat in India falls within the dry forest and if tiger

disappears it is most likely from these habitats. Therefore such long term monitoring of tiger will provide critical information needed to manage a viable population.

EXTERNALLY FUNDED RESEARCH PROJECTS

US-Fish and Wildlife Service Phase II

* Evaluating Panna National Park with special reference to the Ecology of Sloth Bear

Faculty : A.J.T. Johnsingh and Clifford G. Rice (Washington State Department of Fish and Wildlife, Olympia, WA, USA)

Researcher : T.R.K. Yoganand

Ecology and behaviour of sloth bear is being studied in Panna National Park, Madhya Pradesh since February 1996. During this reporting period, three new sloth bears (two adult males and one subadult female) were fitted with radio collars and studied along with the earlier ones. Scat collection and analyses to study feeding habits, other associated habitat studies of phenology, fruit abundance, etc. were continued for the third year. Methods to assess and monitor sloth bear abundance using scat and digging (for ants and termites) sign as indices are being developed, and tested in the field for their ecological and statistical efficiency.

During this period, activity and ranging patterns of bears varied seasonally. They were mostly nocturnal and crepuscular in activity. They have large annual home-ranges and varying sizes of seasonal ranges (22-41 km²). During the monsoon they expanded their ranges and intensively used the degraded areas covered with Lantana. The bears predominantly fed on ants and termites throughout the year. However, fruits constituted the main diet during the major fruiting season i.e. March-June.

An abundance index based bear digging signs that could be used to assess relative abundance of

bears across forest areas and to monitor population trends over the years was developed.

In addition, a questionnaire survey was conducted all over sloth bear range within the country to find out the occurrence and abundance. More bears will be radio collared and tracked during the next year.

During the US counterpart Cliff Rice's visit in January 99 we radio collared a bear, set up an automatic receiver and monitored a denning bear, and discussed data analyses and writing up.

Yoganand made a presentation on 'sloth bear movements and conflict with people in Panna National Park' in the 11th International Association for Bear Research and Management Conference in Tennessee, USA during April 1998.

* The relationships among large herbivores, habitat and humans in Rajaji-Corbett National Parks

Faculty : A.J.T. Johnsingh, S.P. Goyal, G.S. Rawat, Asha Rajvanshi & Paul Krausman

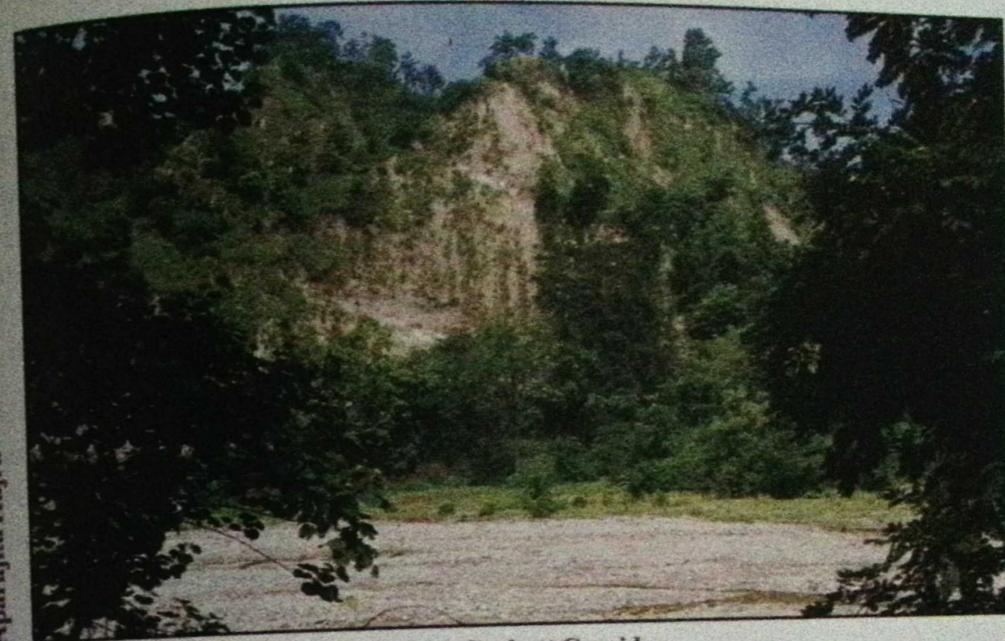
Researchers : A. Christy Williams, Aparajita Hajra, Joy Dasgupta and Kashmira Kakati

The research project was initiated to study the relationships between large herbivores and the habitat and to investigate the impact of humans on the Rajaji and Corbett National Parks and on the corridor area between these parks. This would enable an understanding of the suitability of the habitats for the major herbivores and quantify the amount of disturbance caused by humans, so that in time suitable management recommendations could be made.

Habitat use by elephants, and the effects of biotic pressure on elephant distribution, population and age-sex structure, elephant-woody plant interaction, nutritional composition of elephant diets and relative densities over the Rajaji-Corbett corridor area were studied. In 1998-99, data collection was carried out on habitat use, elephant use of Rajaji-Corbett corridor area and elephant population parameters.

The distribution and relative abundance of wild ungulates and livestock were assessed in the Rajaji NP and Rajaji-Corbett corridor area. The work

The objective of the project is to build a biodiversity model for representative areas and to simulate results at larger landscape. The data has been collected from field and secondary sources. The spatial database is developed at 1:250, 000 scale. The database of socio-economic, plants, birds and mammals are now being compiled. We have ensured the validity of data by adopting strict quality control measures like data verification and maintaining metadata information.



A view of the vegetation in Rajaji-Corbett Corridor

on visual interpretation and Digital Image processing of the satellite imageries was undertaken for the study area. Range contour generation and preliminary vegetation map was prepared and ground truthing completed in Rajaji and corridor areas. A population estimate of the resident pastoralist group (Gujjars) and their livestock and mapping of the Gujjar settlements or 'deras' within the study area are currently in progress.

* Identifying Potential areas for conserving biodiversity in the Indian Himalayas

Faculty: V.B. Mathur, R.S. Chundawat, Qamar Qureshi, Don Hunter and Rodney Jackson

Researchers: Rashid H. Raza, Meera A. Ommen, R. Jayapal and C. P. Kala

The Himalayas constitute one of the biodiversity hotspots of the Indian subcontinent and with physical variation from 500 m to 9,000 m in altitude and from 100 mm to 600 mm precipitation, such diversity is not surprising. Though the Himalayas harbours a high diversity of flora and fauna, Protected Area network is abysmally poor.

The vegetation classification of Ladakh is under progress, SPOT and IRS Satellite data have been used for vegetation mapping. The Kedarnath Sanctuary and adjacent areas are being mapped using IRS data. The field validation for vegetation mapping of Ladakh and Kedarnath is under progress. Field sampling for plants, birds and mammals is continuing in Ladakh and Kedarnath.

* Impact of fragmentation on the biological diversity of rain forest small mammals and herpetofauna of the Western Ghats Mountains, South India

Faculty: Ajith Kumar (SACON), Ravi Chellam, B. C. Choudhury & Barry Noon (Colorado State University)

Researchers: Karthikeyan Vasudevan, Divya Muddappa, N. M. Ishwar

This project has field bases in Kalakad-Mundanthurai Tiger Reserve (KMTR) and Indira Gandhi Wildlife Sanctuary (IGWLS). The rain forests of KMTR are treated as the contiguous site while the forest fragments are in and close to IGWLS.



The brown palm civet (*Paradoxurus jerdoni*) an endemic species of viverrid to the Western Ghats

The major objectives of this project are:

1. To identify the major factors which govern the faunal distribution and relative abundance in a large, contiguous and relatively undisturbed rain forest in Kalakad-Mundunthurai Tiger Reserve.
2. To identify the extent of and nature of changes brought about by forest fragmentation on the major factors identified above and relate these changes to changes in faunal distribution and abundance in the rain forest fragments of Anamalai hills.
3. To develop a set of statistical models based on (1) and (2) above, which would allow the prediction of faunal changes as a function of fragmentation.
4. To carry out a survey across the Western Ghats to validate the predictions of the models.

During 1998-99 field work was carried out in both the study sites. Sampling for amphibians was completed in the rain forests fragments identified for sampling in Indira Gandhi Wildlife Sanctuary, Anamalai Hills. The sampling for reptiles was completed at KMTR and the researcher shifted to IGWLS for sampling the forest fragments. Sampling in IGWLS for reptiles should be completed by June, 1999.

Since April, 1998 efforts have been underway to trap and radio-collar small carnivores in KMTR, so far we have succeeded in trapping and radio-collaring brown palm civets. Collared civets are being tracked regularly to obtain data on their home range size, ranging patterns, habitat use and activity

patterns. Data on roost tree characteristics and phenology of civet food plants are also being collected. Field work in KMTR is scheduled to be completed by December, 1999.

* **Development of an Indian Co-operative Wildlife Health (IWHC) Programme and Technical Assistance in WII's Wildlife Health Research**

Faculty : Pradeep Kumar Malik & F. Josh Dein

All the five Indian Wildlife Health Co-operative Centres (IWHC) are well established and have the strong support of the college Deans and University Vice-Chancellors. There is a strong evidence of collaborative spirit in each centre, with faculty teams working with the Wildlife Health Co-ordinators (WHCs) to provide diagnosis and investigation of disease outbreaks, information exchange, education and consultation to wildlife managers and veterinarians.

An annual planning meeting cum project development workshop for IWHC co-ordinators was organised at Wildlife Institute of India in April, 1998. Mr. Fred Bagley, USFWS provided his inputs and guided Wildlife Health Co-ordinators in developing new proposals for meeting the critical operational expenses to their work.

Apart from the regular consultation on diagnosis and investigation of disease outbreaks, IWHC, Western Region at Hissar Veterinary College organised a workshop at Hissar on "Prevention and Control of Disease in Wildlife and better Husbandry Practices in Zoos" for the wildlife officials of Haryana State. A manual dealing with various issues on health management of captive wildlife was also provided to all participants in Hindi language.

The IWHC centres at Guwahati and Madras Veterinary Colleges have developed a "Wildlife Veterinary Manual" for wildlife managers and veterinarians.

The mid-term evaluation of the project was done in Oct. 1998 by Dr. J.E. Cooper, international

wildlife disease consultant and Dr. V. Gnanaprakasam, former vice-chancellor, Tamil Nadu Veterinary and Animal Sciences University. The evaluators considered that the project is of utmost importance in conservation and health management of wildlife in India and considered that the project is still in its growing phase but satisfied that it is already transferring deliverables.

Another review of the project was done by Indian and US Co-ordinators of the project in March 1999 for mutual assessment of the project progress. The co-ordinators met several wildlife officials to encourage their utilization of IWHC centres.

* **Establishment of a wildlife forensic capacity at the Wildlife Institute of India**

Faculty : S. K. Mukherjee, S. P. Goyal K. Sankar, Ken Goodard and Dr. Bonnie Yates.

Researchers : Archana Bahuguna, S.P. Rajkumar

Research project for developing wildlife forensic capabilities was initiated to provide assistance to enforcement agencies for proper implementation of Indian Wildlife (Protection) Act-1972. The project is aimed to standardize techniques to identify species from the biological parts and products and establish a repository of reference samples. Scanning electron microscopic study was undertaken to describe hair characteristics of tiger, leopard, domestic and wild pigs, Tibetan antelope,

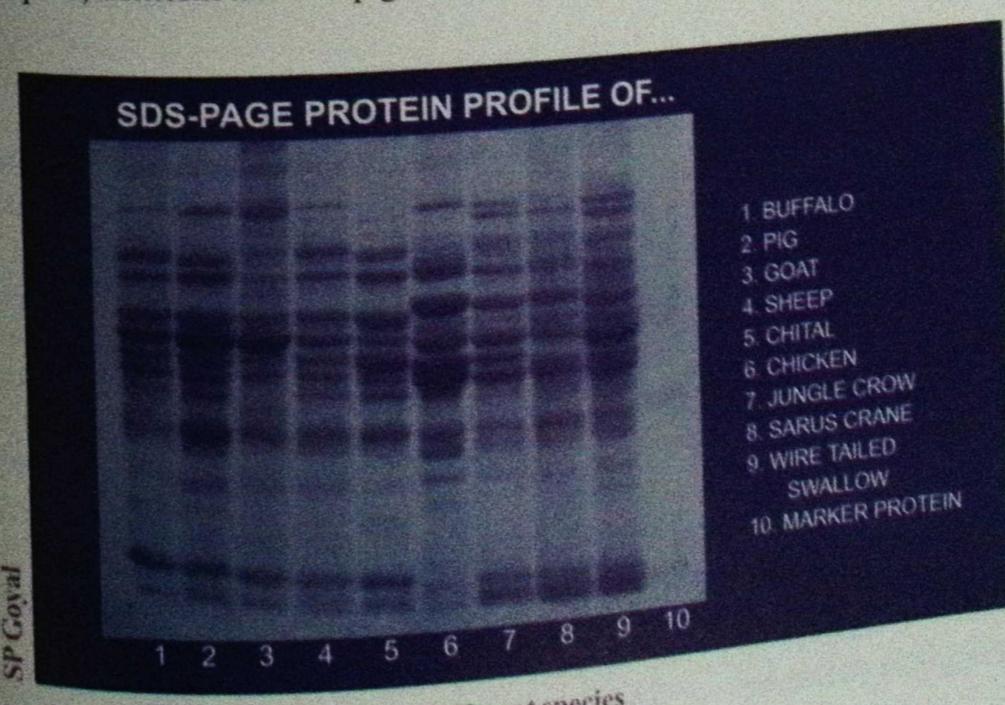
angora rabbit, pashmina goat, ibex, blue sheep, shahmina goat, nilgai, chital and wolf. A liquid nitrogen container was placed at the National Zoological Park, New Delhi for the collection of tissue samples. Samples of six species (blackbuck, sambar, chital, wild boar, thamin and hog deer) were collected and kept in the cryogenic freezer at -70°C. Tissue samples of twenty species have so far been collected from birds (n=6) and mammals (n=14) including a few domestic species. Effectiveness of formalin, absolute alcohol and silica gel as tissue preservative was analyzed to enable to identify species. The silica gel was found to be effective and it can be used for storing tissue samples for a period of 10-15 days without any changes for the enzymatic analysis.

* **Conservation of the Indian Wolf**

Faculty : Y.V. Jhala and Dr. Olav Oftedal

Researcher : Dinesh K. Sharma, Bharat Jetwa and Vinatha Vishvanathan

This research project is well into its third year of implementation. There are three intensive research sites where the endangered wolves are being studied with radio-telemetry and one site where intense human-wolf conflict instigated to conduct short-term intensive study. During the past working year wolves were live trapped with rubber padded foot-hold traps and radio-collared in Ojhar, Nasik district and in Abdasa, Kutch area. Research is likely to provide a good understanding of wolf ecology and result in generalities that will help develop a National conservation strategy for the wolf as well as provide inputs to site specific conservation measures.



A study was conducted on the serious wolf-human conflict in eastern UP where over 50 children were allegedly killed by wolves. A full report on findings has been provided to the UP forest department. This

study is of relevance since such a problem has again cropped up in the Rai-Bareilly area of U.P.

In Nasik the wolves are found to be residing within the refuges created by high security areas of the military and Hindustan Aeronautical Ltd. premises in a semi urban setting. The conflict here is of a different kind, where the wolves are alleged to damage the expensive barrier net installed at the runway to prevent damage to fighter planes that may over shoot the runway. It was confirmed that wolves are the likely culprits by examining their scats and detecting net fibres. The ecology of wolves with radio-telemetry in this unique situation where wolves leave their refuges at night and forage on the paved, street lamp lit roads of Ojhar township, is being currently studied.

In the Bhal area of Gujarat (Velavadar National Park) research has provided information on the critical habitat patches used by wolves over an area of 200 km². Radio-collars on wolves and hyenas in Abdasa, Kutch have recently been put out. Several sightings of the caracal which was considered locally extinct in the region was made. Data on the caracal's habitat use and ranging patterns are slowly accumulating and within the next few years some information on its ecology in Kutch will be obtained.

This research project has received funding from US-India Fund allocations of the U. S. Fish and Wildlife Service, National Geographic Society, Center for Field Research (Earthwatch) and National Fish and Wildlife Foundation.

* **Planning and Development of Interpretive Facilities in Panna National Park and Corbett National Park**

Faculty: Ujjwal Bhattacharya, Bitapi C. Sinha, D. V. S. Khati, Gary Stoltz and Gayle Hazelwood

The project, in collaboration with US-FWS under its phase-II programme is in the process of development plans and facilities for two protected areas viz. Panna National Park in Madhya Pradesh and Corbett National Park in Uttar Pradesh in accordance with their specific field situations,

potential and requirements. The two areas, though located in two different ecological regions, have similar management issues vis-a-vis communities and have impressive inherent potential for development of interpretive facilities.

Site specific Interest Group Workshops were held at the two aforesaid project sites in May, 1998, where in the Director-WII and faculty members involved in the project, US counterpart scientists, Park management and various other stakeholders participated and gave their inputs in planning for interpretive facilities in the respective protected areas.

Consequent to this a cooperative agreement between the US Fish and Wildlife Service and the Wildlife Institute of India was signed detailing the background, scope of work, institutional responsibilities, period of performance and financial administration. A memorandum of understanding (MoU) was signed between the WII and the M.P. Forest Department and the same is awaited for want of Govt. of U.P.'s approval. Activities were initiated as per a work-plan. Field studies, resources inventory and data collection are in progress for preparation of Interpretive Plan.

The project finally aims to provide comprehensive interpretive facilities using a variety of appropriate media in order to enrich visitor experience so that they can return satisfied and become supporters of protected areas in particular and wildlife in general.

USDA Forest Service

* **Management of forests in India for biological diversity and forest productivity - A new perspective**

Faculty: V. B. Sawarkar, P.K. Mathur, S. P. Singh, Ajai Saxena, D. V. S. Khati, Sugato Dutt; Bruce Marcot, Richard Holthausen, John Lehmkul, Martin Raphael, Tom Darden (USDA Forest Service)

Researchers: Anjana Pant, Harish Kumar, Ashish Kumar, T. K. Sajeev

The objective of this project is to evolve approaches and practices for integrated forest

management planning which are essential for conservation of biological diversity and enhanced productivity of forest ecosystems. The study sites are (i) the Balphakram National Park, Siju Wildlife Sanctuary and outlying Reserve and Community forests in Meghalaya (GCA) (ii) the Dudhwa Tiger Reserve and forests of north and south Kheri divisions in U.P. (TCA) ; (iii) Satpura NP, Bori and Pachmarhi WLS, managed forests of Hoshangabad, north, east and south Betul forest divisions of M.P. besides the Melghat tiger reserve and managed forests of east, west and south Melghat divisions of Maharashtra (SCA) ; (iv) the Anamalai WLS and managed forests of Kodaikanal and Dindigul divisions of Tamil Nadu (ACA) . These sites represent a diversity of ecological, managerial, socio-cultural and economic challenges necessary for testing a range of technological templates and options; development of management tools and the final product in form of field guides. Following were the accomplishments during the period under report.

Anamalai Conservation Area (ACA) : Transects were laid in the established strata viz evergreen, moist and dry deciduous (with teak), and thorn forest communities, eucalyptus plantations (low elevation), montane shola, grasslands; grasslands with coffee plantations (high elevation), teak plantations. Data was generated on distribution and abundance of bird species; vegetation composition was recorded on plots along transects including phenology and herbivore pellet counts.

Garo Conservation Area (GCA) : Digitization of maps pertaining to basic drainage, roads, landuse categories of the entire area except along a section bordering Bangladesh was completed. Changes influenced in primary and other successional stages of secondary forests were analysed. In primary forests a total of 100 tree species with 2960 individuals were recorded.

Satpura Conservation Area (SCA) : Data collection on additional community attributes on 36 transects and 200 plots already established was continued. In addition 16 transects and 80 plots were laid in sections of forests of north Betul division. Nine parameters were chosen to assess

structural components and species distribution. Seven species of fruit bearing trees were addressed to assess the impacts of wild fruit collection. Seed banks were assessed in 10m dia circular plots around sample trees. Status of regeneration, seed production, impact of fires and weed abundance were addressed. The information arising from such investigations would be transferred to the forest department for integration of such concerns in the JFM and ecodevelopment programmes.

Terai Conservation Area (TCA) : In the woodland 178 nested plots were laid and measured for species richness and tree density. 58 tree species were recorded across different vegetation communities. The highest tree density was 801/ha in evergreen forests and the lowest was 52.2/ha in wooded savannah. Species richness followed a likewise pattern. Further analysis on nutrient contents and biomass estimation of grasses remained to be performed. Work was extended to the managed forests of north and south Kheri.

The process of developing Wildlife Habitat Relationships (WHR) on a selected range of vertebrate species began. The number of such species will vary between 80 to 100 per project site.

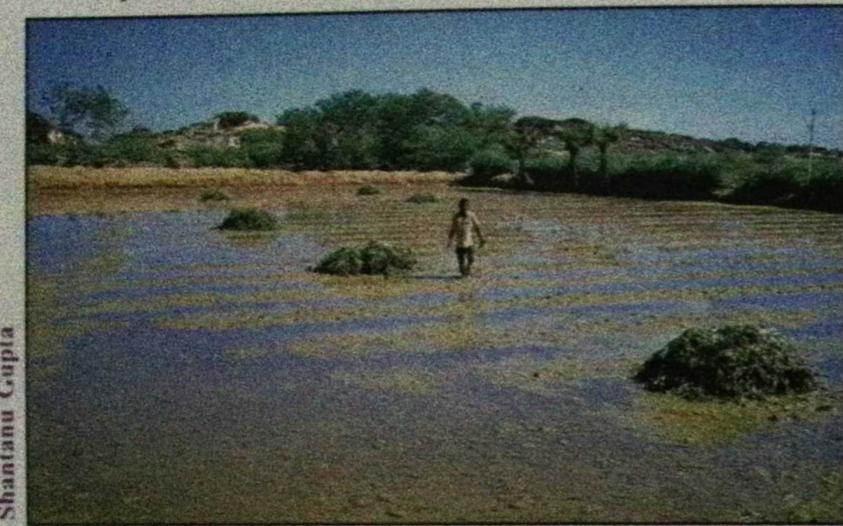
Forestry Research Education and Extension Programme.

* **An Ecological Study of the Kalakad-Mundanthurai Tiger Reserve : An Eco Development Approach - FREEP**

Faculty : Sugato Dutt, A.J.T. Johnsingh, G.S. Rawat, B.K. Mishra, N.P.S. Chauhan
Researchers : Kaberi Kar Gupta, Jayanti Ray, J. Ronald, Shantanu Gupta, Hema Joshi

The Wildlife Institute of India has initiated a research project in collaboration with the Tamil Nadu Forest Department which has a strong component of ecodevelopment along with a biodiversity conservation approach at Kalakad Mundanthurai Tiger Reserve (KMTR). The field work was initiated in August 1996 and an inventory of plants, mammals, reptiles and birds was conducted during 1997-1999.

During 1998-1999 studies were conducted on the vegetation survey using stratified random plots within 1 km x 1 km square grids. In all 22 grids were sampled in different vegetation



Leaves of *Dodonea viscosa* is extensively used by local people around KMTR as leaf manure.

types. Transects for mammals and birds were laid within the same grids studies on the socio-economic aspects and patterns of crop damage by wild animals along the village fringes were conducted. A component on the ecology and status of slender loris was completed. Other components which have been completed during 1998-99 include study on the ethnobotany of Kani tribes and survey of avifauna.

During the course of part one year there were sightings of three new species from KMTR which had no earlier record viz. the barking deer (*Muntiacus muntjak*), a bat species (*Megaderma spasma*) and Ceylone Frog mouth (*Batrachostomus moniliger*).

An Ecological Study for the Conservation of Biodiversity and Biotic Pressures in the Great Himalayan National Park : An Ecodevelopment Approach.

Faculty : B.M.S. Rathore, P.K. Mathur, V.B. Mathur, G.S. Rawat, N.P.S. Chauhan and S. Sathyakumar



Hay stacks in villages in and around GHNP

Researchers : V.P. Uniyal, Pradeep Kumar, Sunit Naithani, Vinod T.R., Sanjay K. Singh and K. Ramesh.

This project, the second of the World Bank's FREEP in which WII is the nodal agency carrying out research and monitoring, seeks to study GHNP's biodiversity, the impact of livestock grazing, herb collection and other human activities on it and also takes a look at the socio-economic aspects of the park dependent people. The project envisages to set base line information on biological as well as socio economic attributes concerning the GHNP conservation area.

Considering that ecodevelopment for biodiversity conservation is an ongoing and dynamic process, several research studies were initiated simultaneously. The studies that are nearing completion include impact of livestock grazing, species diversity among select insect groups, assessment of floral and habitat diversity in GHNPCA, vegetation and wildlife habitat mapping, the faunal diversity and ecological requirements and assessment of socio economic condition of the people in the context of GHNP. A number of studies covering the biological and socio economic aspects have been completed by involving both national as well as international consultants.

A three day workshop at Sai-Ropa in Great Himalayan National Park was held in May 21-23, 1998 wherein the research findings were shared and deliberations were made over designing of the monitoring programme. The workshop was attended by participants involving the PA management and the staff, the senior officials from HPFD, the WII resource persons including consultants, the EDC members and the NGO representatives. A series of training workshops for staff and EDC members have been organized that aim at transferring the skills for monitoring biodiversity. In its latest aide memoir, the World Bank has commended the research project coordinated by WII, "the excellent research has provided a strong foundation for PA management".

Funded by Ford Foundation

* **Project on "Building Partnership for Biodiversity conservation in Rajaji National Park".**

Faculty : B.M.S. Rathore, D.V.S. Khati, Ajai Saxena, Anil Bhardwaj and Ruchi Badola

The project is based on the premise that given a complex situation in Rajaji, a pragmatic approach to biodiversity conservation would require an enabling environment amongst key stakeholders based on mutual trust and confidence to help them solve the problems affecting both habitat and local communities. Built around this premise, the project envisage capacity enhancement of key partners i.e. of local community and the park personnel in various competencies so that they are able to forge effective partnership. Other project outputs include modal microplans from identified village clusters, short term research to bridge information gap and process documentation. Role of institute is essentially of a facilitator - helping the key partners in sharing the common platform and moving towards an institutionalised co-ordination mechanism, capacity building and resource mobilisation. The project has been funded by the FORD Foundation and would continue till June, 2000.

Under this project, during this year, team members of Rajaji has given a new direction to the project.

A three days training programme on "Integrating Genders in ecodevelopment" was organised for the spearhead team through Gender Training Institute, Centre for Social Research, New Delhi during January 1999. The spearhead team, has organised a number to training programmes for the frontline staff and villagers in few of the village clusters around the park.

PROJECT INITIATED

* **Conservation Genetics of Olive Ridley sea turtles on the east coast of India**

Faculty : B. C. Choudhury
Researcher : Kartik Shankar

The conservation of Olive Ridley sea turtles (*Lepidochelys olivacea*) on the east coast of India, particularly Orissa, has been a matter of some concern due to large scale trawling mortality over the past five years. In recent years, the development of molecular techniques have offered a new range of tools to answer questions of ecological interest. This short duration project was initiated in February 1999 to study the population genetics of the Olive Ridley sea-turtles nesting along the east coast of India in general and Orissa in particular.

The basic questions that are to be answered using a molecular genetic level analysis are whether the nesting Olive Ridley population along east coast of India are one population or are different population.

From February to March 1999, four populations on the east coast were sampled; Gahirmatha, Devi River mouth, Rushikulya in Orissa and Chennai in Tamil Nadu. Blood samples and tissues from freshly dead Olive Ridleys and from nesting individuals and hatchlings were collected.

After collecting some more samples during April and May, the samples are to be analysed at the Centre for Cellular & Molecular Biology at Hyderabad. It is proposed to use four different methods to reveal information.

ORGANIZATION

The most important body at the Wildlife Institute of India is its WII Society which is headed by the Union Minister for Environment and Forests. Among the other members are some State Forest Ministers, nominated Members of Parliament and Members of Legislative Assembly, officials from several central government ministries and departments, representatives from NGOs and eminent individuals. The Annual General Meeting of WII-Society was held in December 1998.

The actual functioning of the institute is directed by a 15 member Governing Body, presided over by the Secretary, Ministry of Environment & Forests. The XXXII, XXXIII, XXXIV meetings of the GB took place in July 98, Nov 98 and March 99 respectively.

DEVELOPMENT COLLABORATION

UNDP

The Government of India and UNDP have been collaborating since 1992 on a project aimed at "Strengthening wildlife management and ecodevelopment planning capabilities" within the Central and State wildlife agencies. As part of this, Management and Ecodevelopment Plans have been drawn up for 14 protected areas in the country by respective Field Planning Officers trained under the project.

During the year, following project evaluation last year, a Preparatory Assistance Mission was fielded to develop a proposal for the implementation of one or two model Ecodevelopment Plans. The Mission prepared a Sub-programme Support Document on Wildlife Protected Area Management which was subsequently revised. The current project ended in June 1997, while the implementation proposal has been approved in principle by the Project Steering Committee of the UNDP.

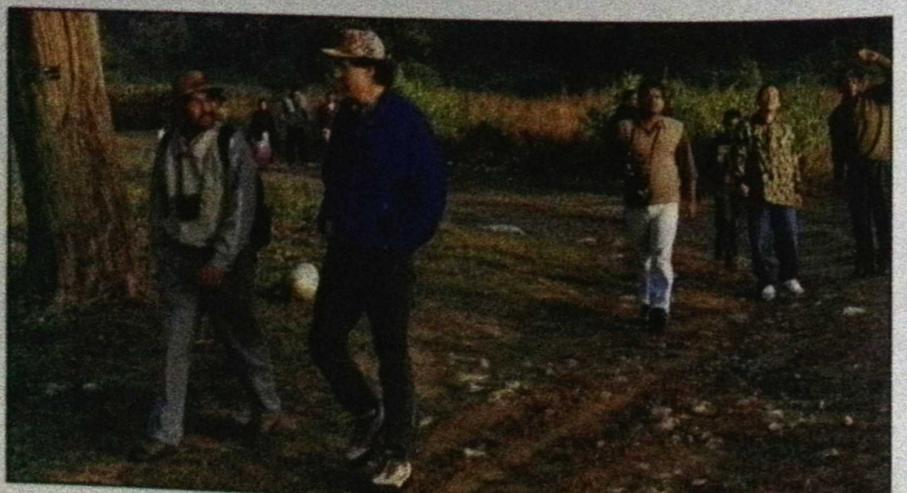
US - Fish and Wildlife Service

US-Fish and Wildlife Service (US-FWS) has been collaborating with the Government of India on various wildlife conservation programmes since 1977. At the celebrations held in Washington on 23 September 1997, to mark 20 years of this collaboration, FWS made a mention of the outstanding support, assistance and cooperation received from a wide variety of individuals and organizations in its international programmes. Toward this, a special mention was made of the Wildlife Institute of India and a certificate presented in acknowledgement of WII's cooperation and significant contribution to the conservation and management of natural resources.

The collaborative project between WII and FWS, since 1989, has assisted the institute in upgrading its skills and tools in conducting its training and research programmes in biodiversity conservation. The Phase-I of the project completed in 1994. The Phase-II of the project (1995-2000) seeks to test the competence acquired as also to consolidate the gains of the first phase. This is being done through specific projects, broadly directed at management oriented biodiversity research or at developing laboratory or field technology and curriculum. (For details, see section on Research).

USDA

Individual project collaborations are also being conducted with the USDA Forest Service. A Mid-



Vinod Verma

Field visit by participants of the mid term review & workshop of USDA Forest Service collaborative projects.

Term Review and Workshop of this project was conducted by WII from 8-12 November 1998 at Corbett Claridges Hideaway, District Nainital, U.P. The workshop was attended by Project Investigators and USDA forest Service counterpart scientists. The sessions included Forest Management realities, needs, strategies and project accomplishments, presentations on 4 project site and Management and Institutional Linkages, Future Direction.

The agenda included a two day trip to one of the project sites, the Terai Conservation Area (TCA) - Dudhwa National Park, where the Mid-Term Review report of the project was also finalized.

SERVICES

CONSULTANCY PROJECTS

M. P. Forestry Project Curriculum Design for frontline staff in Protected Areas of M.P.

A team of faculty members drawn from Wildlife Management, Wildlife Extension and Ecodevelopment Planning Cell took up this assignment. This assignment which is seen as a critical step in building/strengthening in house competence within the frontline staff of M. P. Forest Department, carried out the need assessment, evolved competencies and carried out the development of performance standards and development of course structure and learning resources to help the trainees achieve competence against the agreed standards. The implementation of the curriculum with the help of inhouse trainers under the technical guidance of WII has already started at Bandhavgarh as a pilot programme. WII faculty has joined different modules to facilitate this pilot programme.

India - Ecodevelopment Project under GEF

Final report on "The Strategy for Updating Management Plans for India's Ecodevelopment Project Sites" was prepared and submitted to Government of India during May, 1998. This report can be seen as a new step forward for updating the management of the Protected Area of the country as a whole.

Impact Zone Assessment Around Panna National Park

This project was assigned to Wildlife Institute of India by the M.P. Forest Department under M.P. Forestry Project. It is aimed to identify the impact zone of the park including quantification of various impacts and suggest strategies to mitigate these impacts. Making use of the inhouse capabilities of the frontline staff, village survey work and mapping of pressures in and around the PA has been carried out using this human resource after their capacity building through training workshops (one for spearhead team of Frontline staff, at Hinnauta during October 1998 and another for the villagers at Brijpura during January, 1999). A workshop for understanding the problems of impact zone and for suggesting possible strategies of mitigating these impacts by involving various government and non-government agencies/individuals has been carried out as a part of this assignment during January 1999. The field work is over and the report of the project is likely to be completed by May 1999.

Bibliography on wildlife in the context of Madhya Pradesh

Under the World Bank aided Madhya Pradesh Forestry Project, the MP State Forest Department (MPFD) has assigned a 10-month task to develop a bibliography on wildlife in the context of Madhya Pradesh. As envisaged in the agreement, a computerized database based on the UNESCO's CDS/ISIS was designed and developed. Also the participating faculty members visited headquarters of almost all protected areas in M. P. to collect available literature. Likewise participating team members representing WII's library visited various State/National level libraries to scan back volumes of committed scientific journals and collect other relevant literature. Simultaneously, information on the collected documents was fed to the specially developed MPBIB database. Interim and draft final reports were submitted to the MPFD.

Maharashtra Consultancy Project

Under the World Bank funded Maharashtra Forestry project, WII was selected to offer technical assistance to (1) Develop monitoring and evaluation methodology for PA management and

design a database to cater to the information needs of biodiversity conservation programme (2) Prepare an action plan for promotion of wildlife tourism in Maharashtra and (3) Develop competency based training package in wildlife management for frontline staff of the forest department.

During the period under report, field studies in selective PAs in different regions of Maharashtra, namely : Vidarbha, Marathwada, Khandesh, Western Maharashtra and coastal areas were conducted; training workshops were held and all the assigned tasks were successfully completed.

Final reports, competency based training guides and compact disc were produced and submitted to the Maharashtra Forest Department, which were accepted.

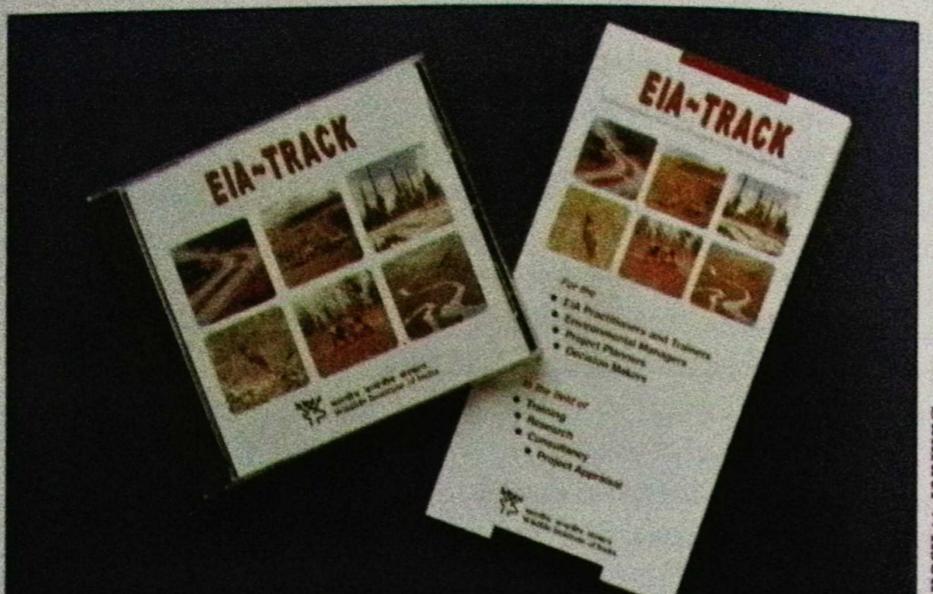
Environmental Impact Assessment

The Environmental Impact Assessment Cell of the Wildlife Institute of India continues to provide training, consultancy and advisory services to various professional bodies, and Government and Corporate organisations.

During the year 1998-99 WII's professional inputs were sought by -

1. National Hydroelectric Power Corporation Ltd. for the Environmental Impact Assessment of proposed Chamera Stage V Hydroelectric Project at Chamba, Himachal Pradesh.
2. The World Bank and the Andhra Pradesh Road Building Department for upgradation of Nandyal - Giddulur - Thokapalli road, Andhra Pradesh.

The World Bank Office, Washington and the Canadian Environmental Collaborative Ltd., Canada offered to WII a consultancy support for



EIA TRACK - A tool for EIA Practitioners, Decision Makers and Project Planners

Samuel Wilson

the preparation of a best practice guide for road development projects through sensitive environments. The MoU between WII and the international counterparts was signed on August 14, 1998. The work on this assignment is in progress since then.

A computer aided decision support system EIA - TRACK (EIA - Training Cell of the Institute) with professional support from Tata Consultancy Service Ltd., (Gurgaon, New Delhi) was prepared. The first module of this decision support system was released on August 10, 1998 by Shri Vinod Vaish, Additional Secretary, Ministry of Environment and Forests, at the Wildlife Institute of India. The product was subsequently showcased at the IT Comdex '98 at Pragati Maidan by Tata Consultancy Services. This software is a useful tool for EIA Practitioners, Environmental managers, Project Planners and Decision Makers and is available as a priced product.

OTHER CONSULTANCIES

* Improvement in the Management of K. B. R. National Park, Hyderabad

On receiving a request from the forest department, Govt. of Andhra Pradesh, U.K. Bhattacharya conducted a study with a view to improve the management of K. B. R. National Park, Hyderabad. The study aimed at assessing the natural

resource inventory of the Protected Area, evaluate the existing management practices, study the visitation in the area and evaluate impacts of visitor pressure.

It also focused to study and evaluate the conservation education initiatives taken up by the park management and recommend strategy to improve management practices in order to conserve the biodiversity of the area and make it visitor attractive and educative.

Technical assistance was provided for drawing up a strategic plan for the management of K. B. R. National Park. The task was successfully completed and the report submitted to the forest department, Government of Andhra Pradesh.

* Mitigation of Nilgai problem at Sarsawa Airforce base.

N.P.S. Chauhan visited Sarsawa Airforce Base to solve the problem of nilgai. Nilgai seek shelter in small forests patches, during day time. They frequently come on the runways and cause serious threats to landing and taking off of aircrafts. The barbed wire fence around the airforce base is very old and broken at number of places. The Nilgai area inside need to be thoroughly scanned to drive these animals from the lifted barbed wire fence facing cultivation areas outside. The whole fence line needs to be reconstructed making the barrier nilgai-proof.

* Construction of Wildboar and monkey proof power fence at experimental Farm, Selakui.

The Terrace block and Dhoolkot block of the experimental farm of Central Soil and Watershed Training and Research Institute at Selakui were visited to solve the problem of monkeys and wild pigs and to map the area for construction of power fence. The monkey and pig-proof power fence design and details of equipments and components required for the construction of 3.56 km and 1.25 km power fences were provided.

*** Construction of elephants and wildboar power fence along Khandgaon at Motichur Range.**

N.P.S. Chauhan surveyed the Khandgaon area of Motichur range where the elephant and wildboar proof power fence was proposed to be constructed. The design of elephant and wildboar-proof power fence include angle-iron posts of 6 feet above ground.

*** R.K. Singh, SRF conducted a field survey for assessing the Physio-Chemical properties of Banganga Stream, Pachmarhi, M.P. affected by untreated sewage discharge.**

*** Courses for staff and officers from the U.P. Forest Department under UP Forestry Project**

Under the World Bank aided forestry project of U.P. four short courses were conducted at the Institute. The first course on Wildlife Health Management was conducted from 23-27 November, 1998, second training programme of guides in Wildlife Tourism was conducted from November 30th to December 4th, 1998. The third course on Wildlife Management was conducted from 5-9 January, 1999 and the fourth from 15-19 February, 1999.

The courses comprised of classroom theory lecture, practical demonstrations and field exercises. The participants were given practical demonstration on collection, preservation and shipment of biological samples in wildlife health management course. Modern ecological precepts were employed to develop rationale for management decision. The wide ranging issues discussed were large mammals many of them endangered wild animal and people interface, the problem management strategies, population estimation techniques for elephant, mountain and plain country ungulates, the critically endangered tiger, assorted habitat components and their management, management outside PAs, planning for wildlife research. Field examples from U.P.

were used. The sessions were open and interactive.

TEACHING INPUTS

* **IGNFA: IFS (P) Course** - Ajai Saxena; Lectures on elephant camp management and experiences in Antarctica. IFS Induction Course (I, II and III) - Lectures on Wetland conservation in India and CITES.

* **SFS College** - Ajai Saxena and Asha Rajvanshi attended the course as resource person.

* **Skill upgradation courses** - V.B. Sawarkar and Asha Rajvanshi as resource person for the two courses conducted for IFS officers by IGNFA.

* **14th Infantry Division**, Clement Town, Dehradun invited B.K. Mishra, Scientist SF (extension) as guest speaker to deliver a lecture entitled 'Planning for Survival' to the senior Army Officers (10th August 1998).

* **Army Environment and Nature Conservation Workshop** for Senior Army Officers at RIMC Dehradun (5th January 1999) organised by Local Army Command. B.K. Mishra, scientist SF (extension) assisted the local army unit in planning and designing the course curriculum and photo-exhibition, besides giving guest lecture on 'Sustainable Development and Biodiversity Conservation'.

* **St. Mary School**, Dehradun invited B.K. Mishra as guest speaker to deliver lecture to school children and teachers of the school on 'Environmental Conservation'.

* **Training Course** at Indian Institute of Remote Sensing, Dehradun. Asha Rajvanshi attended the course as a resource person.

* **Regular Training Courses** for the IFS Probationers at Indira Gandhi Forest Academy, Dehradun. Asha Rajvanshi

provided teaching input in these courses.

* **Training programmes** conducted by IGNFA, SFS College, Dehradun and LBSNAA, Mussoorie - B.M.S. Rathore acted as resource person.

* **Compulsory training programmes** - A.K. Bhardwaj contributed as resource person for Forest Officers organised by SFS College, Dehradun.

FACILITIES

ENVIS CENTRE

The Environmental Information System (ENVIS) Centre at Wildlife Institute of India set up in September 1997, is part of the ENVIS setup in the Ministry of Environment and Forests, Government of India. It deals with general matters concerning "Wildlife" and specifically those related to "Protected Areas".

As the first step towards dissemination of information electronically, the development of HOME PAGE of the WII-ENVIS Centre has been accomplished. With the establishment of a full INTERNET connectivity at WII in June 1998 the informations from the WII-ENVIS Centre are available on line at Institute's WEBSITE - <http://www.wii.gov.in/envhome/eindex.htm>.

Second issue of the ENVIS bulletin was published in October 1998 on "Small Cats of India". In this issue information about 11 small-cats which are found in India has been provided. Description of each species, the problems in identifying them, their distribution in India have been discussed. Also information from status survey of small cats in the states of Maharashtra, Rajasthan, Gujarat, Andhra Pradesh and Orissa has been compiled. More than 300 references were compiled on small cats of India.

The third issue of the bulletin will be on "Indian Crocodiles" and is expected to be published in June 1999. About 1,000 references on Indian crocodiles have been compiled. Data of 3 species of crocodiles such as their description and identifying characters, distribution in India, captive breeding and restocking programme are being compiled.

NATIONAL WILDLIFE DATABASE CELL

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

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

During 1998-99, the main thrust has been on data collection, input and its validation. The Protected Area Database was updated further. Another major task completed was the review of the Protected Area Network in India by incorporating information upto February 1999. More than 300 user queries were attended and outputs were provided. Bibliographic database was updated and cross checked.

Two students from Guru Ram Rai Institute of Technology & Science completed their MCA dissertations in the supervision of the Database cell.

A software was also developed for IPAN (Integrated Protected Area Network) project of Maharashtra State Forest Department.

COMPUTER & GIS FACILITY

During 1998-99, the computer facility of the Institute was further strengthened by the procurement of new hardware/software from WII Grant-in-Aid and ENVIS project.

Hardware & Software

Two digital 3200 Pentium II fileservers each with 128 MB RAM were procured for the Computer Centre and Library. Two Pentium systems and four notebooks were procured alongwith one laser logger, a 3 KVA UPS system, and IOMEGA Jaz

cartridge tape drive. One Pentium II system with digitizer (A3) and colour inkjet printer (A3) has been provided by the International Centre for integrated Mountain Development (ICIMOD), Nepal for further strengthening GIS activities of the Institute.

Forty existing 386/486 systems were upgraded to 16 MB RAM and 1.2 GB/2.1 GB HDD. Two digital pentium systems were upgraded each to 128 MB RAM and 4 GB HDD. These systems are used as Internet Servers. A 9.2 GB HDD was added to SUN Ultra 1 machine used for GIS and digital image processing of remotely sensed data. An additional 32 MB RAM has been added to HP Designjet 750C inkjet plotter. The LAN has been extended to the newly built porta cabin used for office staff. A total of 15 plus nodes on porta-cabin are connected to LAN.

Software package procured are MS Windows98, Office97, McAfee Total Virus Defence, SPSS 8.0 for Windows, S-Plus, ArcView, Sigma ScanPro, Sigma Gel and Reef Base. Few software packages have been upgraded to the latest version viz., AutoCAD 14 with CAD Overlay, Idrisi 2.0 for Windows and Corel Draw 8.0.

Internet Connectivity at WII

The Institute established a leased line internet connectivity with VSNL (Videsh Sanchar Nigam Limited) through microwave link at 64 Kbps band with a CISCO 2514 route was procured and installed to provide internet services to all nodes (100 plus) on LAN. The institute has installed its own Pentium based web server and mail server operating under windows NT. Internet packages Netscape suitespot for servers and Netscape Communicator for nodes is being used. All faculty and technical staff has been allotted with individual e-mail account.

The WII website (<http://www.wii.gov.in>) was officially inaugurated by Shri Vishwanath Anand, Secretary to Government of India, Ministry of Environment and Forests on 28th July, 1998.

LIBRARY AND DOCUMENTATION CENTRE

Information is a vital resource for research and developmental activities. The library and documentation centre in WII is the focal point for

collection, processing, organisation and dissemination of scientific and technical information on wildlife conservation and management and its allied subjects. Some of the services rendered by the library are - Current Awareness Service (CAS), Retrospective Search Service (RSS), Bibliographical services on demand and anticipation, Inter Library Loan Services (ILL) among local libraries and information centres, Reprographical services and Document delivery service through snail and e-mail to researchers, managers, policy makers students and scientists of the institute and outsiders also.

The total scientific and reference collection now stands about 17000 books, 7700 reprints, 140 conference proceedings, 1298 reports, 303 thesis and dissertations and 108 standards, 321 current journals and many others at present.

Apart from these, the library and documentation centre has been strengthening and maintaining the in-house database like Thesaurus of Wildlife terms for uniformity in retrieval and to achieve high precision and India Wildlife Abstract of articles published in India. Library and Information services were evaluated in different levels in this year to strengthen services and its feasibility.

WII RESEARCH LABORATORY

WII Research Laboratory has developed its capability to handle various physical and chemical parameters useful in the field of wildlife sciences. These include 29 parameters for water samples, 18 for plant material and 17 for soil samples. The laboratory also prepares sample solution to undertake trace metal analysis of water, soil, plant material and animal tissue through AAS/SCP instrument.

The instrumentation facility in research laboratory has been improved by replacing the old analog models of pH Conductivity and Flame Photo Meters with printing facility. An auto titrator was also purchased to minimise human error during the acid base and redox titration.

Total 191 samples (117 plants and 74 of soil) were analysed for 7 research projects of WII during 1998-99 for various physical and chemical parameters. 70 samples of Rajaji Project, 23 samples for Pench Gaur Project, 62 samples for Tadoba Database Project, 15 dung samples for

Elephant Project, Singhbhum, 18 samples for GHNP project and 8 samples for Hornbill project were analysed for ADF, lignin and ash content. NDF was determined for Gaur Project (n=23), Tadoba project (n=62), GHNP project (n=18) and Hornbill project (n=8). Crude Protein determination was made for GHNP project (n=18) and Rajaji project (n=40). Nine fruit samples for Hornbill Project were analysed for crude fat. In soil analysis, 49 samples for GHNP project were analysed for pH, and soluble cations and anions. LOI were determined for GHNP project (58 samples) and elephants projects Singhbhum (n=75). Forty five plant and 45 elephant dung were digested to prepare solution for trace metal analysis through AAS at Wadia Institute of Himalayan Geology for Elephant project, Singhbhum. In total 232 scat samples were also analysed for carnivore food habit studies (Tadoba Database Project, n=155; Rajaji Project, n=12 and Kedarnath project, n=65).

Efforts are on to develop a computer software 'Laboratory Management Information System' (LAMIS) for the effective management of laboratory activities. The laboratory is also preparing manuals on soil and plant analysis for the users.

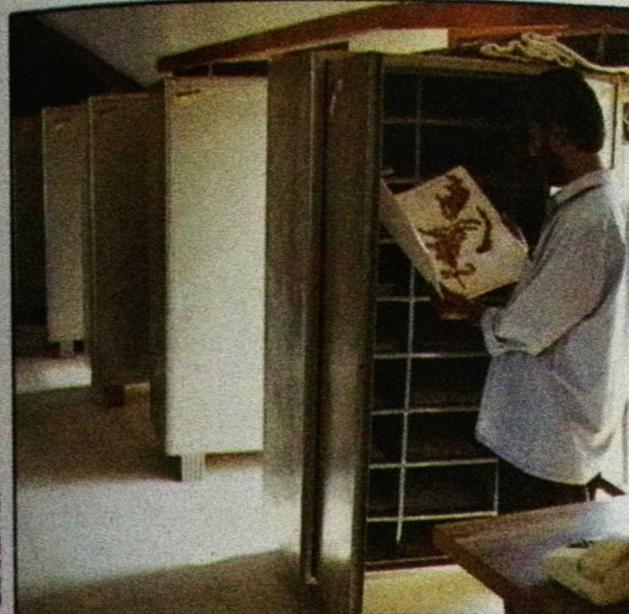
FORENSIC LAB

Wildlife Forensic Laboratory is aimed to develop and standardize various techniques for identifying species from the products and parts seized under wildlife offence cases for the proper implementation of the Indian Wildlife (Protection) Act. Thirty two wildlife offence cases were referred to the lab from the various enforcement agencies such as Forest Departments, Police, Indian Customs, CBI, Court of Law and others. Most of these cases were referred from Delhi, Uttar Pradesh, Madhya Pradesh, Maharashtra and others. Of the 417 wildlife items, 77 percent were mainly of skins, hair and antlers. Report on species identification for eighteen cases was sent to respective enforcement agencies.

HERBARIUM

During the year WII Herbarium received plant specimens for identification and processing from the following localities : Garo Hills, Meghalaya (430 species); Pakhui WLS, Arunachal Pradesh (100 species); Rann of Kutch Gujarat (75 sp.);

GHNP (300 sp.) and Rajaji National Park U.P. (150 sp.). Twelve species were added to the



WII's herbarium houses samples collected from various protected areas in the country

checklist of WII Campus flora making it a total of 356 species. A database using Fox Base has been developed to aid identification of plant's which need to be updated and tested further. So far, it has been tested for WII campus flora and was found satisfactory. Herbarium staff conducted a vegetation survey of grasslands of Pachmarhi in Madhya Pradesh. Computerization as well as other routine work in the herbarium is in progress. One of the staff members of WII Herbarium attended a short training course on the management of Forest Herbarium and Arboretum at FRI, Dehradun.

AUDIO-VISUAL UNIT

The AV Unit of the Institute caters to the requirement of academic activities, training, seminars, workshops etc. by providing support through its slide library, video and film library and teaching the use of AV equipments. The unit has video camera, a wide range of still cameras and accessories, slide projectors, overhead projectors and 16mm film projector. Facilities also exist for computer and video aided panoramic projections

which are extensively used as teaching aids. During 1998-99 about 400 colour transparencies and a few video films were added to the AV Unit's collection.

In an ongoing effort to make inhouse production of training films, the AV unit produced a film entitled "Charai Ki Samasya" as a conservation education initiative. The film is based on a skit produced and enacted by XX P.G. Diploma officer trainees while on their field trip to Sariska Tiger Reserve. The unit also produced another film "Kulhadhi Bund Panchayat" which deals with peoples participation for conservation of biodiversity in Kailadevi WLS, Rajasthan.

PUBLICATION

During the year 1998-99, the second issue of the ENVIS biannual bulletin was published. The issue provided reading material and extensive bibliography on the "small cats of India."

As part of information dissemination programme WII published the following reports:

- * An Annotated Bibliography on Musk Deer.
- * A preliminary study on the Ecology of the Leopard, *Panthera pardus fusca*, in the Sanjay Gandhi National Park, Maharashtra.
- * Ecology and conservation of the Valley of Flowers National Park, Garhwal Himalaya.



WII's publications released in 1998-99

- * Ecology and conservation of the grasslands of Eravikulam National Park, Western Ghats.

SPORTS

The 7th All India Forest Sports Meet was held this year at Lucknow on 10-14 February 1999, in which 31 teams participated from states, UTs and institutions. WII's contingent comprised 28 members participating in cricket, lawn tennis, table tennis, carrom, rifle shooting, billiards and athletics besides taking part in the quiz competition in the meet.

The WII cricket team also participated in two renowned tournaments of Dehradun viz. Dehradun District Cricket League and High Power Cricket tournament in which WII cricket team performed well and reached the Quarterfinal and Semifinal respectively.

WORLD ENVIRONMENT DAY

Like in previous year, on World Environment Day i.e. 5th June, 1998, a number of nature awareness programmes such as nature trail walk, nature excursions, wildlife film show and extempore debate competition on environment theme was organised for school children of Chandrabani village.

WILDLIFE WEEK

This year the Wildlife Week was celebrated by organising drawing art, debate and quiz competitions for school children of age group 10-14 years. Villagers of Chandrabani village joined hands with the school children for a garbage cleaning operation in the village. Fifty seven children participated in this programme.

OTHERS

The Extension Faculty of the Institute as a part of its outreach programme, participated in exhibitions in Delhi and Dehradun to popularize various conservation issues among members of the public. Specially focused exhibits were displayed to generate interest in our natural resources among the school children.

CAMPUS DEVELOPMENT

The building work of additional modular institutional block is in progress and is likely to be completed by the end of October 1999.

Since the electrical load of the institute has increased substantially a unit of OCBs to cater for these provisions has been installed with one incoming and two outgoing OCBs at a cost of about 6. 86 lacs inclusive of cabling and heat shrinkable thermal joints.

Sub-station building for housing OCBs has been constructed at an approximate cost of Rs. 2. 84 lacs.

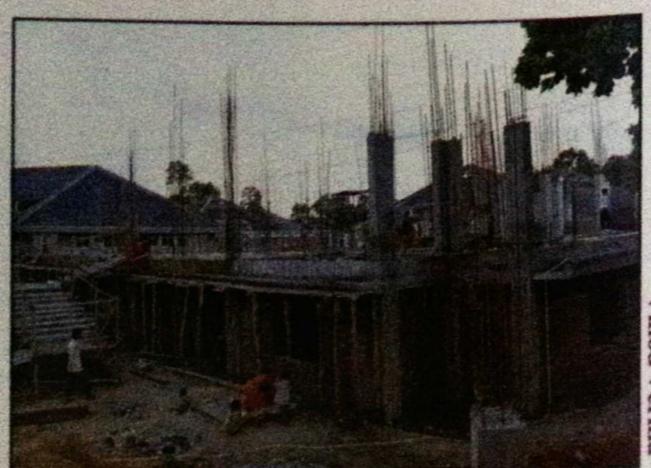
An automatic motorised voltage regulator has been installed in the central AC plant room for upgrading the voltage.

A block of kitchen and dinning hall has been constructed and completed adjoining the new hostel block at a cost of Rs. 12. 75 lacs

ACTIVITIES AND ACHIEVEMENTS OF THE VIGILANCE UNIT

As laid down by the Central Vigilance Commission, Government of India, a Senior Faculty discharges the functions of the Chief Vigilance Officer for the Institute. The activities of the unit are as per the laid down procedures.

During the period under report, there were no cases pending, contemplated or decided.



Construction of additional modular institutional block

PERSPECTIVE 1999-2000

After long years of persuasion WII, was able to get approval of scientific and technical positions and it is hoped that the Institute will be able to fill up these posts to take up new challenges in the field of wildlife management and biodiversity conservation. Hopefully, the new institutional building which is under construction will be available in time so as to solve the problem of space requirement with incoming of additional staff and taking up new programmes as well.

All regular training courses including that of short training workshops will continue during the year 1999-2000. The Institute is planning to have a national workshop in collaboration with Lal Bahadur Shastri National Academy of Administration (LBSNAA), Mussoorie for eco-regional planning where we expect to involve senior decision makers from Government of India and concerned State Governments, scientific communities, NGOs etc. During the year we also plan to complete country-wide saras crane survey as concern has been expressed that the population of saras crane is declining. The Institute has also planned for training workshop on satellite telemetry in collaboration with Bombay Natural History Society, Indian Institute of Science, Salim Ali Centre for Ornithology & Natural History, Aligarh Muslim University and concerned State Government. Ministry of Environment and Forests and Fish & Wildlife Service of United States are expected to provide required assistance to conduct such training workshop.

The Ministry of External Affairs, Govt. of India has recognized WII as one of the training centres

for specialised courses of protected area management under International Technical and Economic Co-operation (ITEC) programme and we hope that from 1999-2000 onwards the Institute will be getting trainee officers from various other countries from different parts of the world.

We are also working very hard for Y2K compliance so that after December, 1999 the Institute should not face problem in respect of this issue.

The Institute also has plans for bringing out several publications of research findings, bibliography etc. apart from regular publication of its Newsletter and bi-annual ENVIS bulletin. The next issue of ENVIS bulletin which will come out after June, 1999 is on Crocodilian species and thereby we will dedicate this issue of publication towards 25 Years of Conservation on the three crocodilian species found in India.

With the assistance from UNDP the Institute was able to prepare model management plan for some selected PAs and also ecodevelopment plans in certain areas and during the period we are hopeful that UNDP assistance will be available for implementation of some selected plans to test the effectiveness of plans prepared in past.

Gaining experience from our research activities in Orissa coast in respect of sea turtles the Institute is planning to launch long term conservation project for which financial support from UNDP is expected.

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Chief Conservator of Forests (WL) &
Chief Wildlife Warden,
Government of Uttar Pradesh,
17, Rana Pratap Marg,
Lucknow - 226 001
13. Shri. V. B. Sawarkar,
Head, Management Faculty,
Wildlife Institute of India,
Post Box 18, Chandrabani,
Dehradun - 248 001
14. Shri. S. K. Mukherjee, Director
Member Secretary
Wildlife Institute of India,
Post Box 18, Chandrabani
Dehra Dun - 248 001

Special Invitee :

Shri. J. C. Daniel,
(As Chairman, TRAC)
16/186, Chander Niwas, Seon (East)
Mumbai - 400 022

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Former Vice Chancellor,
Tamil Nadu Veterinary and Animal Sciences
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203, Barrackpur, Trunk Road,
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Indian Institute of Science,
Bangalore (Karnataka)
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Anaikatty P. O.,
Coimbatore - 641108 (Tamil Nadu)
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Director
Zoological Survey of India,
M-Block, New Alipore,
Calcutta - 700 053
9. Director
Botanical Survey of India
P-8, Brabourne Road,
Calcutta (WB)
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Bikaner House,
Annexe IV, Shahjahan Road,
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Dehradun
12. Shri. J. P. Aggarwal, IFS
Chief Conservator of Forests (WL),
Government of Gujarat,
Dr. Jivaji Mehta Bhavan,
Block No. 14, 1st Floor,
Old Sachivalaya,
Gandhinagar - 382 010 (Gujarat)
13. Shri. C. D. Katoch, IFS
Chief Wildlife Warden,
Government of Himachal Pradesh,
Dept. of Forest Farming & Conservation,
Mist Chamber, Khalini,
Shimla - 171 002 (Himachal Pradesh)
14. Shri. S. K. Patnaik, IFS
Chief Conservator of Forests &
Chief Wildlife Warden,
Government of Orissa,
7, Shahid Nagar,
Bhubaneswar - 751 007 (Orissa)

15. Shri. D. Dutta Roy, IFS
Chief Wildlife Warden,
Government of Tripura,
Aranya Bhavan, Nehru Complex,
Agartala -799 001 (Tripura)

16. Shri. R. P. S. Katwal, IFS
Chief Conservator of Forests - cum -
Chief Wildlife Warden,
Government of Tamil Nadu,
6D, Panagal Building,
No. 1, Jeenis Road,
Saidapet, Chennai - 600 015 (Tamil Nadu)

17. Dr. A. J. T. Johnsingh,
Head Wildlife Biology Faculty
Wildlife Institute of India
Dehradun

18. Shri. V. B. Sawarkar,
Head, Wildlife Management Faculty
Wildlife Institute of India
Dehradun

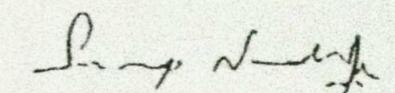
19. Shri. U. K. Bhattacharya,
Head, Wildlife Extension Faculty
Wildlife Institute of India
Dehradun

20. Dr. Ravi Chellam,
Research Coordinator
Wildlife Institute of India
Dehradun

21. Shri. S. K. Mukherjee,
Member Secretary
Director,
Wildlife Institute of India
Dehradun

AUDIT CERTIFICATE

I have examined the Receipts and Payments Accounts/Income and Expenditure Account for the year ended 31st March, 1999 and the Balance Sheet as on 31st March 1999 of the Wildlife Institute of India, Dehradun. I have obtained all the information and explanations that I required and subject to the observations in the appended Audit Report, I certify, as a result of my audit, that in my opinion these accounts and Balance Sheet are properly drawn up so as to exhibit a true and fair view of the state of affairs of the Wildlife Institute of India according to the best of information and explanations given to me and as shown in the books of the organisation.



Principal Director of Audit
Scientific Departments

Place : New Delhi
Date : 9/1/2000

Wildlife Institute of India

Balance Sheet as on 31-3-99

FUNDS & LIABILITIES	As on 31-3-98	Additions during 98-99	As on 31-3-99	ASSETS	As on 31-3-98	Additions during 98-99	As on 31-3-99
Excess of income over exp	32712406.99	-2373530.85	30338876.14	LAND	6607214.65	0.00	6607214.65
Pension Fund	3855447.25	2423433.00	6278880.25	TREES	2432709.00	0.00	2432709.00
GP Fund	5131132.03	1102844.00	6233976.03	Avenue Plantations	2354350.15	534968.00	2889318.15
Amount Capitalised	195053988.03	23492019.75	218546007.78	Campus Development	3985073.31	1390546.00	5375619.31
CGE/GIS Refund	16423.90	0.00	16423.90	Lab equipment	1263660.07	140856.00	1404516.07
				Furniture & Fixtures	7857032.69	283249.75	8140282.44
Security Deposit	834330.95	230311.00	1064641.95	Vehicle	5626247.21	0.00	5626247.21
Withheld Amount	19393.00	0.00	19393.00	Library books	8657103.28	1320189.00	9977292.28
				Office Equipment	3838378.90	1226189.00	5064567.90
Payment received for research equipment for Siberian Crane Project	124012.00	0.00	124012.00	Camp Equipment	526129.34	32642.00	558771.34
Project Cost (Shri Pratap Singh)	88590.30	0.00	88590.30	Materials and supplies	1602470.20	490117.00	2092587.20
Advance receipt of printing of Eco Dev Project	500000.00	0.00	500000.00	Educational films	1080432.35	0.00	1080432.35
Advance for conducting zoo management course	500000.00	-429310.00	70690.00	Boundary Wall	19420572.24	2999443.00	14703691.00
Acquisition of land around National Park	0.00	25000.00	25000.00	Boundary fencing	1446200.59	0.00	1446200.59
Workshop GHNP	0.00	229325.00	229325.00	Building complex Architectural & supervision fee	817934.93	0.00	817934.93
				263510816.35	Carried Over		

Brought Over Cost of posters	50000.00	50000.00	263510816.35	Brought Over	715126.00	0.00	207769870.46
				DG Set EPABX	1176484.00	0.00	1176484.00
				AC Plant	2597452.00	0.00	2597452.00
				Advance for expenses (Trg.)	181250.00	364235.00	364235.00
				Advance to staff	829483.00	623705.00	1453188.00
				Loan & advance to staff	133511.20	702418.00	1847629.20
				Staff quarters	3175520.00	0.00	3175520.00
				Road & culvert	1724111.00	0.00	1724111.00
				Tennis court	530852.32	0.00	530852.32
				Auditorium	856592.00	0.00	856592.00
				Closing stock of steel & cement	1835559.90	108615.00	1854065.90
				Closing balance (Training)	0.00	-90109.00	0.00
				Closing bank balance	0.00	0.00	5553994.19
				Closing cash balance	0.00	0.00	104977.70
				F.D.R	1300000.00	-3000000.00	1000000.00
				GPF	0.00	0.00	1033976.03
				Bank balance	0.00	0.00	3000000.00
				Kisan Vikas Patra	0.00	0.00	1450000.00
				F.D.R	0.00	0.00	3400000.00
				PENSION FUND:	0.00	0.00	1428880.25
				Bank balance	0.00	0.00	0.00
				Kisan Vikas Patra	0.00	0.00	0.00
				F.D.R	0.00	0.00	0.00

Brought Over

263560816.35	Brought Over
Training cost accrued but not received	635000.00
	169200.00
	410200.00

CONSULTANCY PROJECTS

Closing balance	0.00
	0.00
	6949017.90

GRAND TOTAL

The above balance sheet to the best of our belief contains a true account of the Funds, Liabilities, Property and Assets of the Institute

S.S. Oberoi
(S.S. OBEROI)
Finance Officer

263585816.35 GRAND TOTAL

263585816.35

S.K. Mukherjee
(S.K. MUKHERJEE)
Director

263560816.35	Brought Over
Training cost accrued but not received	635000.00
	169200.00
	410200.00

256226598.45

TOTAL

17489814.00

NON PLAN

6500814.00

PLAN

10989000.00

TOTAL

231588.00

NON PLAN

29571.00

PLAN

1178854.00

TOTAL

447175.00

NON PLAN

100000.00

PLAN

347175.00

TOTAL

2769523.00

NON PLAN

0.00

PLAN

30814.00

TOTAL

641349.00

NON PLAN

0.00

PLAN

3261985.00

TOTAL

573498.00

NON PLAN

0.00

PLAN

239986.00

TOTAL

0.00

NON PLAN

239986.00

PLAN

448098.00

TOTAL

337833.00

NON PLAN

0.00

PLAN

337833.00

TOTAL

59578.00

NON PLAN

0.00

PLAN

134054.00

TOTAL

88622.00

NON PLAN

0.00

PLAN

963153.93

TOTAL

200000.00

NON PLAN

1163153.93

PLAN

1169000.17

TOTAL

600130.00

NON PLAN

0.00

PLAN

518614.00

TOTAL

206442.00

NON PLAN

0.00

PLAN

14758.00

TOTAL

68431.00

NON PLAN

0.00

PLAN

9210.00

TOTAL

9089166.00

NON PLAN

31138583.10

PLAN

0.00

TOTAL

31138583.10

NON PLAN

0.00

PLAN

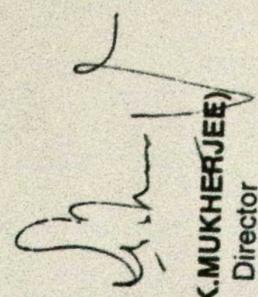
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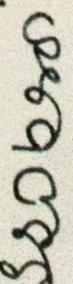
TOTAL

0.00

	Brought Over			
To	PENSION FUND:			
	Opening balance	By	House building advance	0.00
	1005447.25	By	Advance for exps for staff	623705.00
	1400000.00	By	Landscaping	513687.00
	Kisan Vikas Patra	By	Stipend	170904.00
	Receipts during the year	By	Legal expenses	0.00
	3204892.00	By	Publication	65048.00
	1450000.00	By	Training cost on course	0.00
	189900.00	By	Government contribution to pension fund	172000.00
	525146.00	By	Leave salary & Pension contrib	463886.00
	597525.00	By	Maintenance of vehicles	0.00
	Guest House Rent	By	POL for vehicles	985572.00
	208140.00 }	By	Laboratory chemicals	117136.00
	Recovery of lost items	By	Estate Maintenance	1597009.00
	3976.00	By	Trade Tax	297492.00
	H.L. fee	By	Avenue plantation	534968.00
	132399.00	By	Advance for expr (training)	0.00
	44150.00	By	Cement	108615.00
	Penalty W/P Act	By	Furniture and fixtures	283249.75
	Sale of V/H Products	By	Lab equipment	140856.00
	140070.00	By	Office equipment	1226189.00
	Bus charges	By	Training equipment	2999443.00
	68790.00	By	Camp equipment	32642.00
To	Steel	90109.00		

Brought Over		100570971.32	Brought Over	39996273.85	13969152.00	83155578.17
Acquisition of land-MOE around National Park		25000.00	By PENSION FUND:			
			Expenditure during the year	0.00	0.00	781459.00
			Bank balance (closing)	0.00	0.00	1428880.25
			Kisan Vikas Patra	0.00	0.00	1450000.00
			F.D.R.	0.00	0.00	3400000.00
			By CONSULTANCY PROJECT A/C:			
			Payments during the year	0.00	0.00	3431036.00
			Closing balance (bank) CONSULTANCY projects	0.00	0.00	6949017.90
			TOTAL:	100595971.32	39996273.85	13969152.00
						100595971.32


(S.K.MUKHERJEE)
 Director


(S.S. OBEROI)
 Finance Officer

Wildlife Institute of India
Income and Expenditure Account for the year 1998-99

EXPENDITURE		INCOME	
To	salaries & Allowances	17489814.00	By
			Grant - in - aid Dept. of Envt. & Forests
To	Bonus	231588.00	<u>Less</u> . transfer to capital expr
To	Honorarium	29571.00	23492019.75
To	fellowship	1178854.00	29007980.25
To	Wages	447175.00	By
			Training cost
To	Travel exps	2769523.00	By
			Other Receipt(training)
To	Newspaper & Magazine	30814.00	By
			Int. on trainee a/c
To	Publicity & Adv.	641349.00	By
			Int. on bank deposit
To	Operational Expr	3261985.00	By
			Misc. receipts
To	Seminar & Work shop	239986.00	By
			Training cost accrued
To	Stationary	448098.00	By
			but not received
To	Rent	59578.00	By
			W/l receipts(instt charges)
To	Postage & Telegram	134054.00	By
			M.Sc course fee
To	Sports goods	88622.00	By
			consultancy project
To	Telephone & TC	1163153.93	By
			Receipt during the year
To	Electricity & Water charges	1769130.17	By
			excess of expenditure
To	printing & binding	518614.00	over income
To	Govt. contr. pension fund	1331164.00	
To	Leave Salary and Pension contr	663886.00	
To	LTC Carried Over	206442.00 32703401.10	Carried Over
			44056126.10

Brought Over		Brought Over
To Conveyance charges	14758.00	
To Entertainment charges	68431.00	
To SAARC Contribution	140000.00	
To Stipend	170904.00	
To OTA	337833.00	
To Legal Expr	65048.00	
To Training cost	2008825.00	
To Repair & maintenance of vehicle	932205.00	
To POL for vehicle	985572.00	
To Lab chemical	117136.00	
To Estate maintenance	2097798.00	
To Landscaping	513687.00	
To Publication	172000.00	
To Trade tax	297492.00	
To consultancy project expenses	3431036.00	
TOTAL:	44056126.10	TOTAL:

44056126.10

44056126.10

S. Mukherjee
(S.K. MUKHERJEE)
Director

SS Oberoi
(S.S. OBEROI)
Finance Officer

44056126.10

TOTAL:

PERMANENT ASSETS AS ON 31-3-99

PARTICULARS	OPENING BALANCE	ADDITIONS DURING THE YEAR	TOTAL
LAND	6607214.65	0.00	6607214.65
TREES	2432709.00	0.00	2432709.00
Avenue Plantations	2354350.15	534968.00	2889318.15
Campus Development	3985073.31	1390546.00	5375619.31
Lab equipment	1263660.07	140856.00	1404516.07
Furniture & Fixtures	7857032.69	283249.75	8140282.44
Vehicle	5626247.21	0.00	5626247.21
Library books	8657103.28	1320189.00	9977292.28
Office Equipment	3838378.90	1226189.00	5064567.90
Camp Equipment	526129.34	32642.00	558771.34
Photographs & Photos	1602470.20	490117.00	2092587.20
Materials and supplies	3863727.95	0.00	3863727.95
Educational films	1080432.35	0.00	1080432.35
Journals & Periodicals	12151277.00	2552414.00	14703691.00
Training equipment	19420572.24	2999443.00	22420015.24
Boundary Wall	1446200.59	0.00	1446200.59
Boundary fencing	817934.93	0.00	817934.93
Building complex	94645450.00	11996779.00	106642229.00
Architectural & supervision fee	6101886.85	524627.00	6626513.85
DG Set	715126.00	0.00	715126.00
EPABX	1176484.00	0.00	1176484.00
AC Plant	2597452.00	0.00	2597452.00
Staff quarters	3175520.00	0.00	3175520.00
Road & culvert	1724111.00	0.00	1724111.00
Tennis court	530852.32	0.00	530852.32
Auditorium	856592.00	0.00	856592.00
Total:	195053988.03	23492019.75	218546007.78