ANNUAL REPORT 2019-20

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

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FROM THE Director's Desk

It is a pleasure to present Annual Report of Wildlife Institute of India (WII) for the year 2019-20. The worldwide pandemic COVID-19 entered our country at the end of the reporting period; therefore, it could not affect the programmes and activities of the Institute as these were conducted under strict supervision by following the protocols. The regular training programmes of the Institute like XL Post Graduate Diploma in Advanced Wildlife Management and the XXXV Certificate Course in Wildlife Management were completed as per their schedule.

The mandated research activities were conducted as per their scheduled programmes. A total of eleven projects were completed during the reporting year. The research activities, especially under Compensatory Afforestation Fund Management and Planning Authority (CAMPA), The National Mission for Sustaining the Himalayan Ecosystem (NMSHE) and Tiger Cell, achieved some significant milestones.

The UNESCO Category 2 Centre at Wildlife Institute of India initiated the first batch of M.Sc. in Heritage Conservation and Management. XVI M.Sc. in Wildlife Science was completed, and XVII batch of the course was started in July 2019. Both these programmes continued as per the schedule until 20th March 2020. The classes had to be discontinued from this point in time due to the COVID pandemic. All the facilities and Cells at the Institute have supported the successful execution of various activities. The Institute provided advisory services to its stakeholders as and when required. Many short courses, workshops and seminars were conducted during the year as planned. A group of students and faculty from the Griffith University, Australia visited WII, Dehradun during November - December 2019. The visit was organized to increase Australian students' knowledge of the conservation issues in the Indo-Pacific region.

The Institute analyzed the data for estimation of the number of tigers in the country. The reports on 'Tiger Population Estimation 2018' and 'Management Effectiveness Evaluation of Tiger Reserve 2018' were released on 29th July 2019 by Shri Narendra Modi, the Hon'ble Prime Minister of India. These reports were jointly prepared by the Wildlife Institute of India and National Tiger Conservation Authority (WII-NTCA) with full support from the state forest departments.

All the activities were conducted in a planned manner. I wish to thank the Institute's governance and administrative committees for their valuable guidance and acknowledge all the stakeholders, faculty colleagues, staff, researchers and students for their contribution to the smooth conduct of the Institute's activities during the year.

(Dr. Dhananjai Mohan)

17th February 2021

ROLE AND MANDATE

ROLE & MANDATE

INTRODUCTION

During the early eighties of the last century, there was a worldwide realisation that the natural resources were diminishing at an alarming rate, and the environment was degrading very fast. At the same time, the understanding of environmental issues was still a little hazy, and the initial remedial responses to the complex ecological problems had mixed outcomes.

This realisation and need for conservation initiatives also brought into focus the inadequacy of skilled human resources for wildlife management and wildlife biologists to conduct research and overcome the lack of researched information for promoting proper conservation planning. A need was also felt for establishing an organisation that, through multi-disciplinary research at the field level, could help respond to the challenges of biodiversity conservation and develop holistic approaches for managing wildlife and habitats across the country and the region. This situation led to the setting up of the Wildlife Institute of India (WII) at Dehradun in 1982.

WII is a premier training and research institution in the field of wildlife and protected area management in South Asia. In 1986, the Institute was granted the status of an autonomous institution by the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India. Since its inception, WII has had the benefit of collaboration with international organisations such as UNDP, FAO, USFWS, IUCN and UNESCO. These partnerships have helped the Institute build qualified faculty and staff through rigorous training and exposure to modern research and analytical techniques.

The Institute's wide array of capacity building programme provides a practical and realistic direction to the concept and practice of wildlife conservation. By learning from its own and others' experiences, WII is traversing a path of hope and aspiration, which will help strengthen finding answers in addressing wildlife conservation issues and challenges in the country as well as in the South Asian region.

OUR MISSION

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

AIMS AND OBJECTIVES

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

YEAR AT A GLANCE

The year 2019-20 was full of activities as per the mandate for the Institute. The regular courses received a good response. Research projects generated valuable scientific information; their outcomes are presented in the Research Section of the report.

On the academic front, both the Post Graduate programmes, *i.e.* M.Sc. (Wildlife Science) and M.Sc. (Heritage Conservation and Management) at the Institute continued as per their planned schedule. The XVII M.Sc. (Wildlife Science) began with 20 students, who underwent I and II semesters. Teaching inputs were given in the classroom as well as in the field. The students were taken for their Orientation tour and Techniques tour in protected areas of Uttarakhand. The wetlands tour took place in February 2020, for which the students went to Bhitarkanika Wildlife Sanctuary and Chambal National Park. The first batch of M.Sc. (Heritage Conservation and Management) included seven students from diverse academic fields. Both the semesters saw a culmination of classroom teachings, three orientation and heritage study tours. The students were taken for a 15-day Heritage Sites Tour to eastern Rajasthan.

The Institute conducts training programmes for in-service officials of Forest Departments. During the reporting period, XL Post Graduate Diploma in Advanced Wildlife Management concluded. Thirteen officer trainees of the rank of DCF/ACF from ten states participated in the course. The Management Term Paper Exercise was conducted in Bihar while the Management Plan Exercise was conducted in Kerala. The XLI PG Diploma Course began with twenty officer trainees. The officer trainees learnt various wildlife management techniques, including estimating prey and predator populations, studying animal behaviour, carrying out radio-telemetry, chemical immobilization and restraint of wild animals, wildlife health monitoring, vegetation sampling, and habitat quantification and occupancy survey. XXXV Certificate Course in Wildlife Management was completed successfully in January 2020. Total eight weeks were spent at the Institute for learning, while the remaining five weeks were spent in field tours in various Protected Areas across India and Sri Lanka. In all, 19 Range Forest Officers participated in the course.

A total of 55 workshops, seminars and short duration training courses were organized for various stakeholders and participants during the reporting period. The publications are given priority in the research programmes. The faculty members, researchers and students of the Institute published 47 papers in Peer-Reviewed International Journals, 14 papers in Peer-Reviewed National Journals, and presented papers in various seminars. Besides these, three books were also brought out by the Institute during the reporting period.

The Institute carried out work on 68 research projects during the reporting year and completed eleven of them. A total of 48 research projects were ongoing as per their schedule. Nine new projects were initiated during this year.

This Annual Report covers all the activities mentioned above to present the overall picture of a wide array of activities during the reporting period.

RESEARCH

Develop a Framework for Evaluating the Consequences and Trade-Offs of Alternative River Management Actions on Health of the Middle Ganga River

Funding Source
The Nature Conservancy

Investigators
Dr K. Sivakumar, Dr J.A. Johnson, Dr S.A. Hussain, Dr V.B. Mathur and Dr Asha Rajvanshi

Researchers
Dr Roshni Arora

Date of Initiation
January 2018

Date of Completion
May 2019

Objectives: To enhance the ability of decision-makers to make informed and effective decisions, the Centre for Ganga River Basin Management and Studies (CGRBMS), the Wildlife Institute of India (WII), and The Nature Conservancy (TNC) in partnership with the World Wildlife Fund has developed a framework for evaluating the consequences and trade-offs of alternative river flow management actions on biodiversity and ecosystem service objectives for the Middle Ganga (Haridwar to Varanasi). The major objectives of this project were to (i) develop a conceptual framework that establishes relationships among river management objectives, hydrological metrics, and alternatives for action; (ii) identify knowledge gaps and highlight key areas where additional data and information would be needed; and (iii) conduct a trade-offs analysis to examine the consequences of various action alternatives on defined biodiversity, ecosystem service management and eco-hydrology objectives.

Progress and Outcomes: *Adaptive management of river flows:* The framework presented in this collaborative study has identified key biodiversity and ecosystem services that are expected to be directly affected (positively or negatively) by flow increments (addition of 10-30% of canal flows) within the Middle Ganga (MG) specifically during the low flow season. The study recommended that flows within the MG stretch should be implemented/ managed adaptively. It was suggested to initiate adaptive management with small flow releases (*e.g.* 5 or 10% of canal flows) at the Bhimgoda barrage (diverts 80% of the flow) into the river, similar to a phased approach of flow implementation. Phased implementation of suggested flows can prevent impossible pressure being placed on constrained resources while allowing for the evolution of approaches to implementation.

Further, the study has also recommended that possible benefits due to such experimental flow additions should be monitored and evaluated as a part of a targeted research programme. Such a programme would be helpful to test the hypotheses mentioned in the current study. It would also help in reducing uncertainties, and to gain a better understanding of the river ecosystem in question. Apart from this, such changes in the barrage operations could also provide experience to the operators to adjusting flows to support river ecosystem health, and to scientists to learn from flow implementation. The suggested 5-10% increase in the flows is not sufficient to restore biodiversity values and ecosystem benefits. Efforts would be needed to improve canal irrigation and water-use efficiency to make a noticeable difference in benefits and to minimise trade-offs.

Minimising trade-offs associated with implementing environmental flows: The critical outcome of this study was the identification of the trade-off of flow implementation which is predominantly between the main use of the canal (agriculture withdrawals) and benefits accrued for river biodiversity and ecosystem services. It is, therefore, essential to ensure that provision of flow towards enhancing/restoring biodiversity and ecosystem services should not happen at the cost of reduced agricultural productivity (due to reduced water for agriculture). An optimal approach towards restoring the biodiversity value and ecosystem services and minimising trade-offs during the lean period will not depend only on releasing more water but improving water efficiency simultaneously. Therefore, the study recommended that initiatives and investments to improve water efficiency should be explored/ implemented parallel to initiating adaptive management of flows.

Milestone: The key outcome of this study was the identification of the trade-off of flow implementation which is predominantly between the main use of the canal (agriculture withdrawals) and benefits accrued for river biodiversity and ecosystem services of the River Ganges. It is therefore essential to ensure that provision of flow towards enhancing/restoring biodiversity and ecosystem services should not happen at the cost of reduced agricultural productivity (due to reduced water for agriculture). The optimal approach towards restoring the biodiversity value and ecosystem services and minimising trade-offs during the lean period will not depend only on releasing more water but improving water efficiency simultaneously. Therefore, the study recommended that initiatives and investments to improve water efficiency should be explored/ implemented parallel to initiating adaptive management of flows.

Establishing Climate-Resilient Landscapes in Sikkim through Connectivity Corridors and Protected Area Integration: Building Adaptive Capacity of Forest Department to Address Climate Change

Funding Source
United Nations Development Programme (UNDP)

Investigators
Dr Gautam Talukdar and Dr R. Suresh Kumar

Researchers
Malyasri Bhattacharya and Sneha Pandey

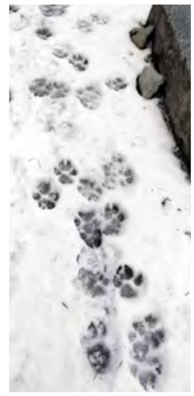
Date of Initiation
November 2018

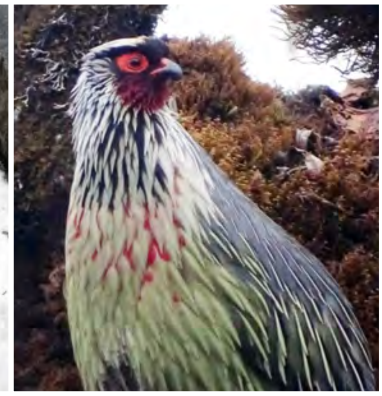
Date of Completion
June 2019

Objectives: The objectives of the project are (i) to delineate possible corridors linking various PAs in the Sikkim Himalaya landscape; (ii) Assessing the biophysical conditions of selected corridors; (iii) to examine the threats and identify critical areas along the corridors with a high probability of negative human-wildlife interface.

Outputs and Outcomes: The research team used Maxent to produce a habitat suitability layer for black bear in Sikkim and later used it in circuit-scape to generate the potential corridors for black bears. Ground survey and questionnaire survey with the local people were done to assess the biophysical condition of the corridors. Through the survey, the team identified threats to the black bear within the study area and also the intensity of the human-bear conflict.

Critical black bear corridors were identified in the study area. The present and future climatic corridors were modelled to assess the potential movement options for black bear for future conservation strategies within the landscape.





Study on Ecological & Socio-economic Impact of Invasive Species, *Prosopis juliflora* and *Lantana camara*, and their Removal from Forest, Common and Fallow Land of Tamil Nadu

Funding Source
Tamil Nadu Forest Department

Investigators
Dr K. Sivakumar, Dr G.S. Rawat, Dr Ruchi Badola and Dr B.S. Adhikari

Researcher
Dr Kamalakannan

Date of Initiation
March 2017

Date of Completion
August 2019

Objectives: The objective of the project was to assess the ecological & socio-economic impact of invasive species, *Prosopis juliflora* and *Lantana camara*, and their removal from forest, common and fallow land of Tamil Nadu.

Outputs and Outcomes: In India, *P. juliflora* was considered as one of the worst invaders in the country affecting natural ecosystems and local biodiversity. To eradicate this species from natural forests, preparation of a restoration plan is desirable with knowledge on ecology and impacts of *P. juliflora* in Tamil Nadu. Keeping this in view, Wildlife Institute of India with support of Tamil Nadu Forest Department assessed the extent and abundance of *P. juliflora* in forest, common and fallow land of Tamil Nadu. Initially, the study was started in the Southern zone of Tamil Nadu, and later in other agro-climatic zones of Tamil Nadu, *i.e.* Cauvery delta zone in Nagapattinam district, Southern zone in Ramanathapuram district, and Western zone in Sathiyamangalam Tiger Reserve in Erode district.

The results revealed that occupancy of *Prosopis juliflora* was more in the southern zone compared to the other two zones. The Southern zone occupies 79.4% of *Prosopis juliflora* invaded in this region than the Western zone (46%), and in Cauvery delta zone (32%). The richness and native biodiversity of plants, and related herbs and shrubs were significantly ruined in the Southern zone followed by Cauvery delta and Western zone. Apart from *Prosopis juliflora* and *Lantana camara*; *Parthenium hysterophorus* and *Chromolaena odorata* caused huge smash up to the native ecosystems in some ranges of Sathyamangalam Tiger Reserves.

Dry zone of Tamil Nadu, *i.e.* at Ramanathapuram the groundwater level-soil moisture conditions, humidity and temperature under the canopy cover were better in the habitats dominated by *P. Juliflora*. Still, in the forested landscapes such as in the Sathyamangalam TR, these environmental factors were comparatively lesser than other habitats of the zone. It reveals that *P. juliflora* in the forested landscape is not suitable for natural environmental settings as well as the biodiversity of the region.

In all the studied zones of Tamil Nadu, the *P. juliflora* was observed to be allelopathic. It discourages other plants from growing around them and seems to be toxic to other biotas in ways that allow the invasives to monopolise the space, sunlight, and nutrients at the exclusion of different species. The research team found that wetlands in the arid region are highly susceptible to *Prosopis* invasion. These wetlands were once used by migratory birds in large numbers, but not nowadays. It might be due to high abundances of invasive species. Although alien invasive species such as *P. juliflora* and *L. camara* are adversely affecting the native biodiversity especially in the Western Zone and Cauvery Delta, it has livelihood values in the Southern Zone especially Ramanathapuram and adjoining districts of Tamil Nadu. Economic analyses also revealed that the benefits of the *P. juliflora* invasion in the Southern Zone are higher than the costs. However, some aspects, such as the increased risk of the water table and long-term ecological changes were not examined, thus making the total economic valuation incomplete. Minimum, ten years of the weed management plan should be made mandatory of all Management Plans of all Protected Areas and other reserve forests of Tamil Nadu to successfully halt the expansion of these invasive species so that the native biodiversity is conserved.

Milestone: In Tamil Nadu, the presence of *P. juliflora* in the forested landscape has adversely affected the natural environmental settings as well as the biodiversity. Further, *P. juliflora* was observed to be allelopathic that discouraging other plants from growing around them and seems to be toxic to other biotas in ways that allow the invasive to monopolise the space. The study found that wetlands in the arid region are highly susceptible to *Prosopis* invasion. Although alien invasive species such as *P. juliflora* and *L. camara* are adversely affecting the native biodiversity especially in the Western zone and Cauvery delta, it has livelihood values in the Southern zone especially Ramanathapuram and adjoining districts of Tamil Nadu. The study concludes that complete eradication of *P. juliflora* and *L. camara* is inevitable in the forested landscapes and Protected Areas of Tamil Nadu. However, the study recommends that sustainable management and control of *P. juliflora* may be a better solution than eradication in the southern zone.

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Transboundary Tiger Recovery Initiative in the Terai Arc Landscape

Funding Source
IUCN-KfW funded Integrated Tiger Habitat Programme, Zoological Society of London (ZSL)

Coordinating Institutions
Wildlife Institute of India and Uttarakhand Forest Department

Investigators
Dr G.S. Rawat, Dr P.K. Malik, Dr Bivash Pandav, Shri D.V.S. Khati, Dr Gitanjali Bhattacharya and Dr Harish Guleria

Researchers
Ajaz Hussain, Gaurav Sirola, Harshvardan Singh, Rathore and Nirdesh Kumar

Date of Initiation
November 2017

Date of Completion
September 2019

Objectives: The overall objective of the project was to secure the transboundary Terai Arc Landscape (TAL) to support the recovery of the tiger population through improved management and monitoring of five key tiger sites. The main aims of the project were (i) Robust monitoring of tiger and prey populations in NWS informing adaptive management measures; (ii) Having in place effective law enforcement informed by systematic patrol-based monitoring conducted by well-trained and well-equipped a frontline staff supported by the deployment of technological tools; (iii) Having in place human-carnivore conflict mitigation strategies designed with inputs from the frontline staff and local communities; (iv) Local communities supporting tiger conservation and benefitting from access to enhanced and alternative livelihoods.

Outputs and Outcomes: A total of 65 forest staff from NWS were trained in the basics of ecological monitoring, camera trap deployment and line transect methodology to monitor tigers and prey across NWS. Camera trapping and line transect sampling were led by frontline staff and supported by the project team. 31 unique tigers were identified (Mt+1) in NWS during 2018 and 2019. It showed an increase in the density of tiger population. Intensive monitoring also revealed the presence of three of the lactating tigresses in the landscape, indicating steady growth of tiger population. The overall ungulate density was estimated using a distance sampling method. The project provided the forest department with infrastructural and equipment support including camera traps, rapid response vehicles to mitigate the human-wildlife conflict, GPS, digital cameras and other field gear required for wildlife monitoring and conflict mitigation.

Strengthened law enforcement across NWS: To improve the on-site surveillance and law enforcement monitoring (LEM) in NWS; the entire frontline staff was trained in the use of M-STrIPES (Monitoring System for Tigers—Intensive Protection and Ecological Status). A total of 74 members of the field staff (forest guards, foresters, deputy rangers, range officers and forest watchers) were provided with a refresher course on basics of legal procedures, reporting of illegal evidence and filing of cases. Apart from intensive training in the use of M-STrIPES, the entire frontline staff was provided with a set of field equipment, including patrolling gear. A total of eleven workshops, using the M-STrIPES software, were held for the frontline staff of NWS. The advanced training of trainers (TOT) was carried out through the workshops. A core team of all the forest guards participated in these workshops. A total of 1,086 long and short-range patrols were carried out in NWS in which a distance of 8,636 km was covered by the field staff of Haldwani Forest Division (HFD) between January 2018 and April 2019.

Human-carnivore conflict mitigation: Detailed data on human-wildlife conflicts for the past ten years was collated from Haldwani, Nainital, Champawat and Terai East Forest Divisions of Uttarakhand Forest Department (UKFD) records. This information helped the programme team to identify patterns of conflict in and around NWS. Ten villages were identified around NWS, having a high level of HWC. Twenty early warning systems were deployed to protect vulnerable villages adjoining NWS, and this resulted in a 90% decrease in crop depredation by elephants in these different conflict hotspot villages. The cattle compensation policy of the UKFD is quite effective in the Nandhaur Landscape.

Enhanced and alternative livelihoods Local communities: Based on detailed socio-economic surveys conducted around NWS, 24 villages were identified for interventions to support alternate and enhanced livelihood generation and development of local enterprises to reduce dependence on forest resources. The project has created access to markets for local communities that are supplying their organic products to stores in Haldwani. Enhanced capacity building through training and exposure visits of the local communities and the line agencies, including forest departments of India and Nepal, has been initiated.

Capacity Building of Uttarakhand Forest Department Officials in Conflict Mitigation Enhanced: Six officers of Uttarakhand Forest Department participated in a study tour to ZSL London and Whipsnade Zoos in the UK and the Zoo Design Conference, Wroclaw, Poland during 13-26 May 2019 to interact with experts in conflict mitigation and rescue and rehabilitation of conflict animals.

Camera Trap Image

The project has resulted in strong collaboration and cooperation between protected area management (UKFD in India and DNPWC in Nepal) and local communities across the transboundary landscape.

Milestones: The tiger monitoring and M-STrIPES institutionalised in Nandhaur WLS. The capacity building of field managers in wildlife capture and restraint strengthened by national and international training courses to effectively manage human-wildlife conflict in the landscape.

Impact Mitigation Plan for Koderma Detour Dedicated Freight Corridor on Gautam Buddha Wildlife Sanctuary

Funding Source
Dedicated Freight Corridor Corporation of India Limited (DFCCIL), Government of India

Investigators
Dr S.A. Hussain and Dr Gopi G.V.

Researchers
Mujahid Ahamad, Vivek Ranjan, Umar Saeed, Dipak Anand, Saurav Chaudhary and Aruna Kumar Rath

Date of Initiation
February 2019

Date of Completion
October 2019

Objectives: The objectives of the project are to (i) Conduct a state-wide survey for documenting the existing nesting waterbird colonies; (ii) Raise baseline ecological information about each of the nesting colonies; (iii) Assess the conservation threats to these identified colonial waterbird colonies; (iv) Distinguish key colonial areas based on the number of species as well as number of threatened species.

Outputs and Outcomes: The study focused on assessing the probable impact of the proposed railway track on adjacent flora and fauna in the protected area and suggesting the mitigation measures accordingly. The survey was conducted based on a robust experimental design in which data were collected at a perpendicular distance of 500 m and 1,000 m from the proposed railway track for determining its impact.

The proposed alignment area supports dense, dry deciduous forest with frequent occurrence of Acacia catechu (Khair) and *Diospyros melanoxylon* (Tendu). Indirect and direct evidence collected during survey reveals the presence of 16 mammals ninety-three species of birds and 85 species of plants in proposed alignment area. The proposed site for laying railway track is rich in diversity and any impact of the railway line in terms of degradation and fragmentation of habitat would negatively affect the surrounding biodiversity.

Milestone: Several mitigation measures were suggested for DFCCIL and respective Forest department for minimising the impacts of railway track during their operational and construction phase on adjacent biodiversity. It was also recommended that any future linear infrastructure that would cross the protected area should be avoided. The present linear infrastructure construction that has already been approved may be allowed after the implementation of proper ecological mitigation measures that would provide free passage to the animals.

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Assessment of Biodiversity for Effective Management and Evaluation of Ecotourism Potential in Four Protected Areas of Himachal Pradesh, India

Funding Source
Himachal Pradesh State Forest Department

Investigators
Dr Bilal Habib and
Dr Bitapi C. Sinha

Researcher
Ankita Bhattacharya

Date of Initiation
May 2018

Date of Completion
November 2019

Objectives: The project has the following objectives (i) Assessing the occurrence and estimating occupancy of the major carnivore species; (ii) Estimating the population of major carnivore and ungulate species; (iii) Estimating the population of key bird species (Pheasants); (iv) Assessing the eco-tourism potential of the protected area; (v) Capacity building of forest department and volunteers at the local level for future monitoring; and (vi) Recommendation for better management of protected areas.

Outputs and Outcomes: The fieldwork of camera trapping and another sampling was completed for Rupi Bhaba and Rakchham Chitkul Wildlife Sanctuary. The data analysis work was completed during the reporting period. The report writing and completion of the final project report were under progress. The following publications were published in the peer review journals: (i) Bhattacharya A, Chatterjee N, Angrish K, Shrotriya S, Sinha BC, Habib B (2019). First photographic evidence of snow leopard from Lippa Asrang Wildlife Sanctuary, India. Cat News, 69. (ii) Bhattacharya A, Chatterjee N, Shrotriya S, Sinha BC, Habib B (2020). First Photographic Evidence of Himalayan Brown Bear from Lippa-Asrang Wildlife Sanctuary, Himachal Pradesh, India. International Bear News, 29 (1). 23-25.

Ten mammal species were photo-captured in Rupi Bhaba and Daranghati respectively, two mammal species in Lippa Asrang and four mammal species in Rakchham Chhitkul. The research team calculated the relative abundance index and richness of species of Daranghati and Rupi Bhaba WLS. The team estimated occupancy of five mammal species in Daranghati and six mammal species in Rupi Bhaba WLS. The presence probability maps of these species were generated. The activity patterns of Black bear and Goral in Daranghati and Rupi Bhaba WLS

Camera Trap Image

were studied. Their activity overlap with livestock was also developed. The areas for ecotourism potential were identified in all the four PAs.

Training workshops regarding camera trapping exercise and other field sampling techniques were conducted with the forest staff, and local people and the field sampling was done, including them in every exercise.

Milestone: The research team found the first photographic evidence of snow leopard and Himalayan brown bear from Lippa Asrang WLS. New habitat records of the beautiful rose finch were found from Lippa Asrang and White-throated tit from Daranghati WLS.

Ecology of Clouded leopard, *Neofelis nebulosa* in an East Himalayan Biodiversity Hotspot

Funding Source
Department of Science and Technology, Govt. of India, New Delhi

Investigators
Shri Salvador Lyngdoh and Dr Bilal Habib

Researcher
Urjit Bhatt

Date of Initiation
November 2016

Date of Completion
November 2019

Objectives: The project objectives are to (i) estimate status, and abundance of Clouded leopard and other carnivore species within selected areas of Manas National Park; (ii) determine prey choice and foraging habits of the Clouded leopard; (iii) assess temporal activity and space use of Clouded leopard and other sympatric carnivores.

Outputs and Outcomes: Fieldwork was carried out during three sampling periods of April 2017-June 2017, December 2017-May 2018, and November 2018-May 2019. A preliminary survey was initiated with open and close-ended interviews with particularly the forest officials (n=75) to gather baseline information on

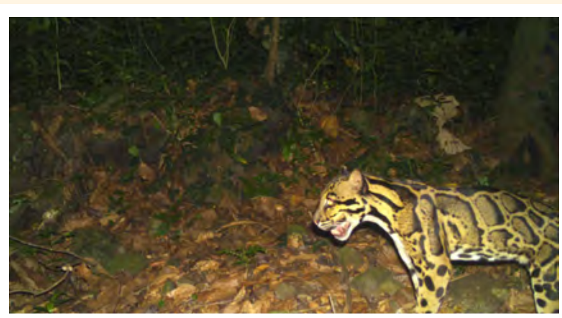
Clouded leopard sightings across all three ranges at a beat level. Based upon the results of pre-survey and sightings of Clouded leopards; 554 camera-traps were deployed in a grid-based approach (grid size: 1 km^2) during three sampling periods covering an area of 270 km^2. The Relative Abundance Index (RAI) of Clouded leopard and other carnivores was calculated. A distinctive cloud-like pelage pattern identified the Clouded leopards. Awareness programs and training workshops, on Clouded leopard ecology, threats, conservation issues, were organised among school children, locals, and forest staff. Capture histories were created for all the photo-captured species using daily capture events to determine the presence or absence of each species at each camera station. By using capture histories, the spatial interactions (positive, negative or random) were investigated between sympatric carnivore species pairs using probabilistic models. This analysis was performed in *R-software* using the "*co-occur*" package. The date and time printed on the photographs were used to describe the diel activity period of Clouded leopard and other photo-captured species.

The species were classified as diurnal, nocturnal, mostly diurnal, mostly nocturnal, crepuscular, or cathemeral. The activity patterns for each species were described, using the *kernel density estimation curves*. Overlap coefficients among the daily activity patterns of Clouded leopards, sympatric carnivores, and their potential prey were estimated using the "*overlap*" package in *R-software*. The precision of this estimator was obtained through a 95% confidence interval (CI), as percentile intervals from 999 bootstrap samples. The moon-phase was classified into new, waxing, waning, and full moon using moon phase software to study the effects of different moon phases on the temporal forest-use patterns of mammals. The research team performed the transformation of the lunar cycle to a 360° scale to analyse mammalian activity data through circular statistics using circular-linear correlation. All civets were grouped, and leopard cats treated another as a small felid. This analysis was done using the program, *Oriana*.

Questionnaire surveys revealed that Clouded leopards were reported in all three ranges over 13 years in the northern boundary of MNP (Doimary, Mathanguri, Kheroni and Latajhar). In all, 19 carnivores were recorded with 2,673 independent records over the sampling period of 13,398 trap nights. Twelve Clouded leopards were identified out of 21 camera-trapped photographs. An informative poster about Clouded leopards was distributed among school children and locals.

Training workshops were conducted for forest staff addressing wildlife monitoring techniques (line transects, sign survey, and camera-trapping). Twenty-one prey species were recorded with 22,225 independent records over the whole sampling period of 13,398 trap nights. Rhesus macaque, barking deer, and Himalayan-crestless porcupine likely were the most important prey species of Clouded leopards. Fifty-one per cent of records were detected in the diurnal period, followed by 38% in the nocturnal phase and 11% during twilight. The activity of large-medium carnivores was driven primarily by prey activity; hence tiger and leopard showed high temporal overlap with large-sized prey, whereas dhole and the Clouded leopard had a high overlap with medium-sized prey species. The Clouded leopard activity was predominantly nocturnal.

Milestone: The study provided baseline information on density, abundance, prey species, and feeding ecology of Clouded leopard in MNP, Assam, India. This study explored a broad description of the spatial and temporal ecology of large-small carnivores, including intraguild, predator-prey, and dominant - subdominant interactions. Such data can be used to study existing patterns in various ecological communities. The study also provides first insights into the moonlight effects on the mammalian community in the forested habitats of Manas National Park and shows how the activity of mammals is correlated with lunar phases. The findings indicated that MNP supports a diversity of mammalian fauna of conservation concern. Continued monitoring of the existing populations of wildlife species and protracted support for conservation will be critical for the future ecological health of the park.



Camera Trap Image

Biodiversity Conservation and Ganga Rejuvenation (NMCG-WII Phase I)

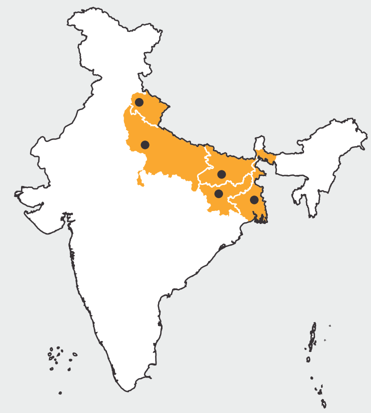
Funding Source
National Mission for Clean Ganga, Ministry of Jal Shakti

Investigators
Dr S.A. Hussain and
Dr Ruchi Badola

Researcher
56 research personnel

Date of Initiation
July 2016

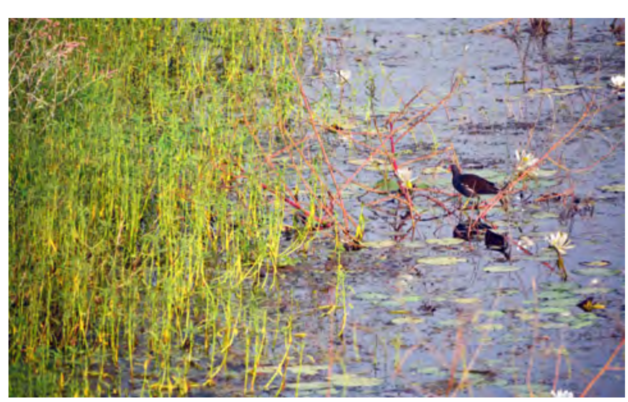
Date of Completion
December 2019



Objectives: Phase I of the project aimed to prepare a science-based aquatic species restoration plan for the Ganga River by involving multiple stakeholders. The project had following six components: (i) Establish Ganga Aqualife Conservation Monitoring Centre at WII Dehradun for science-based conservation planning and dissemination of information; (ii) Prepare biodiversity profile of Ganga river and develop pilot species restoration plans for select stretches and species; (iii) Develop the capacity of Forest Department and other stakeholders of the Ganga River States in monitoring of identified species of conservation significance; (iv) Assist NMCG in establishing the rescue and rehabilitation centres for endangered fauna of the Ganga at select sites by developing human resources and infrastructure with support from the Forest and Veterinary departments; (v) Elicit participation of local communities in NMCG initiatives by providing platforms through Panchayati Raj System, capacity development and payment for ecosystem services; and (vi) Develop and implement conservation education programmes for the river-side communities of the Ganga River.

Outputs and Outcomes: Six high biodiversity identified areas can be maintained by strengthening legal protection and through the support of local communities. A fully operational 'Ganga Aqualife Conservation Monitoring Centre' was established at Wildlife Institute of India, Dehradun as a centralised knowledge repository and nodal agency for policy support on biodiversity and Ganga River conservation. Thirty-two intensive monitoring sites were established along the mainstream Ganga river. The monitoring protocols for the key aquatic species were prepared. Spearhead teams were formed for the forest departments of five Ganga river states. The teams were trained at two national-level training programmes. More than 300 youth were trained in biodiversity monitoring, wetland and river conservation, community involvement and conservation education. The rescue centres were established at Narora and Sarnath along the Ganga river are part of the network to facilitate rescue and rehabilitation of distressed individuals of species of conservation concern.

The capacity of 232 forest department officials, 69 field veterinarians from five Ganga river states, in managing the emergent situation of aquatic macro-fauna strengthened through training and workshops. Two-hundred fourteen participants from local communities were trained to provide effective assistance in rescue and rehabilitation efforts. Grassroots participation has been enhanced by addressing the women and youth members of the local communities.



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A functional cadre of self-motivated Ganga Praharis was established across the five Ganga river states. These Ganga Praharis are carrying forward Ganga conservation activities. They are actively participating in local, regional and national events. Ganga Prahari program has provided rural women with a unique opportunity to be at the forefront of conservation via skill development training courses aimed at economic upliftment through livelihood interventions. The local community members were trained in livelihood activities through the integration of various schemes of the government and NGOs. Jalaj - a mobile livelihood centre at Varanasi is an example of such intervention.

Nature interpretation centres established at Sarnath (Ganga Darpan), Varanasi (Ganga Tarini) and Kanpur (Anubhuti). A total number of 1928 students sensitised about 'Ganga and its aquatic biodiversity'. Information disseminated to the masses, including the teachers, students, fishermen, boatmen and tourist guides through workshops, training programmes, mass media, interpretation centres and performing arts, is resulting in behavioural changes and attitudinal shifts towards the Ganga River.

In the context of the Ganga river, the mechanism for assessment and monitoring of biodiversity were put in place. Status of species and habitat were assessed, and priority areas were delineated. To deal with emergent situations, pilot rescue and rehabilitation centres were established across Ganga states. Spearhead team to carry forward conservation actions were put in place. A cadre of trained human resources for managing river ecosystem was developed. The local communities were sensitised and mobilised for Ganga biodiversity conservation. Concerns of local communities were considered and mechanism for sustainable development in place.

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Milestones: A fully operational 'Ganga Aqualife Conservation Monitoring Centre' was established at Wildlife Institute of India, Dehradun. Conservation priority zones were identified, and conservation efforts are being intensified in these sites through Phase II of the project. The conservation efforts were also upscaled to basin-level through phase II of the project.

Studying the Dispersal of Tigers across the Eastern Vidarbha Landscape, Maharashtra, India

Funding Source
Maharashtra Forest Department

Investigators
Dr Bilal Habib and
Dr Parag Nigam

Researchers
Zehidul Hussain and
Pallavi Ghaskadbi

Date of Initiation
December 2015

Date of Completion
March 2020

Objectives: The objectives of the project are to (i) understand the movement of tigers in and outside Protected Areas that drives population connectivity on a landscape scale and effect of environmental features on dispersal; (ii) validate the modelled corridors and identify new functional corridor and habitats in a highly dynamic landscape; and (iii) directly aiding effective conservation and management of tigers beyond Protected Area (PA) system as a result of real-time data from radio-collars.

Outputs and Outcomes: As part of the project in the Eastern Vidarbha Landscape (EVL), Maharashtra, the research team collared 15 (nine males and six females) tigers of different age and sex classes. During the year 2019-20, the research team collared eight sub-adult tigers (three males and five females) in Tadoba Andhari Tiger Reserve (TATR), Tipeshwar Wildlife Sanctuary and Brahmapuri Territorial Division. In February 2020, the team re-collared a female tiger in TATR. The research team fitted tigers with GPS Plus Vectronics collars to understand the movement patterns and space use of tigers in both protected and outside the protected area.

The two sub-adult male tigers from Tipeshwar Wildlife Sanctuary dispersed during the monsoon of 2019. One of the individual T1-C1 dispersed from the sanctuary in the late June and covered a total distance of 1,500 km to reach Dnyanganga Wildlife Sanctuary. During the dispersing phase, the tigers moved along the corridors and human-dominated landscape including agricultural field between Maharashtra and Telangana covering two States and eight districts before reaching Dnyanganga Sanctuary. Since the radio-collaring in February 2019, the team tracked the tiger for 13 months and received 6,240 GPS location. The tiger seems to establish its territory in the Dnyanganga Sanctuary and adjoining area covering a core area of 52 sq km of home range. The collar was remotely drop-off on 28 March 2020 inside the Dnyanganga Wildlife Sanctuary.

The tiger T1-C3 initial movement was in its natal area inside the Tipeshwar Wildlife Sanctuary. Later, it started exploring the adjoining Pandharkawada Division and bordering Telangana area. It moved out of the protected area on 11 July 2019 towards Telangana crossing the Painganga river. However, just after 15 days, it came back to the sanctuary on 25 July 2019 and currently established its territory in the northern side of the sanctuary.

Of the three sub-adult tigers in Brahmapuri Territorial Division, E1 was translocated and later sent to rescue centre because it came in conflict even after translocation. E3 had established her territory within the division, and the research team has removed the collar after 11 months of tracking. E4 dispersed from its natal area and was found dead in Gadchiroli Division (approx. 40 km away) probably due to a territorial fight with another tiger before establishing her territory.

Milestone: The data from the dispersed tigers over the years in a human-dominated landscape has helped in identify tracts of forest that were selected by animals to disperse acting as important connecting corridors. The data also helped us to validate the functional corridors across the Eastern Vidarbha Landscape. The dispersal of T1-C1 was one the longest recorded dispersal journey covering a total of 3,000 km from Tipeshwar Wildlife Sanctuary until settling down in the Dnyanganga Wildlife Sanctuary in Buldana district.

The information and data from radio-collared tigers have also helped in identifying critical crossing zones of tigers across linear infrastructure such as National and State Highways. A report titled "Highway crossing zones identified using telemetry data of tigers in the Eastern Vidarbha Landscape, Maharashtra, India" was published and submitted to the Forest Department. Based on this report, the research team was able to suggest mitigation measures for wildlife crossing in different areas, where the expansion of linear infrastructures are currently undertaken.

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Study on Ecology and Migratory Patterns of Golden mahseer, *Tor putitora* in River Ganga using Radio Telemetry Techniques

Funding Source
Grant-in-Aid

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

Researcher
Bhawna Dhawan

Date of Initiation
September 2017

Date of Completion
March 2020

Objectives: The project has the following objectives (i) To investigate the migratory breeding patterns of golden mahseer inhabiting in western Himalaya; (ii) Document the habitat use of golden mahseer during different life-history including spawning and growing; (iii) Estimate the breeding and non-breeding home ranges of mahseer inhabiting the main river channel; and (iv) Estimate the Weighted Usable Area and flow requirement of golden mahseer using PHABSIM model.

Outputs and Outcomes: Golden mahseer population abundance was estimated, and its different life-history stages were documented in Kosi, Kollu and Kho rivers in Uttarakhand. The resource (space and food) utilisation patterns by the adult and young ones were studied. Based on telemetry data, the non-breeding home rage of golden mahseer was estimated. Status report on "Golden mahseer population in river Kosi and conservation strategies" was developed and submitted to the Uttarakhand Forest Department for further course of action.

From the telemetry monitoring data, >300 GPS points were located for all the tagged fishes. From the location data, information on fish movement and home range during the spawning season for Golden mahseer was estimated. The environmental parameters and habitat use of golden mahseer (different life-history stages) in Kosi and Kolhu river were found related to the seasonal variation; high water currents, deep pools, wetted river bed, high TDS and conductivity were recorded during the post-monsoon season. Based on the habitat use information, the adult golden mahseer used deep pool habitats with a depth range from >1.5m to 5.9m with high-water current during the post-monsoon season. Backwater pools, secondary channels and run habitats are highly prefered habitats of young individuals. They commonly occur at shallow depth with moderate water velocity. Run habitats and backwater pools with depth and velocity range from 0.3 to >1.8m; 0.3 to >1.2m/s respectively are found suitable for juveniles.

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Movement Pattern and Inbreeding Status of Swamp Deer in Uttarakhand, India

Funding Source
Uttarakhand Forest Department and Department of Science and Technology

Investigators
Dr Samrat Mondol and Dr Bivash Pandav

Researcher
Shrutarshi Paul

Date of Initiation
March 2016

Date of Completion
March 2020

Objectives: The project has the following objectives (i) Mapping the grassland in the study area; (ii) Characterisation of vegetation based on NDVI (Normalized Difference Vegetation Index) and field data.

Outputs and Outcomes: *Grassland mapping*: (i) Extensive field surveys were conducted in 2018-2019 to gather information about different Land. (ii) Use and Land Cover classes in the study area. Landsat images (USGS) of 2018 (Landsat 8) with 30 m resolution were downloaded and visually interpreted using 656 reference points of various LULC classes using Spectral characteristics (size, tone, texture) of different classes, and field knowledge. Once the classification was done, further ground-truthing was conducted to validate and estimate the accuracy of the classification. The total area of different LULC classes and was calculated on a GIS domain (Arc-GIS 10.2.2). The research team classified the final LULC map of 2018 into six different categories (Grassland, cropland, forest, waterbody, settlement and scrubland) and after extensive field verification, accuracy was found to be 91%. It was found that cropland covered 76% of the study area while grassland occupied only 6%.

Vegetation characterisation of grasslands: The main vegetation in connection to swamp deer biology was grassland patches comprising of *Phragmites* sp., Saccharum spp. and Typha sp. as evidenced from our surveys and earlier literature (Tewari & Rawat, 2013). Vegetation analysis of the grassland was done by plot sampling method (Oliver et al., 2012; Cavender et al., 2014). Ninety-eight plots (training) were laid randomly throughout the field area, and GPS was recorded. Area of each plot was considered as 5X5 m^2. The Landsat images (USGS) acquired in 2018 (Landsat 8) with 30 m resolution were used to derive NDVI maps of the study area. Finally, four main vegetation classes were finalised based on field and NDVI data. Further accuracy analysis was done by independent ground-truthing.

Grassland composition: Total area covered by four assigned vegetation classes was 144.04 km^2, among which Saccharum (S) comprises 50.73 km^2, Saccharum Dominated Mix (SDM)-32.77 km^2, Phragmites-Typha Dominated Mix (PDM)-21.77 km^2 and Phragmites-Typha (PT)-38.77 km^2. Overall the accuracy was found to be 86.4%. NMDS analysis of our data clearly shows that there are different clusters of four vegetation classes- Saccharum (S), Saccharum Dominated Mix (SDM), Phragmites-Typha Dominated Mix (PDM) and Phragmites-Typha (PT) as we described using NDVI values as well as field observation. Box plot analysis showed that the vegetation classes had the correct species composition in terms of relative abundance ($p<0.05$, One-way ANOVA). It is evident from our analysis that the grasslands are highly fragmented and as agricultural encroachment continues to rise, the future of swamp deer survival in this human-dominated landscape will lie in our ability to safeguard the remnant grasslands along the Ganges.

Management Recommendations: The grasslands between Jhilmil and Hastinapur require immediate critical attention to safeguard the swamp deer and other fauna inhabiting the human-dominated landscape.

Milestone: The two publications pertaining to the study were published in peer-reviewed journals.

Ecology of Wolves with Emphasis on Dispersal in a Human-Dominated Landscape, Maharashtra, India

Funding Source
Department of Science and Technology

Investigators
Dr Bilal Habib and Shri Salvador Lyngdoh

Researcher
Sougata Sadhukhan

Date of Initiation
April 2017

Date of Completion
April 2020

Objectives: The project has the following objectives (i) What is the current population status of wolves in Maharashtra State? (ii) To estimate the home-range territorial behaviour of dispersing individuals. (iii) To study the dispersal pattern and habitat use of the existing wolf packs dwelling in the human-dominated landscape of Solapur, Osmanabad, Pune and Ahmednagar districts of Maharashtra, India. (iv) To study the social structure and dynamics of the selected wolf packs for individual behaviours within the pack and their interaction with other words in the vicinity. (v) To delineate critical habitat patches and factors governing their utilisation in a human-dominated landscape.

Progress: A total of eight Individuals were collared (Seven GPS collar and one proximity) to understand the movement pattern and habitat utilisation.

Population Status: Sixty-six playback surveys across three radio-collared wolf packs were conducted to study the animal call response rate. The home range was evaluated and confirmed the presence of the pack using a VHF receiver. Once the presence of the pack was confirmed, recorded howls (solo and chorus) were played solicit a response. Multiple regression analysis was performed to assess the effects of factors influencing howling responses. The exercise in home range was conducted, and core areas of each pack were evaluated using a Brownian bridge movement model. The land use in the core, as well as home range, was also assessed to understand the composition of habitat use. The results suggested that the overall forest cover was 41 % in the core, which decreases to 24% in the home range of the same pack. The agriculture and settlements contribute 59% and 76% in the core area and home range of the collared packs respectively.

The howling survey was conducted with newly adapted methodology in the system-generated random grids based on potential wolf habitats in human-dominated arid landscapes of Maharashtra.

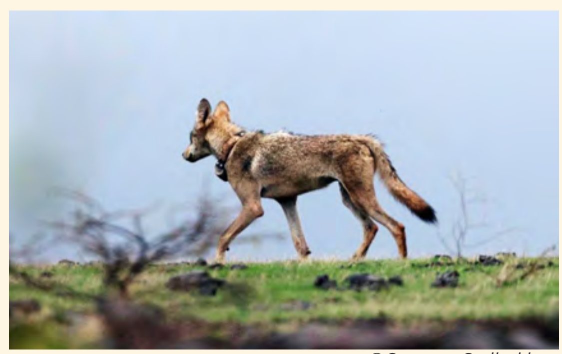
Outputs and Outcomes: *Ecology of Wolves with Emphasis on Dispersal:* The average home range of the three adult wolves of Solapur and Baramati area was found to be 336.53 km^2 whereas the home range of subadult wolves of Ahmednagar and Pune area was found 6.86 km^2. The home range of female from Solapur area was found to be 325.92 km^2 whereas form Solapur male, it was found 399.56 km^2. The minimum home range among adults was found 284.11 km^2 for Baramati female. The average home range of subadults of Pune area (11.23 km^2) was found larger than Ahmednagar area (2.21 km2).

Howling Survey: Wolves in their core home range responded more (n=48, p=0.65) as compared to the buffer of their home range (n=18, p=0.33). The response rate was higher for chorus howls (p=0.61) compared to solo wolf howls (p=0.25). Additionally, the response also varied for the time of the day and season. The results suggest that the rate of response decreases with increasing human footprint within wolf territories. It may be a survival strategy by the wolves to survive and exploit the human-dominated landscape to foster co-existence.

Milestone: This study showed the potentiality of a howl survey as a tool to identify individual wolf. Therefore, howl survey can be used in mark-capture recapture framework. Since the study also specifies the factors which influence the howling response, this could lead us in designing a robust howling survey for mark-recapture based population estimation. The fine-scale habitat utilisation data from radio telemetry helped us to delineate the wolf habitat in a more precise manner which is going to be beneficial during choosing study area for howling survey. The population status of the Indian wolf is unknown to date. Still, the endeavour with howling survey could be the front-runner toward a successful estimating the population of the wolf in the human-dominated landscape of Maharashtra, India.

Telemetry data showed that home range of wolf is more than 300km^2, which is considerably higher than the previous study (~250km^2) (Habib, 2007) in the same landscape. The increase in the size of home-range might be due to the result of increasing anthropogenic pressure and lower prey availability. Anthropogenic pressure on wolf habitat is the apprehension towards the urgency of conservation of this schedule 1 endangered species.

Habitat utilisation data revealed that agricultural land acquisition is fragmenting the wolf habitat, forcing the wolf to use the croplands. This is the reason why most of the collared individuals are using multiple cores fragmented by anthropogenic land-use pattern. Fragmentation also prompts the vulnerability of a wolf toward roadkill and death occurring due to human-animal conflict such as electrocution, poisoning etc. High fragmentation is an emerging challenge to the dispersing subadults finding and establishing their territory and pack. Since the collared subadults are yet to disperse from their parental pack, this is not clear till this point how they manage to disperse with high anthropogenic pressure, what are the critical risk factor and what is the success rate of their pack establishment. The study lays the groundwork for the future work on monitoring the dispersal success of wolves and dynamism of their survival in Anthropocene. The study is also a precursor to developing a scientific method of population estimation for wolves using the uniquely identifiable patterns of individual howls.



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Implementing Rhino DNA Indexing System (RhODIS) to Counter Rhino Poaching Threat and Aid Population Management of Rhino in India

Funding Source
WWF India

Investigator
Dr Samrat Mondol

Researcher
Tista Ghosh

Date of Initiation
April 2017

Date of Completion
April 2020

Objectives: The objectives of the project are (i) To establish a set methodology for undertaking rhino genetic studies based on invasive as well as non-invasive samples and generate a DNA data archive on Indian Rhinos. (ii) This DNA database will be used to match confiscated rhino contraband with the existing database as scientific evidence of poaching involvement in the court to prosecute wildlife offenders. (iii) The DNA database will also be used to understand the genetic status of the present population to facilitate population management of rhinos. (iv) Promoting RhODIS to set better crime scene investigation protocol as Standard Operation Protocol and forest and police personnel will be trained to adopt the system.

Progress: SOPs for sample collection related to poaching cases to maintain Chain of Custody as per standard forensic protocols were developed. The team also designed a rhino specific forensic kit for field sampling following inputs from Wildlife Crime Control Bureau, Government of India. This kit was presented at MoEF&CC and was approved. Subsequently, the kits were distributed to respective Forest Departments for field use.

In the last year, four more rhino poaching cases were received, and all reports were submitted. During this period, dung sampling in remaining four rhino bearing protected areas was completed, i.e. Gorumara National Park (n=109), Jaldapara National Park (n=99) of West Bengal (in 2019) and Kaziranga National Park (n=547), Orang National Park (n=60) of Assam (in 2020).

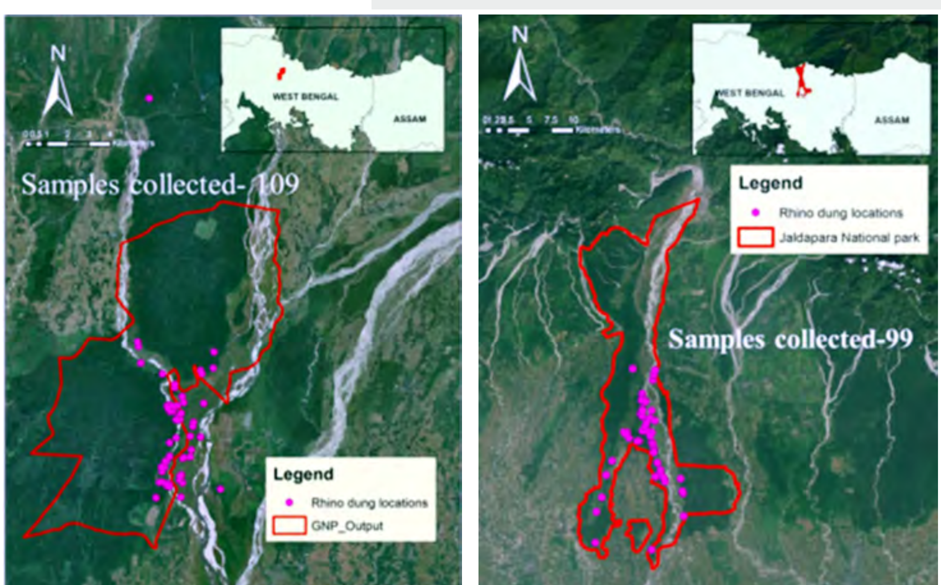
Following genetic analyses with the RhoDIS microsatellite panel, the team identified 47 individuals from Gorumara NP and 76 individuals from Jaldapara NP. Dung samples from Assam were stored in -20C refrigerator till they are processed further.

A database of 359 individual rhinos (using 79 tissue samples of Kaziranga NP) was generated, which is used to generate allele frequency map based on population-specific signals. The genetic structure results indicated the presence of 5 distinct genetic ancestry patterns, corresponding to Dudhwa NP, Gorumara NP, Jaldapara NP, Kaziranga NP and Pobitora WLS. Manas NP showed mixed genetic signatures of both Kaziranga NP (prominent) and Pobitora WLS.

The inbreeding status was evaluated using individual-level data for all five sampled areas. The team calculated the inbreeding coefficient (FIS) value of two populations. Comparatively, the team found very-low inbreeding coefficient value in Jaldapara NP (0.098±0.09) followed by Gorumara NP (0.2±0.09) which is similar to that of Dudhwa NP (0.2±0.06), Manas NP (0.28±0.07) indicating that currently, it might not be of significant concern. Still, careful management plans should be put in place to reduce the risks of higher inbreeding in future. However, in Pobitora Wildlife Sanctuary, the inbreeding coefficient was relatively high (0.4±0.06), which needs urgent management intervention.

Management recommendations: Study of genetic relatedness and inbreeding status will help in population management plans, e.g. reintroduction or selective breeding. The population-specific signals would provide a very effective way to assign seized rhino contrabands to specific populations even in the absence of any suspected poached carcass.

Milestone: All the 16 rhino poaching case reports were successfully presented in court as scientific evidence. The complete genetic data on Dudhwa rhinos were shared by the officials with the media. The study was reported in the Times of India. Similarly, the study was also reported in Mongabay discussing the need for dung based DNA protocol in rhino estimation across India.



Dung sampling locations in Gorumara National Park (left) and Jaldapara National Park (right) of West Bengal

Human-Wildlife Conflict Resolution Mechanism in the Indian Himalayan Region: Risk Assessment, Prediction and Management through Research and Community Engagement

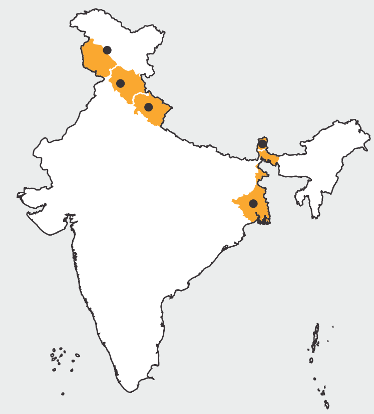
Funding Source
G.B. Pant National Institute of Himalayan Environment & Sustainable Development, Kosi-Katarmal, Almora, Uttarakhand

Investigators
Dr G.S. Rawat, Dr S. Sathyakumar, Shri Qamar Qureshi

Researchers
Dr Dipanjan Naha, Dr Sarvesh Kumar Rai, Sayli Suresh Sawant, Nitin Bhushan, Gaurav Sonkar, Arnab Chatterjee, Suraj Kumar Dash, Abhisek Chettri, Pooja Chaudhary, Pooja Pant, Akashdeep Roy

Date of Initiation
March 2016

Date of Completion
June 2020



Objectives: The objectives of the project are to (i) develop risk assessment tools and processes for identifying negative Human-Wildlife Interaction (HWI) in the IHR through investigations on HWI and predict potential hotspots of conflict for regular monitoring and development of site-specific mitigation efforts; (ii) understand the biological factors and ranging patterns of selected wildlife species involved in livestock/crop depredation and attacks on people in the IHR; (iii) develop and implement adaptive management strategies in some of the identified vulnerable areas through community engagement and use of modern science and technological tools and approaches.

Progress: The research team estimated the average home range, the population density of macaques within 16 km^2 area around WII campus (Chandrabnai, Dehradun). The team monitored two macaque troops in Khisru block of Pauri Garhwal within an area of 12 km^2. The team conducted behaviour sampling and questionnaire surveys (N=130) to understand the crop-raiding pattern, extent of financial damage to households, and perception of local towards macaques. They identified spatial drivers and potential HWC hotspots based on field surveys and species distribution models for Pauri Garhwal (leopard, black bear), North Bengal (leopard and elephant), and Sikkim (black bear). The team camera trapped in an area of 300 km^2 in Pauri Garhwal and 400 km^2 in North Bengal to estimate leopard density and abundance of wild, domestic prey. They conducted semi-structured questionnaire surveys in North Bengal, Pauri Garhwal and Sikkim to assess the perception of local communities towards large mammals (elephant, Asiatic Black Bear, common leopard). The team radio-collared three leopards and estimated their home ranges, activity patterns in North Bengal. A series of multi-interest group meetings, conservation outreach programs were conducted. The team experimented with wildlife deterrents and improved animal husbandry practices within selected hotspots of HWC in Indian Himalayan Region.

Outputs and Outcomes: The team observed 12 troops in the Chandrabani study area. Density of rhesus macaques for two seasons based on line transects surveys: May (summer) 2019 D= 95.31 + 39.31 and October (winter) 2019 D= 61.00 + 48.61 per 100 km^2. In Pauri Garhwal, sixty per cent of the crop-raiding by macaques occurred between April to June and October to December. Langur and macaques raided crops during the day while black bear and wild pig at night. Leopard density was estimated based on an SECR approach, and the results for Pauri Garhwal is 12.74 (SE ±4.3) leopards per 100 km^2. In North Bengal, the density was estimated to be 10.03 (SE 2.1) and 13.33 (SE 3.13) per 100 km^2 in Gorumara & Darjeeling Wildlife Divisions. Among the three collared leopards in North Bengal, a sub-adult female had the greatest home range (176 km^2), when compared with two other males (38 km^2 & 35 km^2) (using 95% Kernel density method in Arc GIS 10.2.2.). Leopard activity was crepuscular and nocturnal. Wildlife deterrents were successful in reducing leopard predation on livestock.

Milestone: The team was successful in generating awareness (> 7500 people) and encouraging young community leaders. They were also successful in creating a common platform for diverse stakeholders to share their views and propose necessary action in mitigating HWC in IHR.

Camera Trap Image

Ecological Responses of Flora and Fauna to Climate Change in Trans-Himalayan Landscape with Special Reference to Vulnerability and Adaptations

Funding Source
NATCOM, MoEFCC, New Delhi

Investigators
Dr B.S. Adhikari,
Shri Salvador Lyngdoh and
Dr Hukum Singh

Researchers
Dharani M, Kalzanj Targe and
Sipu Kumar

Date of Initiation
July 2018

Date of Completion
June 2020

Objective: The objective of the project is to understand the nature of vulnerability to climate change adaptation by the local pastoral communities – livelihood and natural resource dependence *vis-a-vis* vulnerability. The study aims to investigate ecological responses *vis a vis* resource pattern, productivity and biodiversity as well as impacts in terms of livelihood security of traditional herding practices along with ethnomedicinal practice/Amchi System in the Trans-Himalayan region, *i.e.* (Spiti valley, Himachal Pradesh and Ladakh - Jammu, and Kashmir).

Progress and Outcomes: Ethno-Medicinal Practices/Amchi System in Pin Valley in past and present, the status of Amchies, plant parts used, prominent health issues, threats, and anthropogenic pressure on rare and endangered medicinal and aromatic plants (MAPs) were analysed. Out of 69 species, only 27 species were utilised for medicinal purposes, and nine species were IUCN Red Listed species. The research team found that 27 health aliments were claimed to be cured by using various plant parts. Semi-structured interviews were conducted on the migratory pattern and socio-economic status amongst agro-pastoralists and Amchis in the Trans-Himalayan region of Spiti and Ladakh. The herder communities in Ladakh, their movement pattern, seasonal stations, and their dependence on natural resources were mapped, and the vulnerability of communities through a Livelihood Vulnerability Index (LVI) was analysed.

The vulnerability assessment was carried out, with two approaches i.e. Livelihood Vulnerability Index (LVI) and Vulnerability index (IPCC-approach). Among four zones in Pin valley viz., Pin zone (12 villages), Tud zone (8 villages), Bhar zone (11 villages) and Sham zone (7 villages), the vulnerability index is in the order: Bhar zone

(0.462) > Pin zone (0.444) > Sham zone (0.413) > Tud zone (0.394) through LVI-composite index approach. However, through LVI-IPCC approach the vulnerability index was in order: Bhar zone (0.107) > Sham zone (0.052) > Tud zone (0.033) > Pin zone (0.017). In Ladakh, the vulnerability index of three zones (village, western and eastern zones) is as follows: Village zone (0.492-LVI; -0.189-LVI-IPCC), western zone (0.525-LVI; -0.189-LVI-IPCC) and eastern zone (0.537-LVI; -0.125-LVI-IPCC), which infers that the vulnerability is high for eastern zone herders than that of western zone herders and least for village zone. Therefore, the study also aims to do experimental studies to know the response, causes, and mitigation strategies to sustain the changing climate along with the vulnerability and adaptations.

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MSTrIPES (Monitoring System for Tigers: Intensive Protection and Ecological Status)

Funding Source
National Tiger Conservation Authority

Investigators
Dr Y.V. Jhala and Shri Qamar Qureshi

Researchers
Ahana Dutt, Akshay Jain, Anup Pradhan, Ashish Prasad, Ashok Kumar, Deb Ranjan Laha, Kainat Latafat, Krishna Mishra, Ninad Mungi

Date of Initiation
March 2012

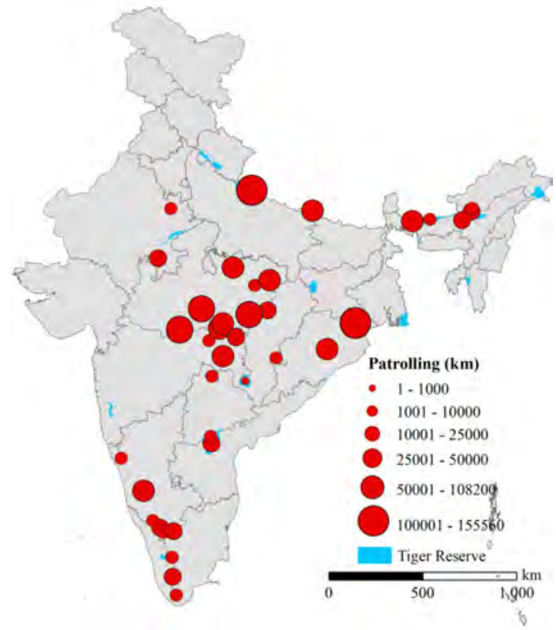
Date of Completion
July 2020

Objectives: The project has the following objectives (i) Developing and continuously updating MSTrIPES software, by including user-friendly protocols, applications, analytics, and data archiving; and (ii) To implement MSTrIPES and orient filed staff to modern techniques on patrolling and ecological monitoring, which will help in adaptive conservation actions.

Progress: Two of the three android applications (Patrol and Ecological) can be used without internet. Mobile connectivity is developed for Android mobile phones up to version 10. It is freely available in 10 official Indian languages (www.mstripes.in). The third application of human-wildlife conflict is under preparation. Desktop software for analysing the app data, periodic reports, and mapping protection indicators is developed for Windows and is distributed across tiger reserves. Around 1,500 forest staff members were trained for effectively using these applications. New software for analysis of camera trap data was also developed. This software helps geotag every camera trap picture, automatically identifies camera trapped species, records the location and time of species captures, analyses the distribution, activity pattern, relative abundance, and occupancy of any camera trapped species. Due to user-friendly, multi-lingual, and open access apps and software, MSTrIPES has been readily imbibed by many protected areas apart from tiger reserves. MSTrIPES is currently being used by 12 such non-tiger reserve areas, whose staff members have been trained.

Outputs and Outcomes: Across India, around 5,000 users from 35 out of 50 tiger reserves are using MSTrIPES for routine patrolling. On an average, ~5,00,000 km of patrolling is done every month within these 35 tiger reserves. Tiger reserves like Kanha, Melghat, Bor, Pench (MH), Nagarjunsagar Srisailam, Mudumalai, Bhadra, and Dudhwa had >90% patrol coverage; Similipal, Satpuda, Navegaon Nagzira, Tadoba, Pench (MP), and Sathyamangalam had >75% patrol coverage, Achanakamar, Satkosia, Panna, Nagarahole, Anamalai, and Sanjay Dubri had >50% patrol coverage, while other had <50% coverage. Around 2,500 species sightings and 20 wildlife crimes were recorded on the average each month.

MSTrIPES desktop was used to analyse over 50,000 carnivore sign surveys, 60,000 line transects and 1,50,000 habitat plots for analysing the data at the landscape scale and site scale for the All India Tiger Monitoring exercise 2018-19. The new camera trap tool (part of the ecological desktop application of MSTrIPES) was also used for evaluating relative abundance index and mapping the distribution of ~90 species across all tiger reserves.



Milestone: With more than 5,000 users, MSTrIPES helped achieve digital literacy for frontline forest staff to use the applications for recording their regular duties. MSTrIPES can be used to monitor the status of ~90 species across landscapes; it can aid informed decision making for EIA's, permissions for developmental projects, and direct law enforcement efforts to vulnerable areas of the landscape. MSTrIPES software is open-source and can be used by the wider scientific community.

Understanding the Amur falcon, *Falco amurensis* their Stop-over Sites in Nagaland and their Migratory Routes for Better Conservation Planning

Funding Source
Ministry of Environment, Forest and Climate Change

Collaborating Agency
Nagaland State Forest Department

Investigators
Dr R. Suresh Kumar and Shri Alex Jacob

Date of Initiation
September 2016

Date of Completion
August 2020

Objectives: (i) deploy modern technology in the form of lightweight satellite tags fitted to Amur Falcons in Nagaland to track their amazing migration journeys; (ii) carry out a state-wide survey to locate and identify Amur Falcon roost sites; and (iii) identify and document prey species from regurgitated pellets of the Amur Falcons in Nagaland, India.

Progress: As part of the second objective visits to different districts in Nagaland were undertaken where the research team surveyed for Amur Falcon roost sites. There, discussions with forest department staff and local people were held to know about Amur falcons roosting in the area. On locating, roost site information on the habitat type, dominant tree species, the ownership of the area was recorded, and the site was mapped using a GPS. This information was then used in a GIS-based modelling approach (Site Suitability Model or SSM) to identify potential roost sites elsewhere in the State.

During 2019-20, the Amur Falcon regurgitated pellets were once again collected from the roost sites to identify and confirm the prey items in the diet. The regurgitated pellets were also collected from other roosts sites in the north-eastern region to document for any difference in prey across sites. Termite colonies were located and excavated to collect castes, morphological characters of which are primarily used for species identification. The termite colony was also excavated for documenting the termite architecture.

Outputs and Outcomes: Of the five Amur falcons' satellite-tagged in November 2016 one falcon named "Longleng" continues to be active. During the reporting season, Longleng on its southbound migration to India did not arrive at the roost sites in Nagaland and instead made its stop-over at the Umrangso roost site in Assam for 20 days. For the record 4th time Longleng arrived at the same wintering site in Southern Africa near the town of Villers located around 100 km southeast of Johannesburg, suggesting high wintering site fidelity.

Survey for the falcon roost sites in Nagaland leads to locate a total of eight active roost sites within Nagaland and in the districts of Dimapur, Wokha, Longleng, Peren, Mon, Tuensang and Kiphire. Additionally, three roost sites in Tamenglong district of the neighbouring State of Manipur and one roost site (Umrangso) in Assam were located. Roost sites having a large congregation of Amur Falcons within Nagaland were found to be associated with the interior river valleys of the River Doyang and Dikhow. The examination of the regurgitated pellets once again revealed a high percentage of termites in the diet and was the same across all the roost sites. Morphological examination of the termite soldiers collected during the study. The termites of the Odonototermes genus are unique for their ability to cultivate a fungus in their subterranean chambers. The excavation of the termite colony provided interesting insights into the colony structure.

Assessment and Monitoring of Climate Change Effects on Wildlife Species and Ecosystems for Developing Adaptation and Mitigation Strategies in the Indian Himalayan Region

Funding Source
Department of Science & Technology under the National Mission on Sustaining the Himalayan Ecosystem (NMSHE) Programme

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Date of Initiation
August 2014

Date of Completion
August 2020

Objectives: The main goal of the project is to develop strategies to mitigate climate change effects on wild animal species and ecosystems in the IHR.

To achieve the above goal, the following research/ task components have been put forth under the theme on fauna and ecosystems: (i) Identify the drivers of landscape change (climatic and anthropogenic) in the IHR (Ganges River Basin) and their effects on the ecological and social systems; (ii) Conduct focussed research on wildlife aspects (terrestrial and aquatic fauna, micro-flora and their habitats) and human dimensions in IHR (Ganges River Basin) for framing evidence-based policy measures; (iii) Develop monitoring and Decision Support Systems (DSS) for indicator species in the IHR (Ganges River Basin); (iv) Undertake climate change scenario analyses and visualisation for predicting potential effects on fauna and ecosystems as a strategy to communicate with stakeholders and to influence policy and decision making; (v) Develop spatial and inter-operable database to facilitate and policy decision making; and (vi) Build capacities within WII and of other stakeholders for sensitisation and development of action plans for climate change impact mitigation and to enhance capabilities for negotiations at the national and international forums.

Progress: As a task force under the National Mission for Sustaining the Himalayan Ecosystem (NMSHE), this project aims to develop strategies to mitigate climate change effects on wild animal species and ecosystems in the Indian Himalayan Region (IHR). Currently, for baseline species richness data generation, the landscapes are subdivided into cells of 256km^2 (16kmx16km) according to the average home range of the largest mammal found in the area, the Himalayan brown bear, *Ursus arctos isabellinus*. Thematic group-specific standard methodologies have been developed and followed. Secondary data collection has been completed for both terrestrial and aquatic themes. Preliminary analysis of species distribution and inventory preparation has been carried out. Research trend and knowledge gap analysis for all the terrestrial and aquatic themes have been completed.

To create a fine-scale temperature and precipitation surface model for the entire two basins. Data loggers have been deployed in different habitats along the elevation gradient. The above-mentioned grid structure was followed to deploy at least one Datalogger in a 256 km^2 grid, and the number of data loggers in a particular grid was increased according to the diversity of habitat and elevation classes in that grid.

Outputs and Outcomes: Landscape driver's analysis: At the 16 km grid-scale, mean annual temperature emerged as the strongest spatial determinant of NDVI with a strong positive relationship. This implied that vegetation cover and productivity status is more influenced in times of higher temperatures regimes at the regional scales. At the 4 km grid-scale, precipitation of the driest quarter was the strongest spatial determinant of NDVI. The human footprint is the second most important factor governing NDVI change at the medium 4 km scale.

Ecological forecasting and niche modelling: Ecological forecasting and niche modelling were done for the snow leopard, blue sheep and Himalayan pit viper using presence-only models. Distribution mapping of snow leopard solely build on an environment variable or abiotic factors can overestimate the area available to species. Higher consumers like snow leopard are more affected by altered resource availability and species interaction due to climate change. In the case of blue sheep, the highest contribution of annual mean temperature to the model suggests that temperature is the most important variable. Ensemble modelling of snow trout in the Indian Himalayan region was completed. Species distribution modelling was also done for Himalayan pit viper.

Vulnerability to the socio-economic system: Socio-economic vulnerability analysis indicated 39, 41 and 41% of the households surveyed in Bhagirathi, Beas and Teesta Basin respectively were vulnerable, whereas 47, 70 and 55% of the surveyed villages were vulnerable respectively. The quality of life index for the Bhagirathi basin ranged from 0.18 to 0.89, *i.e.* a wide array of numbers reflecting poor to the high quality of well-being.

Experiment on microfauna and flora: Experimental setup of OTC was also used to assess the possible impact of change in temperature on soil nematode diversity and its distribution in Gangotri National Park. Baseline data have generated using Open Top Chambers (OTCs) on mean annual soil and air temperature and change in vegetation growth inside and outside the OTC. Analysis of microbial community revealed a highly diverse bacterial community with 20,943 operational taxonomic units from 34 phyla along the elevation.

Strategic knowledge generated for development climate change adaptation and mitigation strategy: Landscape conservation values were estimated for the Indian Himalayan Region. Of the six Himalayan states, the states of

Uttarakhand, Sikkim and Arunachal Pradesh contain a large proportion of areas under high conservation value and there are significant proportions of these areas falls outside the protected areas. Forest fragmentation was estimated for the six Himalayan states using the Landscape Fragmentation Tool (LFTv2.0). The analysis revealed a significant decrease in the large intact core areas (>500 acres) in all the states except Jammu and Kashmir and also revealed ongoing perforations inside the forest in all the Indian Himalayan states.

Tibetan argali, *Ovis ammon*, Tibetan sand fox, *Vulpes ferrilata*, Tibetan woolly hare, *Lepus oiostolus*, Eurasian lynx, *Lynx lynx*, Woolly flying squirrel, *Eupetaurus cinereus*, Pallas's cat, *Octocolobus* manul were recorded for the first time in Bhagirathi river basin. Among these, Woolly flying squirrel was rediscovered in India, and Tibetan Argali is an important species under the Convention on the Conservation of Migratory Species (CMS) of a wild animal. Six abnormalities and malformations were observed in amphibians during the sampling. Abnormality included eye opacity, *Nanorana vicina*; and malformation included Skin web, *Duttaphrynus himalayanus*; Polyphalangy, *Amolops formosus*; Digital loss, *Duttaphrynus stomaticus*, Ectromelia, *Nanorana minica*.

Climate sensitive zone for aquatic organisms in Beas basin was delineated. The distribution model for Snow leopard, Blue sheep, Musk deer and Himalayan pit viper was also developed. Socio-economic vulnerability analysis indicated 39, 41 and 41% of the households surveyed in Bhagirathi, Beas and Teesta Basin were vulnerable whereas 47, 70 and 55% of the surveyed villages were vulnerable respectively. The preliminary results suggest that the bacterial communities are influenced by soil nutrient content more than climatic conditions.

Milestones: The environmental niche models were developed to understand the possible effects of changing climate on the survival and distribution of wild fauna under various greenhouse gas emissions scenarios and anthropogenic pressures. Spatially-explicit predictions for climate habitat suitability in the current and future environments were developed for selected indicator ichthyofauna, mammals and herpetofauna species.

A wildlife watch series (1-5) has been developed for information generation on climate change impacts on wildlife, aquatic resources, and ecosystem using the citizen science approach. In addition, to create awareness about climate change education and sustainable living among the young students, a programme has been initiated through school level Do-It-Yourself (DIY) Activity book "Climate Cool-Kit".

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Securing Livelihoods, Conservation, Sustainable Use and Restoration of High Range Himalayan Ecosystems (SECURE Himalaya)

Funding Source
Global Environment Facility (GEF)
Investigators
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Project Biologists
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Date of Initiation
March 2018
Date of Completion
August 2020

Objectives: The objectives of the SECURE-Himalaya project are: (i) Improved management of high range Himalayan landscapes for the conservation of snow leopard and other endangered species, their habitats and sustaining ecosystem services; (ii) Improved and diversified livelihood strategies and improved capacities of community and government institutions for sustainable natural resource management and conservation; (iii) Enhanced enforcement, monitoring and cooperation to reduce wildlife crime and related threats; and (iv) Effective knowledge management and information systems established for the promotion of sustainable management practices in the high range Himalayan ecosystems.

Progress: To achieve the objectives, following research components are currently carried out at Wildlife Institute of India: (i) Prepare participatory integrated landscape-level management strategy and plans by defining extent of landscape (alpine & subalpine) and evaluating landscape-level existing strategies in SECURE Himalaya project landscapes in Uttarakhand; (ii) Design a comprehensive Human-Wildlife Conflict (HWC) Management Strategy in select Districts / Landscapes of Uttarakhand; (iii) Identifying, delineating and mapping areas with High Conservation Values (HCVs) and developing recommendations for the SECURE Himalaya landscapes in Himachal Pradesh; (iv) Assessment of medicinal and aromatic plant species including their collection, usage, demand, markets, price trends and life cycle, focusing on landscapes in Himachal Pradesh; (v) Assessment of capacity and training needs of key government staff and community members/institutions for long-term effective biodiversity conservation, and development of a framework for implementation in SECURE Himalaya Project landscapes (Lahaul, Pangi and Kinnaur) of Himachal Pradesh; (vi) Effective knowledge management and information systems for monitoring & evaluation.

Outputs and Outcomes: The research team prepared participatory integrated landscape-level management strategy and plans by defining the extent of landscape (alpine & subalpine) and evaluating landscape-level existing strategies in SECURE Himalaya project landscapes in Uttarakhand. During 2019, formal and informal consultations were carried out with government line agencies at both district and block levels, to gather information regarding on-going schemes of each department in both the landscapes. Stakeholder workshops were conducted, two in each landscape during January, February and June 2019.

Design a Comprehensive Human-Wildlife Conflict (HWC) Management Strategy in select Districts/ Landscapes of Uttarakhand: A major component of the SECURE Himalaya project pertains to the complex issue of Human-Wildlife Conflict. The research team adopted a multi-pronged approach to collect information from various qualitative and quantitative sources. Primary information was obtained through extensive individual-household questionnaire surveys.

Formal and informal consultations were carried out with the Forest Department officials to gather information regarding ongoing schemes in both the landscapes.

Identifying, delineating and mapping areas with High Conservation Values (HCVs) and developing recommendations for the SECURE Himalaya landscapes in Himachal Pradesh: High Conservation Value Areas (HCVAs) is an emerging concept used to identify important areas based on a variety of parameters including biodiversity, landscape context, threatened or endangered ecosystems, ecosystem services etc. Six criteria for identifying HCVAs are Species diversity, Landscape-level ecosystems, Ecosystems and habitats, Ecosystem services, Community needs and Cultural values. The study has been conducted in the trans-Himalayan region of Lahaul & Pangi valley, Himachal Pradesh. The secondary data were collected from published sources on distribution of snow leopard and other protected species and various ecosystem services present in the concerned landscape. Areas with high potential for medicinal plants, faunal diversity, ecosystem services and cultural values were delineated. Village level meetings were organized, and data were collected using a semi-structured open-ended questionnaire for validation of potential HCVAs identified through the literature survey. In total, 28 villages (13 in Lahaul and 15 in Pangi valley) were visited. The potential areas were surveyed and observed for the presence/ absence of rare and threatened medicinal plants found in the valley. The sampling of the mammalian populations was done using a combination of direct and indirect methods. After final validation, a total of 17 potential areas were identified in both the landscape of Lahaul and Pangi Valley. Also, a scoring system matrix was developed for further prioritization of identified areas, mainly based on the distribution of major faunal species and ecosystem services. The biodiversity values and the associated threats have been described in the report in detail.

Assessment of medicinal and aromatic plant species including their collection, usage, demand, markets, price trends and life cycle, focusing on landscapes in Himachal Pradesh: The major objective of this component is to assess Medicinal and Aromatic Plants (MAP) species with a focus on ensuring sustainable cultivation and harvesting by identifying usage patterns and studying existing value chains. Principal outcome involves improved and diversified livelihood strategies, improved capacities of communities and government institutions for sustainable natural resource management and conservation in the high range Himalayan ecosystems.

Assessment of capacity and training needs of key government staff and community members/institutions for long-term effective biodiversity conservation, and development of a framework for implementation in SECURE Himalaya Project landscapes (Lahaul, Pangi and Kinnaur) of Himachal Pradesh: The main objectives of the project are to assess the capacities and training needs of key stakeholders for long-term biodiversity conservation, livelihood enhancement and natural resource management, to identify the capacity gaps and develop a capacity development framework and strategies for the target stakeholders, to validate UNDP Capacity Development Scorecard and conduct a pilot training program in each of the landscapes. In the future course of action, a training of trainers (ToT) in the landscape has been proposed on the module titled "Human-Wildlife Conflict in high altitude rangelands: Causes and Management" for the forest department staff.

Effective knowledge management and information systems for monitoring & evaluation: This component aims to provide an information base in the form of an Interactive, Live and Dynamic Web portal. The primary objective of this work is to furnish a knowledge repository through web-based databases and integrating the outputs from other baseline studies carried out under SECURE Himalaya Project. Laravel framework has been used for web portal development. Dynamic Content Management System (CMS) is used for creating, updating and deletion of web-pages/contents in the backend of the portal. The website has five main menus - Home, About Project, Database, Baseline Studies, and Contact. Individual web-pages for the four databases titled "Studies", "Best practices", "Experts", and "Ongoing schemes" have been created and their contents have been integrated into the portal. These databases can be downloaded offline through email verification by an OTP submission. Design of database schema has been finalized, and information based on the set format has been collected and compiled.

Milestones: In Uttarakhand, a landscape-level management strategy, a comprehensive draft human-wildlife strategy, along with species-specific SOPs and training needs assessment for the Gangotri-Govind and Darma-Byans-Chaudans landscapes has been submitted for discussion with the state forest department. In Himachal Pradesh, a total of 17 potential areas were identified in both the landscapes of Lahaul and Pangi Valley. Also, a scoring system matrix was developed for further prioritization of identified areas, mainly based on the distribution of major faunal species and ecosystem services, and relevant conservation recommendation for each area specific to each threat has been provided. Further, capacity assessment of governmental agencies, training need assessment of target stakeholders, capacity development framework, identification of training institutions, district and state-level workshops in the landscape and development of draft training modules have been accomplished.

A separate web-page is developed for baseline studies commissioned under Secure Himalaya project, and the inception reports of these assignments are made available online under the "Publications" sections of the 'Home' page. Secure Himalaya portal has links to the websites of its stakeholders and other related organizations. The portal can be accessed from any device, *e.g.* computers, tablets, or mobile devices and has been developed in accordance with the essential Guidelines for Indian Government Websites (GIGW). This Portal is currently being hosted and maintained by WII and available at this link: http://securehimalaya.in/beta/home.

ABCD Satellite Tracking Amur falcons *Falco amurensis* from their Stop-over Sites in Manipur to Support Conservation Efforts

Funding Source
Manipur State Forest Department

Investigator
Dr R. Suresh Kumar

Date of Initiation
October 2018

Date of Completion
September 2020

Objectives: The objectives of the project are to (i) deploy modern technology in the form of lightweight satellite tags fitted to four Amur falcons in Manipur to track their amazing migration journeys and to support conservation efforts (100%). (ii) carry out a state-wide survey to locate and identify Amur falcon roost sites (50%).

Progress: Two 5-gram PTT (Microwave Telemetry) and three PinPoint 75 GPS Argos tags (Lotek Inc.) were deployed on Amur falcons at the Puching roost site in Tamenglong district of Manipur. Falcons were trapped using canopy mist-nets, and captures were attempted during the evening when the birds arrived in to roost. The capture and tagging operations were carried out from 10th October 2019 to 1st November 2019.

Outputs and Outcomes: Survey for Amur falcons along the Barak and Irang river in the Tamenglong district were carried out from the second week of October. After several attempts on 29th October, a juvenile Amur falcon was first captured, however, since the bird weighed only 110 grams, it was unfit for satellite tagging, and was therefore ringed and released. On the 30th October, four Amur falcons were successfully captured and included a large female weighing 195 grams, and three juveniles that ranged in weight from 125 to 155 grams. Two of the heaviest birds, the large female and the juvenile weighing 155 grams were tagged. Two birds were named Puching and Irang, and were released by the local people of Puching village. On 1st November a total of 18 Amur falcons were captured at the same roost site, and this included six each of male, female and juvenile. Two heaviest males and one heaviest female were tagged. They were named Phalong, Chiuluan and Barak respectively and were released in the presence of local people from the different Amur falcon roost sites in Tamenglong district.

Four of the five Amurs tagged arrived in Southern Africa, while one of the tags post-deployment did not transmit any data, suggesting transmitter failure. The microwave PTTs have been transmitting data regularly while the Pin-point tags have not transmitted data as scheduled. The tagged Amurs remained in the roost site in Tamenglong district and started on their southbound migration in the third week of November 2019. Chiuluan, the adult male falcon, arrived in South Africa in the last week of December 2019 and roosted at a site 130 km northeast of Pretoria till the last week of March 2020. Barak, the adult female, wintered in central Botswana and did not travel further down to South Africa. The juvenile Amur "Irang" interestingly spent the maximum number of days wintering in north-western Zimbabwe along the lake Kariba bordering Zambia. The fourth Amur falcon, a male, named "Puching" was last located in Southern Africa near the town Villers about 100 km south of Johannesburg, following which no transmission was received. Surveys to located falcon roost sites within Manipur are currently underway, and the Puching roost site in Tamenglong district was previously not known, and that is where Amur falcons were captured and tagged for the first time this season.

Milestone: One large roost site in the upper stretches of the Barak river along the Nagaland-Manipur border was identified. Another site along the Manipur-Mizoram border and south-west of Churchandpur town was located.

Assessing the Impacts of Power-Lines on Avian Species in the Arid Plains of Western Gujarat

Funding Source
Power Grid Corporation of India Limited

Investigators
Dr R Suresh Kumar and
Dr Anju Baroth

Researcher
Harindra Baraiya

Date of Initiation
November 2017

Date of Completion
September 2020

Objectives: The objectives of the project are to (i) assess the electrocution and collision risk to birds due to existing power-lines as well as wind farms and identify problematic configurations and generate comprehensive data on mortality of avifauna, and (ii) identify sensitive bird habitats along existing and proposed powerline and wind farm corridors in Western Gujarat.

Progress: The research team completed the characterization of transmission lines in the study area. The team also completed the distribution survey for Cranes and Flamingos and observed flight behaviour of these birds to predict collision and electrocution risks due to power lines. Tagging of six flamingos and one crane was also completed. Data analysis is under progress, including habitat suitability modelling. Progress of the project was presented to the funding agency as well as in the Annual Research Seminar of the Institute. The research was also presented at the conferences held at Aligarh Muslim University and Bombay Natural History Society.

Outputs and Outcomes: One hundred and seventy-three transmission lines (66KV, 132 KV, 220 KV, 400KV, 500 KV) were characterized for height, no. of earth wires, no. of strata and no. of conductors. The distribution survey was conducted for 41 Grids over 16,400 sq km with an effort of 276 Hours, and 130 crane flocks were observed (120 Common; 10 Demoiselle cranes) in these grids. One hundred and eighteen wetlands were surveyed for Flamingo distribution out of which sighting was made at 54 wetlands for 211 Flamingo flocks (177 Greater; 34 lesser flamingos). Windmill survey was carried out over 1,532 km to know the impact of the windmill on space use by cranes. It was observed that the encounter rate was six times less in the wind-mill area vs control area, indicating the displacement of the common crane due to the presence of windmills. Flight behaviour observation of Cranes was made through observing 79 flocks resulting in 253 man-hours. The responses in relation to the presence and absence of power lines in their flight path are currently being analyzed. Movement tracking of flamingos and cranes was done by tagging GSM-GPS transmitter. So far, one common crane and six flamingos (two greater; four lesser) have been tagged, and the tracking data is currently being analyzed.

The following were the outputs during the entire project duration: (i) Technical Report – 1; (ii) Conference Presentations – 4; (iii) M.Sc. Dissertation – 2.

Milestone: First-time satellite tagging lesser flamingos in India and Greater flamingo in North India. It is the first dedicated effort to study the fine-scale movement of flamingos and cranes through satellite tracking in India.

Genetic Connectivity at Landscape Scales for Large Carnivore Populations in Tiger Habitats

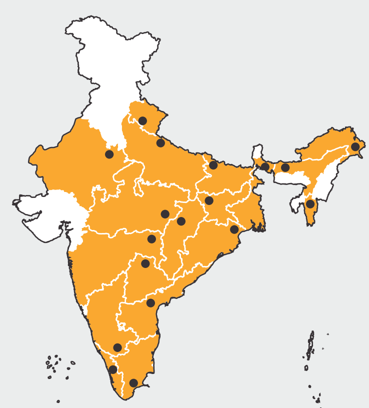
Funding Source
National Tiger Conservation Authority, Delhi

Investigators
Dr Y.V. Jhala, Shri Qamar Qureshi, Dr Vishnupriya Kolipakam

Researcher
Shweta Singh

Date of Initiation
January 2016

Date of Completion
November 2020



Objectives: The objectives of the project are: (i) To carry out genetic identification of tiger, *Panthera tigris*; Leopard, *Panthera pardus*; Dholes, *Cuon alpines*; and Sloth bear, *Melursus ursinus* in the study area from their faecal DNA extracts; (ii) To investigate the metapopulational structure of large carnivores in the country using microsatellite loci genotypic data; (iii) To investigate the level of genetic structuring between local populations and across the country; and (iv) To identify any ESU's or isolated populations that merit special conservation attention.

Progress: *Tiger*: Standards for tiger conservation should transcend beyond increasing tiger numbers. Through the data generated from this project, on 153 unique tiger individuals from across the country, the research team used information on 11 micro-satellites to quantify genetic diversity and divergence of tigers. The team then developed a conservation priority index. Populations that are genetically divergent as well as diverse should be given greater importance for conservation. The team, therefore, computed a Composite Genetic Score (CGS) by using diversity value as an exponent to the populations' divergent score. The inverse log of population size (P) is taken to incorporate vulnerability. Each index was then scaled by taking the proportion contribution of each value to the index. Proportionating the index values ensures that each of the indices contributes equally to the final score of conservation priority. These proportionate indices were then added, i.e. the proportionate vulnerability of a population was added to its proportionate CGS score to evaluate its priority within India for conservation investments.

The results show that the tigers from North-Eastern Hill tiger populations get the highest rating for conservation. This seems most relevant as these tigers are likely to share their gene pool with the most critically endangered subspecies, *i.e. Panthera tigris corbetti*, that exists in Myanmar. Therefore conservation investments for Namdahpa, Kamlang and for making Dibang WLS tiger reserves are of paramount priority. The other priority populations were those of Southern-Western Ghats and North-Eastern Plains. The landscape of Karbi-Anglong that connects the only source population (Kaziranga TR) in the NE-Plains to the southern tiger habitats of Intaki and Dampa TR is of conservation priority and needs significant investments.

Wild dog: DNA was isolated from a total of 700 scat samples and using the Dhole specific marker, 391 scat samples were identified as belonging to that of Dholes. A panel of twelve polymorphic markers was used to identify individual dholes from these Dhole positive scats. The observed heterozygosity for all landscapes was found to be significantly lower than the expected heterozygosity, indicating sub-structure within each landscape. Three major clusters were identified across India; North-eastern, Terai and Central India by using a Bayesian model-based clustering algorithm.

Leopard: Of a total of 1,871 positive carnivore samples that were extracted, 704 were positively identified as those belonging to leopard. From 704 positive leopard samples, the team was able to identify 317 unique individuals, after removing samples that did not amplify well, as well as recaptures of individuals. Central Indian leopards were the most diverse, with a mean number of 14.5 (+/- 3.2) alleles. Connectivity is seen between the Eastern Ghats and the Western Ghats, and there is an Eastern Ghat element that is visible in samples from West Bengal and Northeast. Leopards across India do not show sub-structuring within like tiger, and instead, show signatures of isolation by distance.

Sloth bear: A total of 525 sloth bear scat samples were selected for extraction of DNA. Out of which 249 scat samples were amplified successfully with Sloth bear specific primers. One hundred forty-six samples were selected for genotyping based on their good quality of DNA. A panel of 11 cross-species polymorphic microsatellites loci was used to generate genotype data of selected 146 samples. The team successfully identified 145 unique individuals. Central India and the Western Ghats are more genetically diverse than other populations with (8.3 +/- 2.8) and Western Ghats (7.36 +/- 2.6) as mean number of alleles respectively. No significant structuring was observed, except that Terai populations separated as a different cluster from others when Bayesian clustering algorithms were applied. This is indicative of recent loss of forest connectivity between the two landscapes.

Outputs and Outcomes: Prioritization of tiger populations by taking into account their diversity, divergence and vulnerability with the largest pan-India dataset. North-eastern hill tiger populations should be prioritized for tiger conservation, given their genetic distinctiveness and low population size. The other populations for priority conservation investments are tiger populations in Southern Western Ghats, and plains of North-east India. Information on landscape-level structuring of leopard, dhole and sloth bear across the tiger range states is helping us understand whether the current conservation model takes into account the needs of other species.

Milestones: A paper titled 'Genetic structure of tigers, *Panthera tigris tigris* in India and its implications for conservation' was published in the peer-reviewed research journal Global Ecology and Conservation.

Source to Sea Plastic Expedition

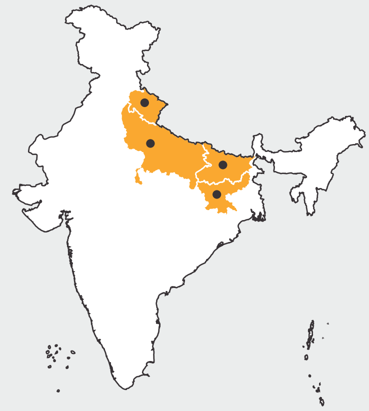
Funding Source
National Geographic Society

Investigators
Dr Anju Baroth, Dr S.A. Hussain, Dr Ruchi Badola, Dr JA Johnson and Dr Bitapi C. Sinha (WII); Heather Koldewey (ZSL), Jenna Jambeck (University of Georgia) and Taylor Maddalene (NGS)

Researchers
Sunanda Bhola, Hina Khatoon, Sumit Sharma and Navin Das

Date of Initiation
March 2019

Date of Completion
December 2020



Objectives: The objective of the project is to understand better and document how plastic waste travels from source to sea and to fill critical knowledge gaps.

Progress: Two expeditions were completed for pre-monsoon (May-June 2019) and post-monsoon (Oct-Dec 2019) to collect water, sediment and air samples for microplastic analysis. The socio-economic surveys conducted for plastic use, management and knowledge, attitudes and behaviour around alternatives to plastic usage in communities. Surveys were also conducted assessing the density of the discarded nets. The workshops were conducted in schools using various techniques to educate them about the current scenario of plastic pollution and motivate them to adopt the 3R (reduce, reuse, recycle) philosophy.

Outputs and Outcomes: New methodology and toolkit are being developed for conducting a similar expedition in other parts of the globe by the international team. The samples are currently being analysed in labs (India and UK) for the presence of microplastics. The data gathered from the socio-economic survey, fish market survey and school education are currently being analysed for various trends. The recommendations will be given to the government and policymakers based on the results and critical gaps in handling plastic pollution issue in India.

Milestone: It was the first international expedition to study plastic pollution from source to sea.

Ecological Impact Assessment of Existing and Proposed Road Infrastructure in Important Wildlife Corridors in India for Strategic Planning of Smart Green Infrastructure

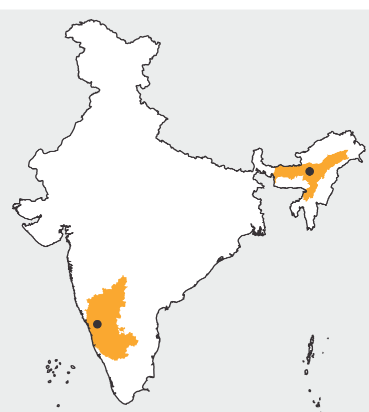
Funding Source
National Tiger Conservation Authority, New Delhi

Investigators
Dr Bilal Habib and Dr Y.V. Jhala

Researchers
Akanksha Saxena, Mahima and Bhanupriya Rabha

Date of Initiation
December 2015

Date of Completion
December 2020



Objectives: The project has the following objectives (i) Assess ecological impacts (direct, indirect and cumulative) of road infrastructure on select wildlife taxa and their habitats within three landscapes in India; (ii) Evaluate the cumulative impacts of existing multiple road developments on conservation values of landscape and integrity of the wildlife corridors in these landscapes; (iii) Assess the implications of future road development in the landscape with special emphasis on wildlife corridor function; and (iv) Provide a regional road development plan based on current and future road development plans to be implemented in the landscape to avoid, reduce and mitigate impacts on areas critical for promoting conservation in the identified landscape.

Progress: Fieldwork to assess the impacts of the state highway 33 or the Mysore-Mananthavadi Highway (MMH) near the Nagarhole Tiger Reserve on wildlife was carried out during December 2018 – May 2019. The study included an assessment of the use of habitat and behaviour of the large mammal community in Nagarhole in response to vehicular traffic on two segments of SH 33 passing through the park.

Fieldwork to assess the impacts of the National Highway 37 circumventing the Kaziranga National Park, Assam, on wildlife was carried out during December 2018 – December 2019. The study included assessment of the characteristics of animal-vehicle collisions on NH 37, including species involved in collisions, hotspots of collisions and corridors most susceptible to collisions.

In Central India, fieldwork to study impacts of the National Highway 44 (earlier 7) passing through the Pench Tiger Reserve has been completed as on December 2019. The study included the assessment of changes in patterns of habitat use by the large mammal community in Pench Tiger Reserve (MP and Maharashtra) in response to traffic on NH 44, assessment of roadkill on NH 44, and behaviour of select species near the highway.

Monitoring of the animal underpasses on National Highway 44 is being carried out as part of the project since February 2019.

Outputs and Outcomes: The study on impacts of SH 33 on mammals in Nagarhole Tiger Reserve was part of an M.Sc. dissertation report entitled "Impacts of road-related disturbances on mammalian and vegetational assemblages: A case study of SH 33 passing through Nagarhole Tiger Reserve, Karnataka". Fortnightly and quarterly reports of the monitoring of animal underpasses on National Highway 44 were regularly submitted to the Forest Department in 2019. A summary of the results of the first year of underpass monitoring was published in the form of an information brochure entitled "Monitoring of Underpass Usage by Wildlife on NH 67 (Now NH 44), Pench Tiger Reserve: A report on the use of animal underpasses by wildlife (2019)". The yearly report for the period from December 2018 to December 2019 was submitted to NTCA.

Milestone: Monitoring of India's first animal underpasses was carried out this year as part of the project. The research team obtained 5,450 photo captures of 18 wild animal species during the year, including 89 tiger crossings of 11 individuals. The findings from the monitoring were published in the form of an information brochure.

State of India's Birds Report

Funding Source
WII Grant-in-Aid; Foundation for Ecological Security; National Centre for Biological Sciences; and Nature Conservation Foundation

Collaborating Agency
ATREE, BNHS, FES, NCF, NBA, NCBS, SACON, Wetlands International, WWF

Investigators
Dr Monica Kaushik, Dr Sutirtha Dutta, Dr Suresh Kumar, Dr Malvika Onial, Dr Gautam Talukdar, Dr Gopi G.V., Dr Manoj Nair, Shri Qamar Qureshi and Dr Vishnupriya Kolipakam (WII); Dr Ashwin Vishwanathan, Dr Suhel Quader, Dr M. D. Madhusudan, Dr Kulbhushan Suryawanshi and team (Collaborating Agencies)

Date of Initiation
2019

Date of Completion
2020

Objectives: Very little information exists on the status of common birds of India. This report aims at presenting the first comprehensive assessment of the distribution range, trends in abundance, and conservation status for most of the bird species that regularly occur in India. Work is completed, and the report has been published.

Progress and Outcomes: This report assesses the status of 867 bird species using data uploaded by birdwatchers to the online platform eBird. This assessment is based on three indices. Two are indices of change in abundance: Long-term trend (*i.e.* over 25+ years); and Current annual trend (*i.e.* over the past five years); and the third is a measure of distribution range size. Of the 261 species for which long-term trends could be determined (*i.e.* not uncertain or data deficient), 52% have declined since the year 2000, with 22% declining strongly. In all, 43% of species showed a stable long-term trend, and 5% showed an increasing trend. Current annual trends could be estimated for 146 species (excluding those Uncertain or Data Deficient). Of these, nearly 80% are declining, with almost 50% declining strongly. Just over 6% are stable, and a 14% increase.

The range size of all but 6 species was estimated. Most species (46%) have Moderate range sizes. A further 33% have Large or Very Large range sizes, and 21% have Restricted or Very Restricted range sizes. Using these three indices together with the IUCN Red List, each species was classified on conservation concern for India, *i.e.* 442 into Low Concern; 319 into Moderate Concern; and 101 into High Concern. Species of High Concern include those whose abundance indices have declined considerably in the long-term and continue to decline today. Species were also categorised as High Concern if their current range is Very Restricted, or if their abundance trend could not be assessed, but they were classified as globally threatened in the IUCN Red List. Of the species in the high category of conservation concern, 26% (26 species) were classified as globally 'Least Concern' by the IUCN Red List 2019. On the other hand, 7 species considered globally 'Near Threatened' or 'Vulnerable' were classified as being of Low Concern in India through this assessment.

Understanding Disturbance Impacts on Psychological, Nutritional Health and their Effects on Reproductive Capacity of Wild Tigers in the Terai-Arc Landscape

Funding Source
Grant-in-Aid

Investigators
Dr Samrat Mondol and
Dr Bivash Pandav

Researcher
Shiv Kumari Patel

Date of Initiation
April 2017

Date of Completion
January 2021

Objectives: The project has the following objectives (i) How stress physiology of wild tigers differs in different tiger habitats across Terai-Arc Landscape (TAL)? (ii) Do wild tigers experience a different level of nutritional stress in different tiger habitats?

Progress: The faecal samples were collected from all the national parks, tiger reserves and connecting areas in the Terai Arc Landscape. Based on previous information, grid cells of about 166 km^2 was superimposed on the entire study area. Only those grid cells containing a minimum forest-patch size of 10 km^2 and more than 10% of overall forest cover was extensively sampled. All faeces collected are stored at -20°C till further processing.

In the laboratory, the outer surface of each frozen faecal sample was swabbed for DNA using a PBS saturated cotton swab and then extracted and amplified for species, individual and sex identification. The samples were then thawed, pulverized and oven-dried at 60°C for 72 hours. The dried faecal powder was sifted, remixed and then extracted in 70% ethanol.

Outputs and Outcomes: The research team conducted extensive surveys in this Landscape. The team collected more than 700 tigers conformed faecal samples from Rajaji National Park, Terai East, West and Central Forest Divisions, Haldwani Forest Division, Champawat Forest Division of Uttarakhand. Amangarh Tiger Reserve, Dudhwa and Pilibhit Complex, Suhelwa and Sohagibarwa Wildlife Sanctuary in Uttar Pradesh and Valmiki Tiger Reserve in Bihar.

During the validation process, the research team conducted experiments to assess the possible influence of soil and other inorganic matter (IOM) present in faecal samples on hormone metabolite measures. The issue of differential IOM presence and its influence on hormone metabolite measure has never been addressed before. A manuscript titled "Effects of faecal inorganic contents inaccurate measures of stress and nutrition hormone in large felines: implications for physiological assessments in free-ranging animals" is ready for submission, it addresses the issue mentioned above, and counter-measures.

After normalizing the influence of IOM, the team conducted a preliminary analysis comparing mean levels GC and T3 metabolites between major tiger reserves. Sample collection and lab standardization were done during the reporting period. Data generation and analysis is still in progress.

Milestone: During the reporting period, the team processed and extracted additional 223 samples increasing the sample size to 373. Assays for both GC and T3 metabolites were performed using a validated procedure for 193 samples representing major tiger reserves of TAL.

Spatio-temporal and Thermal Ecology of Indian python, *Python molurus molurus*, Linn. 1758 in Moyar River Valley, Tamil Nadu

Funding Source
Science and Engineering Research Board, Department of Science and Technology

Investigators
Dr Ramesh Chinnasamy, Dr Gautam Talukdar and Dr Abhijit Das

Researchers
Vishnu C.S. and Tirumurugan V.

Date of Initiation
March 2017

Date of Completion
March 2021

Objectives: The objectives of the project are to (i) determine movement pattern and home range characteristics of Pythons; (ii) generate information on relocated pythons; (iii) document the thermoregulatory behaviour and compared the previous study in northern India; and (iv) generate information of python distribution and people perception towards snakes.

Progress: In India, this is the second snake telemetry study and first python telemetry study. Total 20 pythons proposed for telemetry study out of which in 14 pythons (9 males and five females), the transmitters and i-buttons implanted successfully; remaining six pythons' transmitter implantation process plan to be planted soon. An M.Sc. dissertation was completed in Zoology. The title of the dissertation was "Movement pattern and mating in Indian Rock Python at Moyar River Valley, Tamil Nadu." Data related to movement pattern, home range characteristics, and information on relocated pythons, including homing distance details data collection is in progress in the field.

Thermoregulation- I buttons- Python body temperature data and hobo temp data retrieved at the end of the study. The temperature changes during feeding, digestion, and mating observation will be compared. So far, a total of 14 python's faecal samples have been collected. At the end of the field study, the trico-taxonomy method will be used to identify the prey species of pythons. The existing studies and information on thermo-regulatory behaviour of Indian pythons in northern India were compiled, and the same was published in the peer-reviewed journal. The results would be compared with southern India python's behaviour to know behaviour different according to climatic variations.

Outputs and Outcomes: An M.Sc. dissertation was completed in this project. The title of the dissertation was "Understanding the dynamics of human-snake Interaction: A study of Indigenous perceptions in and around Moyar River Valley, Tamil Nadu, India." Based on the field data, python distribution modelling in various types of vegetation and habitat is being prepared for SCI journal. First time in this study, it was recorded that the smallest adult male (198 cm TL) was mating with females. This is vital information for this species' biology and is being prepared for publication. 'Sympatric predators: In India, the first-time python scavenged by Mugger Crocodile' recorded in this landscape and these notes were published in Herpetological Review-Journal. The study results showed sexual dimorphism exists in Indian Python. Total of 30 reptile species was recorded during surveys. Photographic evidence is available for most species except few.

Milestone: So far, a total of 14 Indian python's transmitter and i-buttons implantation surgery processes were completed. Several new observations and field data are being recorded in these pythons. The study results are important that may be used to reduce human-snake negative interaction in the country.

Tiger Recovery Strategy and Long-term Monitoring in Sahyadri Tiger Reserve, Maharashtra

Funding Source
Sahyadri Tiger Conservation and National Tiger Conservation Authority

Investigators
Dr K. Ramesh and Shri Satyajit Gujar

Researchers
Shah Nawaz Jelil, Avinash Gaykar and Natasha Girkar

Date of Initiation
April 2016

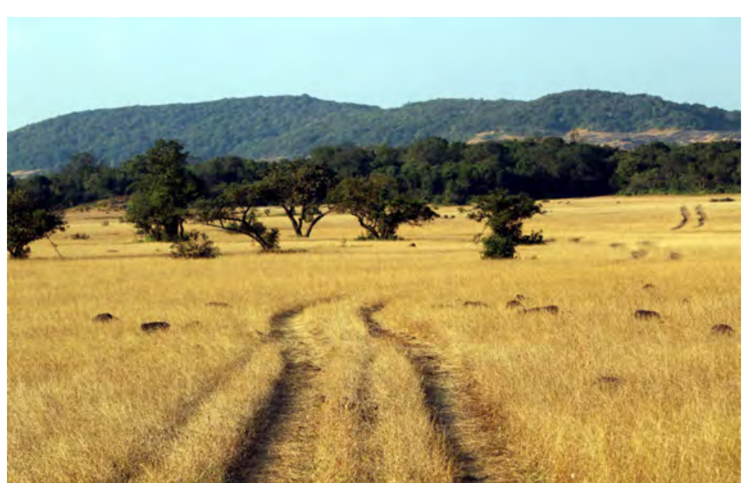
Date of Completion
March 2021

Objectives: The objectives of the project are to (i) conduct feasibility analyses of the area in the context of current habitat condition, natural colonization possibility and social acceptance; (ii) undertake to monitor of prey species and tiger populations looking into movement pattern, population growth, behaviour, genetic structure and physiological profile. (iii) estimate population size of tiger, co-predator and prey species and model the habitat correlated to understand the species habitat relationship and support the ongoing Phase IV monitoring activity; (iv) map landscape composition and configuration, and estimate patch properties, connectivity, landscape permeability and spatial conservation prioritization within and across the landscape; and (v) quantify human-wildlife interface issues, and ecological correlates liked to economics and system services.

Progress: The first objective has been accomplished. The feasibility study was completed, and the report had also been submitted to all concerned in 2018. Recently, an interim technical report, summarizing the work done from 2018 to early 2020 has also been submitted to the concerned forest department. Regular monitoring in the form of opportunistic sign surveys, standard line transects and camera trapping, in tiger reserve has been continued. During the reporting period, modelling prey density within the tiger reserve (using random encounter modelling REM framework) and habitat in the larger Sahyadri landscape was undertaken.

Outputs and Outcomes: For the reporting period, the camera trapping effort totalled 7,682 trap nights and captured 23 mammal species belonging to 13 families. Wild boar was the most captured mammal species (18.78/100 trap nights), followed by Indian gaur (11.23). Among felids, leopards had the highest capture rate of 5.53. No tiger was captured in the year 2019. Only one canid, the dhole (0.52) was captured. Small Indian civet was the highest captured civet species (2.46); and the least captured was the brown palm civet (0.14).

Previously, comparisons between encounter rates from line transect and capture rates of camera traps revealed that density estimates derived from line transect sampling were inaccurate and highly under-estimated. The research team hence estimated prey density based on the Random Encounter Modelling (REM) using the camera trap data. The team derived individual ungulate species densities for all three years



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separately. Accordingly, Rey densities (95% CI) were estimated. Using Sentinel-2A, DEM, Landsat-8 data, the research mapped eight important variables necessary to support tiger recovery - elevation, slope, aspect, land-use, vegetation cover, water index (NDWI), nightlight and human footprint.

Milestone: The research team successfully adopted the REM framework in the field and estimated the prey densities. It was done for the first time for this landscape, and the team intends to continue estimating prey densities in the future using this framework. All relevant spatial layers for corridor connectivity were ready for analyses. After completing feasibility analyses and bridging the knowledge gap, the project is now prepared for the next phase of recovery activities.

Tiger Reintroduction and Recovery Program in Panna Tiger Reserve and the Landscape Complex, Madhya Pradesh: Phase II

Funding Source
National Tiger Conservation Authority and Madhya Pradesh Forest Department

Investigators
Dr K. Ramesh, Dr J.A. Johnson and Shri Subhranjan Sen

Researchers
Supratim Dutta and Kamana Pokhariya

Date of Initiation
February 2015

Date of Completion
March 2021

Objectives: The objective of the project is to (i) Monitor and study the population growth of translocated/re-established tiger population in Panna Tiger Reserve, including their genetic variation and physiological profile; (ii) Understand the dynamics of co-predator and prey populations in relation to tiger occupancy pattern, food habits, habitat association and other management interventions; (iii) study landscape ecology of tiger and ranging patterns incorporating human interface issues such as human use of core and buffer, poaching pressure and ecological correlates linked to economics and system services, including water sources and stream ecology; and (iv) upgrade the skills of PTR staff to independently execute the Phase IV tiger monitoring in next two years.

Progress: The first and fourth objectives were fully accomplished, while the other two objectives are near completion. Phase IV report was submitted to the forest department. Monitoring activities, *i.e.* sign surveys, line transects and camera trapping, in tiger reserve were continued. Fieldwork to study the vegetation type and mapping of forest type was conducted.

Outputs and Outcomes: For the reporting period, the camera trapping effort totalled 8,192 trap nights in the core area. From the total 466 tiger photo captures obtained during phase IV camera trapping (2019-20), a total of 39 tigers (both adult and sub-adult) were uniquely identified. The best fit model in the R interface estimated tiger density to be 6.05±0.9 per 100 sq km, which was the highest density since tiger reintroduction in 2009 and reflected the number that existed in PTR during 2001-2002. Nine radio-collared tigers were regularly tracked using radio-telemetry to monitor their movement and observe their home ranges. Tiger locations were collected by triangulation and home in methods. Later the triangulated locations were analyzed by Locate III software to get the actual position of tigers.

During the reporting period, a total of 144 transects were walked in January and effort length was 864 km. Results showed the density of all the prey species was 48.79±4.36/km^2. During the winter season of the reporting period, when the whole PTR was sampled, the tiger was estimated to be occupying 47% and leopard 71%.

Milestone: The project has accomplished the main objectives of ensuring a viable population of the tiger after it got extirpated in 2009. Not only it achieved the past density after ten years of reintroduction, the project also ensured that necessary technical and management capacities are available locally. After reaching the carrying capacity, the tiger population is showing dispersal behaviour while still space is left in the area. Further investigation led to the identification of land surface temperature to influence actual occupancy and movement of the tiger in Panna Tiger Reserve.

Development of Landscape Management Plan and Monitoring with reference to Ken-Betwa River Link Project in Panna Tiger Reserve, Madhya Pradesh

Funding Source
National Water Development Agency, Government of India

Investigators
Dr K Ramesh, Dr JA Johnson and Dr Abhijit Das

Researchers
Satyam Verma, Manjari Malviya, R. Rajasekar, Sankarshan Chaudhary, Amit Kaushik, Dibyendu Biswas, Nazrukh Sherwani, Ajay Singh, Babu Lakhan, Priyanka Das, Pallabi Mitra, Susmita Khan, Vishal Kumar Prasad, Rahul Gandhi and Priyanka Kumari

Date of Initiation
April 2018

Date of Completion
March 2021

Objectives: The objectives of the project are to (i) Undertake landscape-level assessment for the status of tiger, co-predator, prey species and habitat quality in the entire landscape including as Nauradehi Wildlife Sanctuary (WLS) and Rani Durgawati WLS in Madhya Pradesh, and Ranipur WLS and Mahavir Swami WLS in Uttar Pradesh; (ii) Map the nest site availability (existing as well as potential) of vultures and their ranging pattern in and around Panna Tiger Reserve; (iii) Map surface water resources and study the distribution and abundance of aquatic indicator species in Ken river; (iv) Quantify multi-taxa distribution and abundance in Panna Tiger Reserve and map the biodiversity values along spatial context linked to various zones of impact; (v) Document and establish a baseline of socio-economic conditions of the people in the landscape; and (vi) Suggest mitigation measures to reduce/ minimize the negative impacts of KBLC project.

Progress: During the second year of the project, the camera trapping exercise was completed in the entire landscape. Camera trap data so obtained were sorted and analyzed to observe the presence of tiger, co predator and prey species, as well as, understand the mammalian diversity in the landscape. Camera trapping of submergence zone and highways passing through PTR was initiated. Line-transect based vegetation and disturbance survey were also completed for the entire landscape, including PTR, and data analyzed. Data loggers were installed in PTR to measure climatic variables. Vulture Occupancy Survey was conducted in the landscape and initiated in PTR with a focus on tree nesting species. Behavioural study and population estimation of vultures, in PTR, was also initiated. Multiple spatial layers were generated for the landscape. Groundwater potential zones and Micro-watersheds for the entire landscape, including PTR, were delineated. Based on which, aquatic indicator species sampling was started in Ken river within PTR. Multi-taxa assessment of relocated villages within PTR was also initiated. The socio-economic survey was completed in the landscape, data entered and analyzed. A series of consultation workshops were also organized. First, at range level to understand grass root level issues, faced by forest staff and local communities. And then at the landscape-level, to get inputs of expert and stakeholders on the work that has already been done in phase I and the proposed data collection strategy for phase II.

Outputs and Outcomes: Analyses of camera trap data from the first phase (landscape excluding PTR) revealed the presence of 31 mammal species in the landscape; of which 11 are carnivores, and 20 are herbivores. Tiger capture rate was very low. Capture rate of livestock and human was high throughout the landscape, indicating high anthropogenic pressure on the forest. A total of 144 species (54 families) of vegetation lifeforms have been recorded from the landscape. Mean seedling density ranges from highest (2,590 ind/ha) in Nauradehi WLS and lowest (532 ind/ha) in Rewa Forest Division. In all the forest divisions, the highest number of individuals were recorded in the seedling girth class (<10 cm) and the least number of individuals in the most mature class (>150cm). Five invasive herb species have been recorded in the landscape. A single invasive shrub species lantana camara has also been recorded in almost the whole of the landscape.

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The anthropogenic disturbance was recorded in all of the forest divisions. Comparison of NDVI classes revealed that agriculture was the most dominant class. Habitat suitability analyses results suggest that apart from protected areas in the landscape, there is an important tiger suitable habitat in the landscape, which can be identified and developed into satellite cores. These area form parts of South Panna, North Panna, Satna and Chattarpur forest divisions. A total of 2,904 vultures belonging to seven species viz. Indian Long-billed vulture, *Gyps indicus*, White-rumped vulture, *Gyps bengalensis*, Red-headed vulture, *Sarcogyps calvus*, Egyptian vulture, *Neophron percnopterus*, Cinereous vulture, *Aegypius monachus*, Eurasian griffon, *Gyps fulvul*, and Himalayan griffon, *Gyps himalayensis* were recorded in the landscape.

With the help of NDWI, a total of 19,960 surface water bodies in the landscape were identified, including ponds, rivers, canals and small check dams. With the help of drainage density perennial and non-perennial rivers in the landscape have been delineated. In Panna landscape, the area of valley fills, and river banks exhibited very good groundwater potential zones. Moderate potential zones are located in the fallow land and areas with a gentle slope. The low potential zones typically are located in the moderate-steep slope areas. Overall, 33 different species of fishes were recorded in Ken river, within PTR. Twenty-six Muggers were sighted in PTR core, eleven in Ken Gharial Sanctuary and one Bariarpur Dam. However, no direct sighting of Gharials, *Gavialis gangeticus* was recorded. Two nesting sites of Muggers, *Crocodylus palustris* were also recorded in Ken Gharial Sanctuary. Six additional herpetofauna species were recorded in PTR, which takes the consolidated species inventory of herpetofauna of PTR to 60 species.

The households in the landscape were found to be dependent mostly on natural resources for their livelihood, for example, agriculture, animal husbandry, bidi making, fuelwood selling, basket making, Non-Timber Forest Product (NTFP) collection, etc. Forest dependency was found to be high as almost 80.75% of the households reported that they extract timber from the forest, around 90.76% households reported dependence on fuelwood and 47.59% sampled households reported dependence on NTFPs. Leopard and wolf were reported causing most domestic animal mortalities; nilgai and wild boars were found to be the main crop raiders. Most of the people don't apply for any kind of compensation.

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During the landscape-level workshop, various suggestions regarding the project output so far and planned activities for each of the eight conservation/ management plans were received from experts and forest officials.

Milestone: The framework and the methodological approach of developing the management plan have received the endorsement from the key stakeholders and field functionaries. The field team has accomplished the landscape - level survey on major thematic groups. Stakeholder workshops for officers and local communities have been completed, which has given further insights on the strategies to be followed and resources to be allocated, and these shall be incorporated in the landscape management plan.

Influence of Micro-Climatic Variables on Herbaceous Plant Communities in Treeline Ecotone in the Himalaya

Funding Source
NMHS, New Delhi through CHEA, Nainital

Investigator
Dr B.S. Adhikari

Researcher
Rahul Kumar

Date of Initiation
April 2016

Date of Completion
March 2021

Objective: The objective of the project is to understand the impact of depletion of snow-melt water on the growth of grassland species composition and selected functional processes.

Progress and Outcomes: The focus of the present study is to understand the influence of snowmelt water on species composition; diversity; richness; phenology; and biomass of different alpine plant communities constitute alpine meadows. The study is being conducted in timberline ecotone Sokharak, Tungnath, which lies on the southern fringe of Kedarnath Wildlife Sanctuary. Two major communities, *viz.* Trachydium and Mixed herbaceous communities were selected as permanent sites to monitor structure, composition and phenology of herbaceous species.

A rapid preliminary sampling was done for vegetation survey by laying a plot of 20x20m in each community. Four, 1x1m plot was laid to count individuals of each species at each corner of the plot. The soil samples were collected from sites randomly down to 20 cm and brought for Physico-chemical analysis. The phenological events have been recorded, such as vegetative growth (*i.e.* start of shoot elongation); reproductive stages (*i.e.* flower buds swelling, flower open, flower senescent and fruit ripe) following BBCH scale. Under different snow manipulation conditions, *i.e.* Control plot, Snow free plots, Snow addition and Snow free and in Open Top Chamber (OTC) at Sokharak monitoring of vegetation to see the growth pattern of different species is underway.

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Development of Conservation Action Plan for Ganges River Dolphins

Funding Source
CAMPA-MoEFCC

Investigators
Shri Qamar Qureshi, Dr Vishnupriya Kolipakam, Dr S.A. Hussain, Dr Bitapi Sinha, Dr Ruchi Badola

Researchers
Dr Abdul Wakid, Dr Rashid Raza, Shovana Ray, Vineet Singh, Sajal Sharma, Sunny Deori, Merin Jacob, Gargi Roy Choudhury, Kanad Roy, Abhishek B, Harshini Jhala, Hiyashri Sharma, Ayan Dutt, Anurag Rokade, Madhavi, Bhavna Pant, Sneha Mane, Vishruta Rao, Rajat Rastogi, Ranjana Negi, Aaranya Sekharan, Gautam, Abhijit Konwar, Jitul Kalita, Subhasree Das, Karuna, Tabassum

Date of Initiation
April 2016

Date of Completion
March 2021

Objectives: The objectives of the project are to (i) develop robust monitoring protocol for dolphins; (ii) Status of associated river fauna like Gharial, Otter, Turtles and Fishes; (iii) Quality assessment of threats to dolphin population and habitat – development of mitigation strategies; and (iv) Involve stakeholders to develop a network which will assist in dolphin conservation.

Progress and Outcomes: *Ecological Monitoring*: A comparative study was carried out in the 92 km protected Kaziranga National Park, and the 84 km unprotected Goalpara-Dubri stretch to understand the effect of protection regimes. In these two sites, the research team assessed how population dynamics of dolphins vary between sites and assessed the habitat use by dolphins.

There was a double observer method under the mark-recapture framework to estimate abundances and to standardize the population estimate methodology. It was also to standardize the methodology for abundance estimation.

The average estimated population was 125±14.05 in Kaziranga and 112±20.04 in Goalpara-Dubri. The encounter rate was found to be 3.49±0.38 in Kaziranga and 1.95±0.41in Goalpara. The calf to non-calf ratio was 1.03: 0.13 in Kaziranga and Goalpara-Dubri, respectively, suggesting a low recruitment rate in Goalpara-Dubri. This pattern seems to be consistent over the years, where Kaziranga shows a higher recruitment rate than other stretches. The low non-calf: calf ratio at Goalpara-Dubri stretch, could be due to the higher human-induced calf mortalities, as there is the higher human use of this area than Kaziranga. Dolphins are long-living species with low reproduction rates. Since this population is small, there is a low growth rate, and non–calf: calf ratio is also very small, this indicates the vulnerability of the population.

Acoustics: Despite being a surface breather, dolphin's surfacing occurs every 30-120 sec, and this surfacing lasts for less than 3-5 seconds. Given that they constant vocalise for their movement, foraging and other behaviour, due to almost complete blindness, acoustics presents an ideal tool to monitor this species. The research team deployed C-Porpoise Detector (hereafter "CPOD), a hydrophone instruments used to record acoustic signals emitted by dolphin called "Click". These recordings enable us to understand through passive recordings, the time spent in a particular habitat (intensity of use or preference), and dolphins response to any anthropogenic activity (response vs non-response). The team characterized the acoustic nature of Ganges river dolphin vocalisations. The team examined which habitats they used more intensively, and examined their response in conditions of boat movement. Four representative study sites were sampled, a 60 km stretch in Golapara-Dhubri, 86 km in Kaziranga National Park, 92 km in Hooghly and 10 km in Kulsi during the study months.

A total of 5,985 hours of acoustic recording was obtained for analysis. Three parameters were considered to study the acoustic signature of dolphins, namely, sound pressure level - SPL (a measure of the loudness of a sound), modal frequency (most repeated frequency or number of cycles recorded per second) and inter click interval- ICI (time difference between two clicks in a single click train). The sound pressure level (SPL) helps in determining the sensitivity of the dolphin hearing. Based on the modal frequency data obtained from C-PODs, the river dolphins were found to be producing clicks within a frequency range of 23 and 169 kHz. Based on the acoustic analysis, it was found that dolphins prefer confluences, meanders and mid-channel islands.

For the acoustic response with the boat passage, it was found that the SPL increases when a boat passes, *i.e.* dolphins vocalise louder when boats pass, and there is a change in higher frequency usage. But inter-click interval does not show any considerable change.

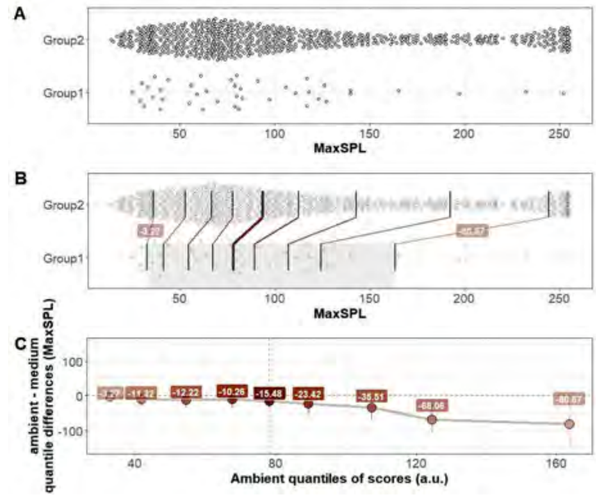

Figure: Difference in sound pressure level before and during boat passages (p=0.003) (based on shift function). Here the Group one is ambient noise and Group two is Medium boats. There is a shift in the higher SPL ranges by 80%, indicating dolphins call louder. Similar pattern was observed for all boat size classes.

Community Engagement: To maintain river health and eventually conserve the river dolphins, adopting sustainable fishing practices and conservation efforts for the species are imperative. To form the baseline for formulating these strategies, the team assessed community viewpoints in villages of two focal places in West Bengal, Farakka and Diamond Harbour. Cases of using dolphin oil as bait were present in both the villages, though it was triggered following an accidental net entanglement of dolphins in the fishing net. The killing of dolphin by accidental net entanglement dolphin and associated oil trade is much more prevalent in villages across Malda-Murshidabad districts. Trading of dolphin carcasses was prevalent at both sites. From the last 30 years, synthetic thread nets are used replacing cotton fishing nets. Due to commercial and easy availability, any person capable of buying fishing nets are taking up fishing, and it is no more traditional employment. With a change in this system, fishing is rampant in all seasons and impacting the dynamics of all aquatic communities. Long-term advocacy campaigns are required to elicit attitudinal changes. Successive outreach designs are undergoing in these villages to address this issue.

Dolphin Conservation Network (DCN) was established in Assam. The communities contribute and participate in monitoring river dolphin and its habitat in DCN. This network is comprised of volunteers from the local fishing communities. According to the previous data provided by this network's monitoring, lack of sustainable fishing practices and awareness about basic features of river dolphins were evident. It was also observed that Fishery Rules and Regulations were not correctly followed and implemented throughout Assam. A series of awareness programs with fishermen and students from river-side villages were designed in collaboration with the State Fishery Department to raise awareness regarding the Assam Fishery Act (1953) and overall river conservation.

Milestones: Dolphins prefer confluences, meanders and mid-channel islands. This is the first-ever information forming the baseline on acoustic characteristics of Ganges river dolphin vocalization from extensive field data. There is evidence regarding the effect of ship traffic on dolphin vocalization, where the research team saw a shift in SPL (*i.e.* loudness) and frequency during movement of boats.

Assessment and Conservation Practices of Pollinators through Community Participation in the Indian Trans-Himalayan Region: Climate Change Perspective

Funding Source
Ministry of Environment, Forest and Climate Change, Govt. of India

Investigator
Dr V.P. Uniyal

Researchers
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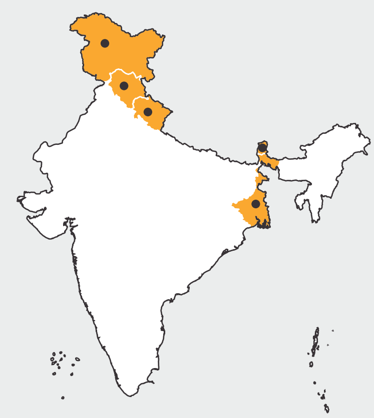
Date of Initiation
April 2018

Date of Completion
March 2021



Objectives: The project has the following objectives (i) Assessment: Impact of land-use changes on the pollinators and the risks associated with the loss of pollination services; (ii) Adaptive Management: Identifying the best management practices and technologies to overcome declines in pollinators; (iii) Capacity Building: Build and strengthen alliances and expertise to increase the benefits from pollination; and (iv) Mainstreaming: Supporting national plans for the conservation and sustainable use of pollinators and increasing the awareness of governments, industry and the public.

Progress: During the study period, 97% of organic farming was being practised by the farmers of Leh-Ladakh with quality knowledge regarding pollination and pollinating agents were documented with the highest number of major pollinating species. Nine species of Diptera (flies), nine species of Lepidoptera (butterflies) and 34 species of Hymenoptera (bees and wasps) have been identified from Ladakh and Jammu & Kashmir. Six species of *Diptera* (flies), 21 species of *Lepidoptera* (butterflies) and 11 *Hymenoptera* (bees and wasps) have been identified from Mandakini watershed, around Kedarnath Wildlife Sanctuary, Uttarakhand. Two species of *Diptera* (flies), 30 species of *Lepidoptera* (butterflies) and six *Hymenoptera* (bees and wasps) have been identified from Pithoragarh, Uttarakhand. Total of 10 capacity building programmes has been conducted. Total 1,147 beneficiaries were involved in the programme.

Outputs and Outcomes: The reshaping of global biodiversity is one of the most significant impacts humans have had on earth's ecosystems. Human-civilization has a great impact in reshaping of global biodiversity on earth's ecosystems. People were willingly ignoring the impact of human practices on the ecosystem providing sources in Lahaul and Spiti. Therefore, government policies should be applied via

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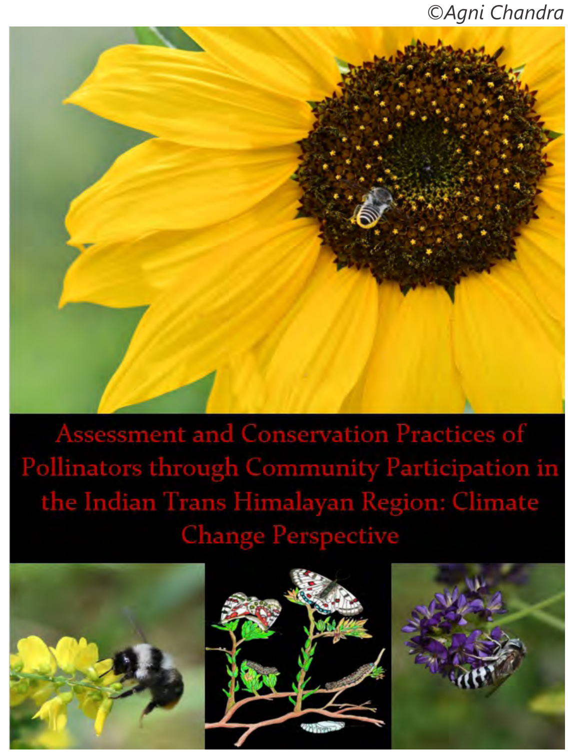

strategic action plans at these locations for sustainable use of the ecosystem. However, people of Leh-Ladakh were found very serious towards conservation policies. People of Lahaul-Spiti were well aware of provisioning services followed by regulating and supporting services and cultural services. However, people of Leh-Ladakh were found quite aware of provisioning services followed by cultural services and regulating and supporting services. Instead of being aware of the role of pollinators and practices that can harm them, inorganic fertilizers and pesticides were intensively used by the farmers to increase the production of cash crops because the farming system proved to be a major or sometimes only income source for them, which is why 71% of inorganic farming was reported from the region. However, 97% of organic farming was being practised by the farmers of Leh-Ladakh as they had attached some spiritual values towards the whole biodiversity and that is the reason why these people were found reverent towards biodiversity conservation.

It was noted that such knowledge of ecosystem services and pollinators importance is typically acquired in biology class at secondary or high schools in the Western Trans-Himalaya. Sustainable farming practices were promoted through workshops in the fragile Himalayan ecosystem to protect ecological integrity and ecosystem functioning. Thirty-one sampling sites in Leh-Ladakh region in Jammu & Kashmir, Navdanya Biodiversity Conservation Farm in Dehradun district, five villages in Mandakini watershed, around Kedarnath Wildlife Sanctuary and 12 villages in Munsyari block, Pithoragarh district, Uttarakhand were covered.

Milestone: Brochures and pamphlets on the conservation of insect pollinators were distributed in the study area. In all, 128 species of insect pollinators have been identified. Total 21 training/ capacity building programmes/ workshops were conducted for local communities, institutions and administrations in different villages of the study area.

Linking Protected Area Networks and Near Real-Time Rain-Bird Locations with IBIN

Funding Source
Department of Biotechnology

Investigators
Dr Gautam Talukdar and
Dr R Suresh Kumar

Researcher
Debanjan Sarkar

Date of Initiation
March 2018

Date of Completion
March 2021

Objectives: The project has the following objectives (i) To arrive at common schemas and understanding on the data exchange modalities for Protected Areas; (ii) Update the information on PA network (iii) Near real-time monitoring of the "rain bird" predicting the Indian Monsoon and linking it to IBIN.

Progress: The database of protected areas of India has along with the metadata, standard schema & manual of the database will be incorporated into the IBIN web-portal as a web service for further analysis. A detailed literature review has been done to understand the ecology, behaviour of the rain-bird as well as its host species, *Turdoides*. Field survey has been done to identify the habitat and ecology of the bird and its host species. Presence-only distribution modelling has been done to understand the relationship between the rain-bird and the climatic variables.

Outputs and Outcomes: Field survey has identified different locations, *viz.* grasslands, agricultural lands and forest fringes for suitable mist-netting locations during monsoon. The modelling output predicted the species seasonal movement in India, and how the different environmental variables are affecting its movement.

Milestone: The work on distribution modelling of Jacobin Cuckoo has been presented in the National Symposium on Innovations in Geospatial Technology for Sustainable Development with special emphasis on NER, Shillong during November 20-22, 2019.

Mainstreaming Landscape Approach to Biodiversity Conservation, Improved Livelihoods and Ecosystem Health in Kailash Sacred Landscape Part of India

Funding Source
National Mission on Himalayan Studies, MoEFCC, New Delhi through State Biodiversity Board, Uttarakhand

Investigators
Dr B.S. Adhikari and Dr G.S. Rawat

Researcher
Soni Bisht

Date of Initiation
May 2018

Date of Completion
April 2021

Objective: To strengthen community institutions, restoration of degraded habitats and management of ecosystem and identification of critical ecosystems/ habitats/ corridors and suggest evidence-based management plans on Biodiversity Conservation, Improved Livelihoods and Ecosystem Health.

Progress and Outcomes: During the reporting period, the registration was done for the Orchid Conservation Society. Several meetings at village level were conducted with the collaboration of Central Himalayan Environment Association (CHEA) and SBB in Lumti as well as awareness programmes were also conducted for local villagers of Baram, Lumti, Maitli, Bangapani and Jara villages including Primary and Higher Secondary Schools in KSL part of India. In OCA, the most common and abundant orchid species were *Aerides multiflora*, *Aerides odorata*, *Bulbophyllum affine*, *Coelogyne ovalis*,

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Eria lasiopetala, *Flickingeria* sp., *Luisia zeylanica*, *Smitinandia micrantha* and *Thunia alba*.

WII plans to upscale the activities with other project partners and local community-based institutions about the restoration of orchid rich sites in Lower Gori valley by developing a map of restoration sites in the landscape, identification of critical ecosystems/ habitats, important biodiversity corridors (including transboundary) in future.

Milestone: Under rehabilitation of degraded sites, a total of six orchid species were relocated *viz.* Bulbophyllum careyanum, Coelogyne ovalis, Eria spp., Liparis caespitosa, Pholidota articulata, and Vanda cristata to the suitable host trees, *i.e.* Engelhardtia spicata and Toona ciliata. The villagers also uprooted roadside weeds, mainly Eupatorium adenophorum to cease its invasion in the fields and OCA.

Knowledge Support to Development of Guidelines, Specialized Field Studies and Training on Human-Wildlife Conflict Mitigation in India

Funding Source
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Collaborating Agency
Ministry of Environment, Forest and Climate Change, Govt. of India and GIZ

Investigators
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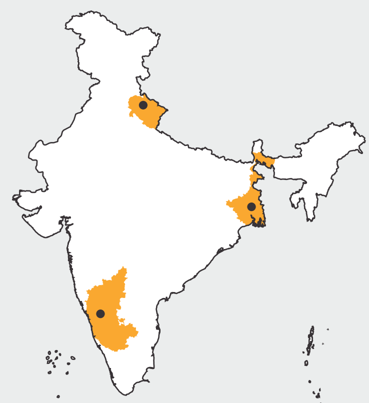
Project Scientists
Dr Upma Manral, Dr Rishi Kumar, Shri Aditya Bisht

Date of Initiation
July 2018

Date of Completion
April 2021



Objectives: The project has the following objectives (i) supporting the development of National Strategy and Action Plan & SOPs, leading the state-level HWC mitigation guidelines for Uttarakhand, and supporting in Karnataka and West Bengal, in a participatory manner engaging all key stakeholders; (ii) support to the database on human-wildlife conflict in India; (iii) specialized field studies and other pilot measures at the project pilot sites in Karnataka, West Bengal and Uttarakhand; and (iv) Implementation of training and other capacity development measures engaging key stakeholders.

Progress: The project has four measures under which various activities and work were conducted as follows:

Project Measure A: *Supporting the development of National Strategy and Action Plan & SOPs, leading the state-level HWC mitigation guidelines for Uttarakhand and supporting in Karnataka and West Bengal, in a participatory manner engaging all key stakeholders*: The names of potential authors' for National Human-Wildlife Conflict Strategy and Action Plan (NAP) and Standard Operating Procedures (SOPs) were finalized with MoEFCC and GIZ, and authors were contacted and made part of the writing process to develop the zero drafts of NAP and SOPs through several meetings/ workshops. Existing guidelines and orders on HWC mitigation were collected from the internet and select SFDs, which were shared with NAP and SOP authors.

Project Measure B: *Support to the database on human-wildlife conflict in India*: The *ex gratia* (for HWC) application format used by various State Forest Departments were compiled and shared with GIZ team working on a Centralized data collection system. A brief write-up and templates (excel sheets) were prepared for centralized online database for wildlife attacks on human (death and injury), livestock depredation, crop-raiding, property damage and socio-economic profile of affected households.

Project Measures C: *Specialized field studies and other pilot measures at the project pilot sites in*

Karnataka, West Bengal and Uttarakhand: Project teams at WII and GIZ discussed the possibilities of conducting various studies to fill information gaps in the NAP and SOPs. Four topics were shortlisted with approval from GIZ, *viz.* Crocodile telemetry, Zoonosis associated with Rhesus macaque', 'Filling information gaps on Human-Blacbuck Conflict' and 'Filling information gaps on existing laws and guidelines to mitigate HWC'.

Project Measures D: Implementation of training and other capacity development measures engaging key stakeholders: Along with GIZ, WII organized one-week training on 'Holistic Approach on Human-Wildlife Conflict Mitigation in India' for Divisional Forest Officers and Assistant Divisional Forest Officers of West Bengal, Karnataka and Uttarakhand at Chalsa, North Bengal (29 July 2019 and 2 August 2019), and at Madikeri, Kodagu, Karnataka (22-27 September 2019).

Project staff participated, presented and interacted with various representatives of schools during the workshop on 'Role of Educational Institutions in Wildlife Conservation and Human-Wildlife Conflict Mitigation' organized by GIZ at Haridwar on September 7, 2019. One veterinary expert from WII and three from Uttarakhand FD participated in the 'Advanced Course in Wildlife Chemical Immobilization and Field Practice' at the University of Pretoria (co-organized by SANParks) from 3-9 November 2019. A 'Training of Trainers on Training Excellence (Teaching methods)' was organized for faculty members and project scientists from WII during 13-15 March 2020 at Bengaluru. The training programme was contracted to Dale Carnegie, India.

Outputs and Outcomes: Sub-zero drafts for SOPs for conflict mitigation with Indian Gaur, Crocodile, Rhesus macaque, Wild pig, Sloth bear, and Nigari and NAP sub-sections on Occupation health and safety, and Legal framework and challenges have been prepared and shared with GIZ. Curriculum and Training materials for various stakeholders involved in HWC management and mitigation across India were developed and tested in training modules at WII.

Milestone: Fifteen WII faculty and Project Scientists participated in the Dale Carnegie 'Training of Trainers on Teaching Excellence'.

Atlas of Colonial Nesting Waterbirds in the East Coast States of India

Funding Source
Grant-in-Aid

Investigators
Dr Gopi G.V. and
Dr Bivash Pandav

Researchers
Frank Sadrack Jabaraj D and
Sumit K Arya

Date of Initiation
April 2017

Date of Completion
April 2021

Objectives: The objectives of the project are to (i) Conduct a statewide survey for documenting the existing nesting waterbird colonies; (ii) Raise baseline ecological information about each of the nesting colonies; (iii) Assess the conservation threats to these identified colonial waterbird colonies, and (iv) Distinguish key colonial areas based on the number of species as well as number of threatened species.

Progress: The study was conducted across the state of Tamil Nadu, which is divided into three broad physiographic regions namely, the western hilly region, the plains along the coast and the northwestern high elevation area during both the season, *i.e.* South-west and Northeast monsoon. Approx > 60,000 km spanning across the 35 districts of Tamil Nadu were surveyed covering major wetlands (lakes, ponds, rivers) for the presence of waterbird breeding colonies. Information pertaining to the nesting area, activity period in the nesting site, nest trees used, nesting species, number of nests and conservation threats were collected during nesting season. Detailed photo documentation for the nesting sites and species were recorded.

Outputs and Outcomes: Along with the previously existing heronries, additionally 30 heronries were identified, taking the total to 101 heronries (21 districts) across the state during the remaining survey period. Apart from the ecological data other details pertaining to ownership and maintenance such as type of wetland, age of the water body, purpose of the wetland, regular maintenance, infrastructure around the water body, villages around and dependence of people were also collected for each nesting sites. Some of the previous nesting sites have been lost due to monsoon failure, cyclone, removal of nesting trees and human disturbance. With the findings, it is found that hunting, removal of nesting trees, sad mining, natural calamities and encroachment of tanks to be some of the observed threats. *Acacia nilotica*, *Prosopis juliflora*, *Peltophorum pterocarpum*, *Azadiracta indica*, *Tamarindus indicus* etc, were found to be major nesting trees. About 18% of the nesting sites fall under the category of the protected area and 82 % in the non-protected area.

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Milestone: All the districts of Tamil Nadu are taken into account and survey is being conducted in all the districts covering most of the water bodies. Most of the recorded heronries during the current study were recorded for the first time when compared with the previous studies in the state of Tamil Nadu.

Developing Genetic Database to Understand Metapopulation Dynamics and Connectivity of Tigers and Other Large Predators across Tiger Landscape of Maharashtra, India

Funding Source
Maharashtra Forest Department

Investigators
Dr Bilal Habib and
Dr Samrat Mondol

Researchers
Shrushti Modi and Shaheer Khan

Date of Initiation
March 2016

Date of Completion
May 2021

Objectives: The project has the following objectives (i) Develop an exhaustive genetic database of individual tiger, leopard, dhole and sloth bear; (ii) Determine population structure, relatedness and sex ratio of these large carnivores; (iii) Population connectivity rates and direction of gene flow at metapopulation scale; (iv) Identify landscape features, if any, affecting connectivity in this landscape; (v) Understand social dynamics of all these species within this landscape.

Progress: The field sampling for the project has been completed. The database generation for the Asiatic wild dog has been done for the whole landscape. A total of 301 dhole individuals have been identified, and five different sub-population cluster has been determined across the landscape.

Outputs and Outcomes: Microsatellite panel for individual identification of sloth bear has been standardised and validated.

Milestone: During the reporting period, two papers were published titled (i) "Non-invasive DNA-based species and sex identification of Asiatic wild dog, *Cuon alpinus*".
(ii) "Standardization and validation of a panel of cross-species microsatellites to individually identify the Asiatic wild dog *Cuon alpinus*".

Assessment of Climate Change Impacts on Soil Health through Microbial and Plant Communities in Alpine Ecosystems of Indian Himalayan Region (GoI- GEF-UNDP Third NATCOM Project)

Funding Source
United Nations Development Programme (UNDP)

Investigator
Dr Gautam Talukdar

Researcher
Pankaj Tiwari

Date of Initiation
July 2018

Date of Completion
July 2021

Objectives: The project has the following objectives (i) Assess soil health by investigating changes in soil organic carbon, soil CO2 efflux and soil microbial enzymatic activity with respect to climate change; (ii) Understand variations in soil nutrient composition under experimental warming with emphases on C: N ratio; (iii) Evaluate climate change impacts on microbial and plant diversity, community composition, plant biomass and phenology.

Progress: Fifteen experimental warming plots or open-top chambers (OTCs) were installed to simulate climate warming process. Data loggers with temperature sensors have been deployed to monitor hourly air and soil temperatures both in OTCs and in control. Baseline data on soil microbial diversity and relative abundance have been generated. Soil and ecosystem respiration has been intensively monitored from May-October 2019. Changes in soil organic carbon have been observed under experimental warming. Warming induced plant productivity has been assessed by estimating plant biomass inside OTCs.

Outputs and Outcomes: Establishment of experimental warming plots for long-term monitoring of climate warming impacts on soil biological and physio-chemical and ecosystem processes. Baseline data was generated on soil and ecosystem respiration and soil organic carbon.

The Assessment of Impacts of the Proposed Nagpur - Mumbai Super Communication Expressway, Maharashtra, Samriddhi Corridor on Wildlife Values and Measures Recommended to Mitigate Negative Impacts

Funding Source
Maharashtra State Road Development Corporation (MSRDC)

Investigators
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Dr Gautam Talukdar,
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Dr Navendu Page

Subject Matter Specialist
Dr S.P. Goyal

Project Scientists
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Shivam Shrotriya

Researchers
Bhumika P. Morey,
Nakul Markandey and
Nilanjan Basu

Date of Initiation
July 2018

Date of Completion
July 2021

Objectives: The project has the following objectives (i) Identify areas of conservation importance in terms of connectivity, important wildlife habitats and important natural features; (ii) Evaluate habitat, characteristics, species diversity, population and conservation status, habitat use by key wild animal species near proposed alignment; (iii) Based on the observations above suggest a location, type, size and number of the mitigation measures across the alignment of the roads for ensuring permeability in the context of identified key wild animal species; (iv) Provide technical guidance during construction and implementation of mitigation measures; (v) Assist in the monitoring of the effectiveness of the mitigation measures during operation phase; and (vi) Suggest measures for achieving the carbon-neutral goal.

Progress: Data collected during a detailed field survey inside WFAs during January-March 2019 was analysed to know the presence of wildlife for further recommendations towards effective planning of mitigation measure. Mammal sign survey protocol of All India Tiger Monitoring was followed during this survey. However, the survey was not limited to only carnivore species, and the research team included other mammalian fauna in the sampling. The surveys were conducted within the 10 km buffer area on either side of the road within the WFA. The 10 km buffer area was adapted from the MoEFCC guidelines for eco-sensitive zone around the protected areas (http://www.moef.nic.in/downloads/public-information/Annexure%207-15072011. pdf).

The research team generated intensity maps of animal presence to identify the critical locations on the alignment where mitigation measures are required. The suggestions are made in consideration of surrounding habitat and land use land cover to avoid anthropogenic interference and ensure habitat connectivity across the landscape. Following this analysis and report writing, WII had a meeting with MSRDC officials in Nagpur on 25 September 2019, where technical feasibility of the suggested mitigation inside WFAs was discussed. After considering and incorporation suggestions from MSRDC, the report was finalised as Proposed Mitigation Measured in Wildlife Focus Areas along Samruddhi Expressway.

During the 13th meeting of Maharashtra State Board for Wildlife (SBWL) held on 17th January 2020, the above report prepared by WII was tabled for discussion. The members of the committee and the concerned forest officers raised some critical concerns about mitigation structures in some vital wildlife areas. Hence, it was decided to conduct the site inspection to discuss the specific concerns on-site and suggest modifications in the proposed measures, wherever necessary. A team constituting of members of SBWL, Wildlife Institute of India, State Forest Department and MSRDC visited DPR package I on 4 February 2020; DPR package II on 5 February 2020; and DPR package V on 13 March 2020. The SBWL committee and WII will submit their independent site visit reports for finalization of the recommended mitigation measures.

Outputs and Outcomes: During the detailed field survey inside the WFAs, the team recorded a total of 2,941 signs (direct and indirect) of 25 different wildlife species in 564.25 km. Nilgai, Boelaphus tragocamelus was the most commonly encountered species present all across the landscape followed by Chinkara, *Gazella bennettii* and Jungle cat, *Felis chaus*. The team encountered the signs of rare species such as Indian pangolin, *Manis crassicaudata*, Honeybadger, *Mellivora capensis* and Barking deer, *Muntiacus muntjak* as well.

Based on the analysis of data collected during field survey on habitat characterization and presence of various mammal species, the team recommend the expansion of 34 box culverts and specific modifications of 26 structures within and nearby the WFAs. Most of the recommendations are modifications of existing structures proposed by MSRDC with five additional wildlife overpasses (WOP). Six structures as wildlife underpasses (WUP) are recommended outside WFAs since appropriate structures within WFA were not feasible.

***Figure 1:** Species sign density hotspots. The research team generated intensity maps of animal signs to identify the critical locations on the alignment where mitigation measures are required.*

General recommendations: All the wildlife mitigation structures recommended here (box culverts, WOP and WUP) should have a minimum height of 4-5 meters. Median should be kept open at all the wildlife mitigation structures, including box culverts. All the box culverts (n=34) within 35 WFA patches are recommended to convert to the 5 meters span x 4-5 meters in height, wherever possible. The box culverts at 34 chainages are highly important for providing wildlife connectivity within their respective landscapes and should be a priority for expansion. The proposed tunnels are recommended to be landscaped on the top portion for making them conducive for wildlife movement. All the viaducts, bridges (major and minor), wildlife overpasses and underpasses are recommended to have landscaping suitable for wildlife.

Samruddhi expressway is a greenfield project, therefore passes through previously underdeveloped areas. The team summarised the data for land use classes in the region to see how wildlife species were utilising the landscape. The indirect and direct evidence was collected from habitats outside protected areas. Hence, the landscape was a mosaic of territorial forests, human settlements, agriculture, wetlands and plantation. Although the team surveyed the areas which mainly included forest patches and corridors mapped using ecological models, the habitat was highly heterogeneous. The team observed that the presence of wildlife species was high in deciduous forest, degraded scrub forest, wasteland, current fallow and Kharif crop areas. The survey was conducted during harvest and post-harvest season due to which there was a significant presence of wildlife in agricultural patches. Kharif crop fields were not being cultivated during the survey season, leaving these available for wildlife. Indirect evidence found near human habitats suggests that animals in this landscape have to use these areas owing to habitat fragmentation.

The WOP should be either a parabolic-shaped design or straight-edged parabolic design. Parabolic arch design overpass creates better opportunities for wildlife to locate approach ramps. All the structures that are present in WFAs should have proper noise and sound barrier. Noise and sound barrier must be present for 50 meters on either side of the structures.

Milestones: The sign survey data was analysed, and the location and dimension of mitigation measures decided. The draft of the report "Proposed Mitigation Measured in Wildlife Focus Areas along Samruddhi Expressway" prepared. A flyer for wider circulation among forest managers and policymakers was designed.

Protecting and Investing in Natural Capital in Asia and the Pacific under the Knowledge and Support Technical Assistance (KSTA)-9461

Funding Source
Asian Development Bank (ADB)

Investigators
Dr Malvika Onial,
Dr Asha Rajvanshi

Researcher
Sharmistha Singh

Date of Initiation
January 2019

Date of Completion
July 2021

Objectives: The objectives of the project are (i) Highlight the many benefits of green infrastructure to a human society based on the principles that protect and enhance nature and natural processes; (ii) Integrate principles of green growth, and concepts of smart planning into the planning of linear developments in identified sectors; (iii) Optimizing the use of natural capital for the sustainability of natural resources; achieving greater acceptability of development goals in harmony with the natural environment and enhancing the quality of life of people; and (iv) Build capacity of stakeholders in the transportation sector through *inter alia* through training, information sharing and highlighting best practices in the field of green linear infrastructure.

Progress: A one-week international training workshop was organized at WII from 15-19 July 2019 to build capacity for conserving and managing natural capital during the planning and implementation of transportation projects in South Asia. The course was endorsed by IAIA, and the officials from ADB attended the course as observers. Twenty participants from Bangladesh, Bhutan, India, Nepal and Sri Lanka representing sectoral development agencies for roads and highways, railways as well as from development banks attended this programme. The course received excellent feedback. Production of an audio-visual adaptation and enrichment of the manual 'Eco-friendly Measures to Mitigate Impacts of Linear Infrastructure on Wildlife' is also being conceptualized through a consultative process.

Outputs and Outcomes: The purpose of the training workshop was to broaden and deepen understanding of issues related to biodiversity conservation and green infrastructure. It sought to build the capacity of individuals and organizations working in the implementation of Green Linear Infrastructure projects in the transportation sector in South Asia. The attendees learned about the principles of smart green infrastructure, transportation ecology and

its relevance, planning road developments in high-value conservation forests. They were briefed about the global development trends in road and rail sectors and challenges for biodiversity conservation. The trainees also learned about the importance of natural capital and ecosystem services in the planning and implementation of transportation projects. The training presented an opportunity for dialogue among stakeholders on the impact of linear infrastructure on animals and context-specific mitigation measures. They were also familiarized with the Strategic Environment Assessment (SEA) as a pro-active approach to avoid reactive mitigation and the importance of offsets.

Milestone: The conceptualization of the Audio-Visual Product (AVP) is underway and includes script-writing through a consultative process and building a database of relevant visuals. Some of the expert's interviews in the webinar series will also be subsumed in the development of this AV Product.

Population Management of Species Involved in Human-Wildlife Conflict

Funding Source
The Ministry of Environment, Forest and Climate Change, Government of India

Investigators
Shri Qamar Qureshi, Dr Y.V. Jhala, Dr Kafil Hussain, Dr Vishnupriya Kolipakam, Dr Lallianpuii Kawlni

Researchers
Project Scientists: Dr Sanath Muliya, Dr Priya Gusain; *Project Fellow*: Uddalak T Bindani, Prashanth Mahajan, Souritra Sharma, Mariyam Nazir; *Project Assistants*: Harshita Prakash, Aditi Karanjkar, Amritesh Dubey, Priyanka Dutta

Date of Initiation
August 2018

Date of Completion
August 2021

Objectives: The project objectives are to (i) understand the ecological aspects of conflict management; (ii) develop appropriate reproductive control techniques to manage the population of certain species below the tolerance level. Currently, four species namely Rhesus macaque, *Macaca mulatta*; nilgai, *Boselaphus tragocamelus*; Wild pig, *Sus scrofa*; and Elephant, *Elephas maximus* were identified as the focal species.

Progress: Among various reproductive control methods, immunocontraception using Porcine Zona Pellucida (PZP) vaccine has been proven useful in managing various wild animal populations abroad. Therefore, the PZP vaccine was selected for trials on focal species in the first phase of the study. Since the vaccine and raw materials required to produce them are unavailable in India, MoU was signed with organizations that can cater to the requirements for technical expertise as well as the supply of vaccine for initial trials.

The study requires concurrent vaccination trials in captivity as well as free-ranging setups to evaluate the efficacy and applicability of vaccines in focal species. For this purpose, letters seeking permissions to carry out capture, handling, health assessment, collaring and PZP field trials have been communicated to concerned forest departments. The project scientists have also visited the relevant State Forest Department to expedite the process. An extensive study to understand optimal demographic age and sex ratios were initiated in Uttarakhand for Rhesus macaques and Karnataka for elephants. Additionally, telemetry studies were also initiated in Rhesus macaques and elephants to assess the ranging patterns, resource use, social organization and ethology.

Apart from fieldwork, implementation of immunocontraception also involves extensive laboratory analysis. Based on inputs from experts and personal visits by the project team, an advanced 'Reproductive Ecology Laboratory' was designed and prepared with its construction initiated. Additional human resources were hired to carry out laboratory activities and also to extend the fieldwork to focal sites in the state of Uttarakhand, Karnataka and Madhya Pradesh.

Outputs and Outcomes: Administrative approval to carry out the project work was secured from Uttarakhand (Rhesus macaques), Karnataka (Elephants and wild pigs), and Madhya Pradesh (nilgai and wild pig). Additionally, permissions to initiate the captive trials on nilgai have also been secured from Zoo Authority of Karnataka and Central Zoo Authority.

Extensive demographic data for Rhesus macaques in Chandrabani, Dehradun, a mosaic of forest, urban and rural habitats has been collected. Additionally, based on radio telemetry in 4 females (one each from study troop), information on ranging patterns, resource use, social organization and behavioural aspects were also established. Further, laboratory studies for gender identification, reproductive endocrinology and nutritional diet estimation have been initiated with the help of existing facilities at the institute. It was found that the Rhesus macaques foraged on at least 57 species of plants, constituting 17 herbs (including five species of grass), 16 species of shrubs and 24 species of trees.

Zoonosis is an under-emphasized yet significant subset of HWC and a study, therefore, was initiated. The laboratory team is currently studying the role of macaques in enterobacterial zoonoses by examining the microflora obtained from freshly collected faeces and their role in maintenance and transmission of antimicrobial resistance through Enterobacteriaceae, a global emerging health concern. Diagnostic screening of Elephant, Endotheliotropic Herpes Virus from samples collected of collared elephants is also underway.

Fieldwork in Kodagu, Karnataka was initiated with the establishment of a base camp in Virajpet Division. An initiation workshop was organized to sensitize the local forest department staff on project objectives and methodology in December 2019. Data from collared elephants from Karnataka Forest Department from April 2019 to January 2020 and the average home range of elephants with 50% and 90% Kernel density was observed to be 11.83±12.62 km2 and 62.80±45.95 km2 respectively. In collaboration with the Deutsche Gesellschaft fürInternationaleZusammenarbeit (GIZ) GmbH and Karnataka Forest Department, radio telemetry studies in elephants have also been initiated, and collars were deployed on three female elephants from the study herds in May 2020.

Milestone: MoU between WII and Humane Society International (India) was signed for assistance with PZP vaccine procurement, and sharing technical know-how on immunocontraception techniques from their South African counterparts. The research team is securing administrative approvals for field contraception of Rhesus Macaques using PZP vaccine from Drugs Controller General of India, Central Drugs Standard Control Organization, Government of India.

Extensive demographic and ecological data were compiled for Rhesus macaques in study sites of Uttarakhand, which will enable initiation of the second phase of actual vaccine trials in the species. Field activities were initiated in Karnataka and Madhya Pradesh enabling commencement of demographic and behavioural studies to rest of the focal species viz., nilgai, wild pig and elephants.

Movement Ecology of Tiger, *Panthera tigris* for Conflict Prediction and Landscape Management in Sathyamangalam - Nilgiri Biosphere Complex

Funding Source
National Tiger Conservation Authority (NTCA)

Investigators
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Dr Vaibhav Mathur

Researchers
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Deepan Chakravarthy,
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and Alljo Paul A.

Date of Initiation
October 2018

Date of Completion
September 2021

Objectives: The objectives of the project are to (i) study the Spatio-temporal movement pattern of tigers between the population clusters; (ii) predict the human-tiger conflict probabilities in the current and future contexts based on actual and simulated movement and landscape analyses; and (iii) develop landscape management strategy integrating the emerging knowledge and existing tiger conservation plans.

Progress: Landscape-scale study was undertaken based on spatial layers such as physical features (slope, rivers, etc.) and the man-made features (roads, land use land cover, etc.) with the help of Arc GIS software. A human footprint was mapped out for the complete landscape to obtain landscape configuration including connectivity options for tiger. The focused study area was delineated involving PAs and BRs of Nilgiri Biosphere Reserve, and then districts within a 20-km buffer were considered. Out of all the Tiger Reserves, National parks, Wildlife Sanctuaries, and Forest divisions, Sathyamangalam Tiger Reserve was selected initially for pilot efforts. Efforts were made to survey the area using camera traps and interview with staff and local people to identify potential sites for capturing tiger for movement ecology study.

Outputs and Outcome: For landscape configuration, the Land-use land-cover layer was used in the FRAGSTAT software to get the different class statistics for the determination of the tiger movement and habitat suitability. Connectivity model of a least-cost path is under progress and would be added later. Landscape matrices calculated in FRAGSTAT quantifies specific spatial characteristics of patches, classes of patches, or entire landscape which provides much clear reflection of patterns within the landscape. Following are the landscape matrices calculated in FRAGSTAT 4.2 using the image representing the quality and quantity of land use land cover distribution over the landscape.

Table 1: Showing the forest classes, number of patches and density of each class of LULC in STR

S. No.	Class	Contiguity Index
1.	Agriculture	0.55
2.	Forest	0.14
3.	Degraded	0.11
4.	Water Body	0.20
5.	Settlement	0.11
6.	Barren	0.10

Contiguity index assessed the spatial connectedness, or contiguity, of cells within a grid-cell patch and provided an index on patch boundary configuration and thus patch shape. The following table illustrates the highest contiguity score for agriculture land as the classes are regular or connected. This indicates that the landscape has a significant agriculture matrix and thus, the possibility human-tiger interface activities are high here.

So far, a sign survey of 569 km over maximum beats and ranges of Sathyamangalam Tiger Reserve has given a spatial distribution of scat and pugmarks, which on analysis over the settlement, major roads and river shows a high frequency of tiger's presence and occurrence over the major roads, rivers and few settlement areas.

Table 2: Contiguity index of all classes in STR

S. No.	Class	No. of Patches	Patch Density
1.	Agriculture	2744	0.02
2.	Forest	18110	0.14
3.	Degraded	77063	0.61
4.	Water Body	4103	0.03
5.	Settlement	9362	0.07
6.	Barren	179	0.001

Milestone: Efforts from camera traps and sign survey have offered an initial list of 25 locations where trapping efforts would be made in the coming months. These locations will be considered for regular observation and tracing for the capture of the tiger for collaring. The camera trap capture has given evidence of the presence of both male-female and young ones. Further course of actions will be linked to intensive camera trapping efforts and GPS tracking of the tigers, and the predictive modelling.

Spatial Ecology of Himalayan Torrent frog *Nanorana vicina* in Response to Habitat Dynamics

Funding Source
Grant in Aid

Investigator
Dr Abhijit Das

Researcher
Swati Nawani

Date of Initiation
October 2017

Date of Completion
October 2021

Objectives: The objectives of the project are to (i) determine the movement pattern and home range size of *Nanorana vicina*; (ii) understand stream habitat and microhabitat preference by the species; and (iii) Factors responsible for the movement of individuals.

Progress: The research team fitted radio-transmitter on 16 individuals of *Nanorana vicina* in the two streams in Benog Wildlife Sanctuary. The movement pattern of the tagged individuals was monitored. Stream mapping and stream grid-based survey was completed.

The herpetofauna diversity and observation of natural history were assessed.

Outputs and Outcomes: Preliminary information on home range and movement pattern of Nanorana vicina: The study revealed that N vicina is mostly found in the pool section of stream followed by cascade, riffle and runoff section. The maximum distance moved by the species is 100 meter.

During the study period, the average movement by tagged individuals was found to be higher during monsoon (4.35 m/day) than pre-monsoon (2.99 m/day) and post-monsoon (1.06 m/day). Average movement by males of the species is slightly higher (2.93 m/day) than that of female (2.84m/day). The study recorded five species of amphibians and nine species of reptiles from Benog Wildlife Sanctuary. The research team recorded rare species of reptiles such as *Lycodon mackinnoni* and *Eurylepis cf. taeniolata*. The team also studied the reproductive behaviour of *Duttaphrynus himalayanus* and recorded acoustics of *Nanorana minica*.

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Milestone: The specimens and DNA samples of the recorded species were deposited in Wildlife Institute of India for future systematic and phylogenetic study.

Monitoring of Reintroduced Gaur *Bos gaurus gaurus* in Bandhavgarh Tiger Reserve, Madhya Pradesh, Phase II-Extension

Funding Source
Madhya Pradesh Forest Department

Investigators
Dr Parag Nigam,
Dr Bilal Habib and Field Director, Bandhavgarh Tiger Reserve

Researcher
Ritesh Vishwakarma

Date of Initiation
November 2018

Date of Completion
November 2021

Objectives: The objectives of the project are to (i) understand the movement, ranging pattern, fission-fusion dynamics and habitat use of the gaur population; (ii) understand the social interaction within and between gaur herds in Bandhavgarh Tiger Reserve; (iii) provide the genetic makeup of the gaur population and evaluate the individual contribution towards population growth; and (iv) monitor the health condition of reintroduced gaur in Bandhavgarh Tiger Reserve.

Progress: All the radio-collared gaurs were monitored in Bandhavgarh Tiger Reserve (BTR) through ground tracking and direct sightings. The gaur individuals without collar were identified based on their body size, horn structure (shape, colour, spread, length and curves), permanent marking (scar and injury on the body), individual with nonfunctional collar (old collar individual) and the size of the bos spp. The Minimum Convex Polygon (100% MCP) and Fixed Kernel Density Estimator (FKD) method was used for home range estimation, whereas, habitat variables such as terrain, broad vegetation type, distance to the nearest water body, road and human settlement were recorded to evaluate the habitat use of radio-collared gaur.

A total of seven herds were identified, and a herd profile and individual dossiers for each identified individual were prepared. The identified individuals within the herds were separated based on their body characteristics. The social interaction within and between gaur herds was studied using behavioural sampling methods, the Social dynamics of gaur herds were studied using social network analysis.

Outputs and Outcomes: During the study period, a total of 184 locations were recorded for all the gaur individuals of identified herds (n=7). Using obtained locations (n=184) of radio-collared gaurs and identified gaur herds the overall home range of gaur in Bandhavgarh was estimated. The overall estimated home range for gaur using 100% MCP was 205.4 sq km, whereas it was 163.6 sq km using 95% FKD and 29.5 sq km using 50% (core area) FKD. The home ranges for all seven herds with 100% MCP were estimated. The mean estimated home range for different gaur herds using 100% MCP was 25.37 ± 3.94 (SE) sq km (95% CI= 9.64).

The gaur with functional radio-collared (n= 3), were monitored, and locations were recorded. The home ranges for collared gaurs were at 100% MCP was 43.66 ± 10.79 (SE) sq. km (95% CI= 46.45 sq km) for the study period.

The behavioural data was collected based on animal's association, affiliation and agonistic behaviour of individually identifiable animals. A total of 110.20 hours' behavioural samples of all possible interaction were collected. Social Interaction, network statistics, and social network diagram of individual association of one group were prepared. The association network provides information that the group members reciprocally interact with each other in all age classes. The network also shows the group's dominance hierarchy was statistically nonlinear and based on one individual centrality.

Milestone: Monitoring of the gaur herds was carried out during the study period. The present study showed that the current population of gaur is now expanding to other parts of the reserve and has significant fission-fusion dynamics with fluctuating resources.

The study of fission-fusion dynamics through the Social network analysis (SNA) in gaur, predicts the integrated movement decisions made by individuals scales up to group motion as they are now expanding their home ranges to the different part of the reserve. The results of the association network of one herd provided the quantitative information of the herd size and structure in available resources. The study revealed that the individuals could modify the persistence of associations with others herds or individuals and result in the complex higher-order social structure. The association matrix of interaction in the herd describes behaviorally heterogeneous differences of herd and individuals within the herd that may provide information on herd dynamics and hierarchy structure of gaur. The study is first of its kind of Gaur in India. Additionally, the genetic makeup of the reintroduced gaur population would be carried out in the present study.

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Intensive Monitoring and Study of Dispersal of Tigers in Kanha Tiger Reserve (Phase IV)

Funding Source
National Tiger Conservation Authority

Investigators
Dr Y.V. Jhala and
Shri Qamar Qureshi

Researchers
Neha Awasthi,
Jayanta Kumar Bora,
Shravana Goswami

Date of Initiation
June 2009

Date of Completion
December 2021

Objectives: The project objectives are to (i) monitor the population of tigers in Kanha Tiger Reserve; to (a) estimate the tiger population within selected areas of the reserve, and (b) obtain survival and mortality information through a mark-recapture study; (ii) monitor prey and co-predator populations and the condition of the habitat in the tiger reserve; and (iii) gain an understanding of tiger dispersal patterns.

Progress: The research team set up remotely triggered cameras, with heat and motion sensors, at 646 locations in forest and grassland habitats using 2 km2 grids to estimate tiger abundance. Cameras were run for 25 days each year at each location, which resulted in an effort of ~16,000 camera trap nights. The entire reserve was systematically sampled covering all the habitat types to estimate the prey density, with 200 line transects of 2 km length; 150 in the core zone, 50 in the buffer zone. The total transects survey effort comprised 1200 km of the walk. An area of 200 km2 was camera trapped for the entire year to understand tiger movement and turnover rates. Cameras were moved to different locations within the grid every month to have multiple spatial locations of captures for estimating home ranges.

The team obtained ~2500 images of 118 tigers, out of which 83 were adults and 35 cubs. Among the adults, 39 were males, and 42 were found to be females, and two remained to be unidentified. Analysis of the line transect based data revealed that the chital had the highest density amongst all ungulate species, followed by sambar and gaur.

Table1: Division wise prey density estimates in KTR in 2019

Division	Species	Density (SE)*	Best Fit Model
Core	Chital	40.58 (7.1)	Hazard Rate Cosine
	Sambar	8.81 (1.6)	Hazard Rate Simple Polynomial
	Gaur	5.46 (1.21)	Hazard Rate Cosine
	Wild Pig	5.74 (1.29)	Hazard Rate Simple Polynomial
	Barking Deer	2.30 (0.28)	Hazard Rate Simple Polynomial
	Chousingha	0.17 (0.08)	Half Normal Cosine
Buffer	Chital	2.8 (1.09)	Half Normal Cosine
	Sambar	0.43 (0.11)	Half Normal Cosine
	Gaur	0.29 (0.24)	Half Normal Cosine
	Wild pig	3.78 (0.93)	Half Normal Cosine
	Barking Deer	2.71 (0.67)	Half Normal Cosine
	Nilgai	0.26 (0.17)	Simple Polynomial

Milestone: The research team has completed two years of intensive continuous monitoring exercise in 200 km2 core area with a high density of tigers. The research team obtained fine-scale habitat use pattern of 31 tigers from this dataset. The team showed how tigers limit leopard spatial demographics through a publication in Scientific Reports. Using radio telemetry, the team assessed the land tenure pattern of three wild dogs' packs in reserve. Additionally, the research team studied habitat use, suitability and activity pattern of the rare rusty-spotted cat and published an article in a peer-reviewed international scientific journal.

Camera Trap Image

Habitat Improvement and Conservation Breeding of Great Indian Bustard: an integrated approach

Funding Source
National Compensatory Afforestation Fund Management and Planning Council

Collaborating Agency
Ministry of Environment, Forest and Climate Change, State Forest Departments of - Rajasthan, Gujarat, Maharashtra, Bombay Natural History Society, The Corbett Foundation, Humane Society International- India

Investigators
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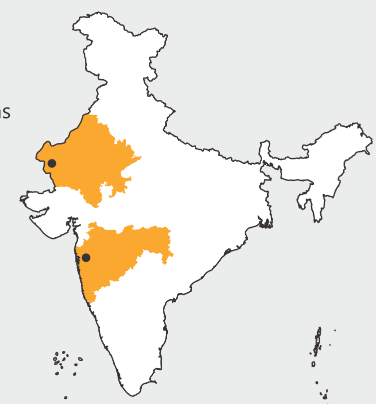
Project Team
Dr Shravan Singh Rathore, Dr Sujit Narwade, Dr Tushna Karkaria, Bipin C. M., Arjun Awasthi, Vineet Singh, Srinivas Yellapu, Priyamvada Bagaria, Pravesh Sakhlani, Mohib Uddin, Devendradutt Pandey, Sourav Supakar, Tanya Gupta, Hrishika Sharma, Hema Joshi, Vishal Varma, Indranil Paul

Date of Initiation
2016

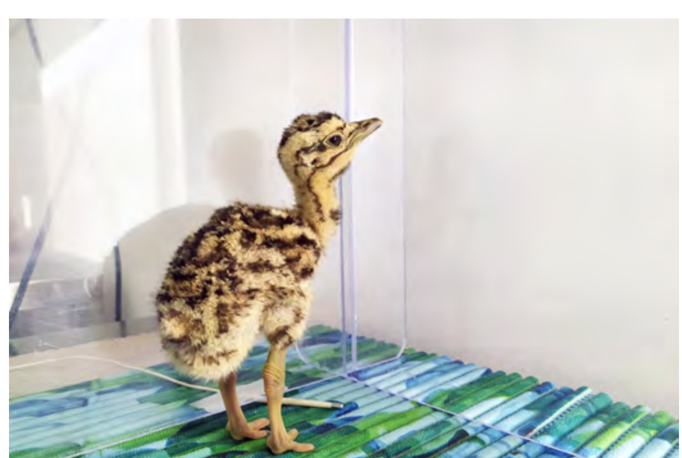
Date of Completion
2021



Objectives: The declining population of the critically endangered Great Indian Bustard (GIB) and Lesser Florican (LF) need urgent conservation. The main aims of the project are: (i) Conservation breeding of bustards; (ii) Understanding where and how to conserve the species, assessing threats and monitoring management effectiveness; (iii) Capacity-building of implementing agencies and outreach for stakeholder support; and (iv) Pilot implementation of mitigation measures and evaluation of their effectiveness.

Progress: The Tripartite Memorandum of Agreement (MoA) for the Great Indian Bustard (GIB) and Lesser Florican conservation breeding and research program was signed between MoEFCC, Rajasthan Government, and WII to operationalize conservation breeding of the GIB under the guidance of a Steering Committee, with facilitation of Rajasthan Government and funding of MoEFCC. Based on, site assessments carried out by the project team, Sorsan, Baran District and Ramdevra, Jaisalmer District were finalized for establishing the Conservation Breeding Center, and construction is under progress in Ramdevra.

The project team was trained in husbandry practices and veterinary care at the International Fund for Houbara Conservation (IFHC), Abu Dhabi. To utilize the GIB breeding season in 2019, the first GIB Conservation Breeding Center has



been established at Sam, Jaisalmer that currently houses ten hand-reared GIB chicks from wild-collected and artificially hatched eggs. The current stock comprises of eight females, one male and one unsexed individual. Nest search, collection and incubation for the breeding season of 2020 are in progress. Under the applied research component, four GIB females and one Lesser Florican male were radio-tagged in Desert National Park, Jaisalmer and Ajmer respectively during March 2019 - June 2020 for understanding bird movements, identifying critical habitats for conservation planning, prioritizing power lines for mitigation, and searching nests for conservation breeding program. Birds have been transmitting data for months from Jaisalmer and Kachchh and providing hitherto unknown basic information on GIB space use and ranging patterns. The average travel distances were similar between the two tagged birds in Thar and almost double than that of Kachchh. Bird home ranges ranged between 76 km2 in Kachchh to 124 km2 in Jaisalmer.

Investigation on patterns of bird community structure about land-use driven habitat changes in the arid grasslands of Thar suggested that although primary grassland habitat is essential to save the full spectrum of the regional species pool, low-impact land-uses can act as important secondary habitats for conservation of bird species. Molecular analysis of GIB biological samples revealed that Rajasthan population had the highest genetic diversity and had relatively more genetic flow with Maharashtra-Madhya Pradesh, whereas Gujarat and Andhra Pradesh populations had some private alleles. From bird carcass surveys under power lines in Kachchh, the research team estimated carcass encounter rates of 0.27 (0.14 SE) and 0.25 (0.06 SE) per km per month for high- and low- tension power-lines and mortalities of ~22,000 birds (all species) annually in ~1,100 km2 GIB habitat emphasizing the need for immediate power line mitigation measures. Earlier, in Thar, the research team estimated about 90,000 bird mortalities per year in a 4,200 sq km landscape. Preliminary investigation of soil and GIB food samples revealed the presence of organophosphate pesticides in GIB habitat in and around Rollapadu Wildlife Sanctuary, Andhra Pradesh.

Outputs and Outcomes: As part of social engagement, the research team surveyed 20 villages in Jaisalmer district to assess livelihood concerns and conservation attitude of the local population. The team intended to involve the locals as stakeholders in GIB conservation to create goodwill, and these social surveys will help in developing outreach programs. Additionally, customized nature education programmes in 22 schools, skill development workshop for responsible nature tourism to local youth and forest department staff, awareness program to sensitize locals and tourists on grassland and GIB conservation at Desert festival, Jaisalmer were conducted. Publicity materials such as posters, t-shirts, caps, books, bags, brochures for power agencies and other stakeholders were prepared and widely disseminated. The team met with representatives of various private and government power agencies as well as senior government officials, media and legal fraternity to sensitize them on the critical issue of power line mitigation for GIB conservation. The research team also conducted a training workshop to sensitize power agencies and the media on GIB conservation. Under pilot habitat management, 801 dogs from 23 villages in/around DNP were sterilized in collaboration with Humane Society International (HSI)- India and Rajasthan Forest Department. Analysis of data collected from population surveys of dogs and other nest predators in/around DNP is under progress. Preliminary analysis showed that the proportion of unsterilized dogs is still very high in villages. Pigs and desert foxes were the most abundant nest predators in/around DNP.

Milestone: The research team has commenced relocation of nest predators from GIB breeding enclosures in DNP. Meetings with the local community to manage a portion of their land in GIB-friendly manner and interactions with power agencies and bird diverter suppliers for marking critical power lines were held. More bird diverters for power lines have been procured for installation with the help of power agencies in Thar.

Meta-population Dynamics of Tigers in the Terai-Arc landscape, India

Funding Source
WCT-Panthera, DST-GOI

Investigators
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Dr Bivash Pandav and
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Researcher
Suvankar Biswas

Date of Initiation
November 2014

Date of Completion
December 2021

Objectives: The project has the following objectives (i) The extent to which tigers occupy unprotected areas within this landscape. (ii) What are the source and sink populations? (iii) Population connectivity, by estimating rates and direction of tiger dispersals at metapopulation scale. (iv) What landscape features, if any, affect connectivity in this landscape.

Progress: In this study, a combination of field, molecular and remote sensing GIS tools were used to understand the source and sink dynamics and the landscape features which regulating such dynamics of the tiger in this human-modified landscape. 13,000 km2 of potential tiger habitat have been surveyed of the state of Uttarakhand, Uttar Pradesh and Bihar and collected large carnivore faecal samples.

Outputs and Outcomes: So far, 1,608 samples have been analyzed and identified 743 samples as tiger positive. Genotyped data were generated from 677 tiger samples using 13 microsatellite markers, and 190 tiger samples have been excluded because of low amplification success. Five hundred fifty-three tiger samples were analyzed further for unique individual identification as rest did not qualify the minimum cut off amplification success (⩾ 50% of 13 loci) and identified 219 individual tigers which cover 34% of total tiger population in this landscape. All the 13 microsatellite loci were found to be polymorphic, with the mean number of alleles of 14.76±2.83. No evidence of large allelic dropout and null alleles were observed in the data set. Spatial genetic analyses identified three subpopulations of the tiger in this landscape, and results also suggest twelve out of 13 existing corridors are functional, Gola river corridor needs immediate attention, Kilpura-Khatima-Surai corridor is non-functional. GIS analyses identified distance from the forest. The team also identified bottlenecks within nine active corridors.

Management Recommendations: Genetic and GIS analyses identified Rajaji, Corbett, Pilibhit, Dudhwa, Valmiki TRs, Lansdowne, Ramnagar and Haldwani FDs as source and Haridwar, Najibabad, Terai west, Terai central, Pilibhit Social and South Kheri FDs, west-Sohagibarwa WLS and Amangarh TR as sink populations of the tiger in this fragmented landscape. Result also identified corridors like Kosi river, Gola river, Kilpura-Khatima-Surai, LaggaBagga-Shuklaphanta-Tatarganj, Kishanpur-Dudhwa, Dudhwa-Katerniaghat and additionally some specific areas as critical corridors of functional tiger movement. Proper management of all these source and sink populations and the critical corridors which connect these population is very crucial for long-term persistence of tiger in this fragmented landscape as most of the non-protected areas were heavily affected by immense anthropogenic activities.

Milestone: Two papers on (i) 'Genetic analyses reveal population structure and recent decline in leopards, *Panthera pardus fusca across* the Indian subcontinent'; and (ii) 'A proactive faeces collection protocol for multidisciplinary research in wildlife science' were published in peer-reviewed journals during the reporting period.

Intensive Monitoring and Study of Dispersal of Tigers in Kanha Tiger Reserve (Phase IV)

Funding Source
NTCA, Madhya Pradesh Forest Department

Investigators
Dr Y.V. Jhala and
Shri Qamar Qureshi

Researchers
Neha Awasthi, Jayanta Kumar Bora and Shravana Goswami

Funding Source
NTCA

Date of Initiation
Janury 2015

Date of Completion
Janury 2022

Objectives: The project has the following objectives (i) Monitor the source population of tigers in Kanha tiger reserve and will address: (a) Tiger Population estimates in entire Tiger Reserve, and (b) Survival and mortality information through mark-recapture study. (ii) Monitor Co-Predator populations in the Tiger Reserve. (iii) Monitor prey populations in the Tiger Reserve. (iv) Gain an understanding of tiger dispersal patterns and land tenure system.

Progress: *10.1. Camera trap sampling to estimate tiger abundance*: Remotely triggered cameras, with heat and motion sensors, were set up, at 646 locations in forest and grassland habitats using 2 km2 grids. Cameras were run for 25-35 days each year at each location, which resulted in an effort of ~16,000 camera trap nights.

The sampling was done in two parts; the core zone is sampled between January to June 2019, and the buffer zone was sampled in the winter season (November 2019 to January 2020). Camera traps were checked every 2–3 days to ensure the proper functioning of the cameras, to replace drained batteries and to download data.

Distance Sampling to estimate prey density: Line transects were established within the Kanha Tiger Reserve for prey density estimation using distance sampling. The entire reserve was systematically sampled covering all the habitat types, with 200 line transects of 2 km length; 150 in the core zone, 50 in the buffer zone. The total transect survey effort comprised 1,200 km of the walk. Each transect was walked in the morning (6:00hrs- 9:00hrs) when animals are more active. To estimate the densities of herbivore species data based on direct sightings (species name, radial distance, animal bearing and group size) were recorded along transects in the survey areas.

The sampling exercise was carried out through the MSTrIPES Ecological app following standardized protocols for ecological monitoring by frontline staff. The Global Positioning System (GPS) readings were automatically recorded by the Ecological app.

Radio Telemetry: Satellite (GSM and Iridium) radio-telemetry was used to collect ecological and behavioural data on dholes. The team put radio collars on three animals from different packs. Dholes were tracked using vehicles early in morning and afternoon. Collared individuals were tracked with the help of a 3- element Yagi antenna and with 'Wildlife Materials, Inc' and 'BiotrackTM' receivers. Attempts were made to monitor the individuals in 3-4 consecutive days and record the numbers of prey killed by each pack. Home ranges were calculated using Hawths tools in ArcGIS 10.2.

Camera Trap Image

Outputs and Outcomes: Abundance of carnivores: The research team obtained 2,703 images of 118 tigers, out of which 83 were adults and 35 cubs. Among the adults, 39 were males, and 42 were found to be females, and two remained to be unidentified. The team obtained 2500 images of the leopard; the individual identification and data analysis are in progress.

The abundance of prey: Analysis of the line transect based data revealed chital had the highest density amongst all ungulate species, followed by sambar and gaur.

Land tenure of dhole: Three adult females of dhole were radio-collared for the study. There were 1,865 independent locations of these dholes obtained through ground tracking as well as satellite transmission. Collared individuals avoided high tiger areas, and they extensively use the buffer zone where tiger densities were low. Dholes were observed in the core areas of the Tiger Reserves, especially the meadows during early morning or sometimes in the evening to hunt wild prey. After feeding, they immediately go back and settle in the buffer. The team observed that the collared dhole make den sites in the buffer area close to human settlement to raise pups. This mechanism protects dhole pups from large cat predation as these carnivores largely avoid human habitation.

Milestone: Prey abundance of the halon catchment need to be enhanced to foster the growth of tiger population.

A Field Guide to the Plants of Shivalik Hill Range

Funding Source
Grant-in-Aid

Investigators
Dr Navendu Page,
Dr Bivash Pandav and
Dr G.S. Rawat

Researcher
Sachin Rawat

Date of Initiation
February 2019

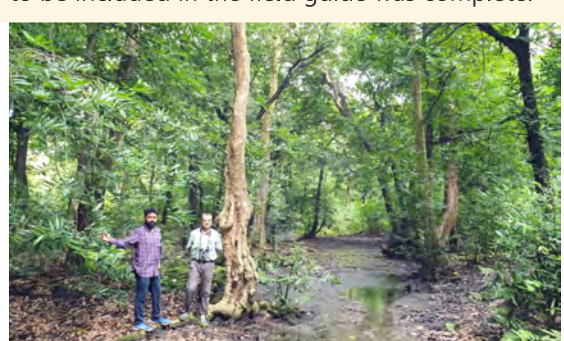
Date of Completion
February 2022

Objectives: The objective of the project is to design a field guide to the plants of Shivalik Hills.

Progress: Based on published literature, a list of woody plants distributed in Shivalik and Outer Himalayan Hills was prepared. Two interns were assigned the task of preparing a database on the updated nomenclature, local names, elevational limits, and geographic distribution. Multiple field trips were made to the locations in Shivalik tracts as well as the outer Himalayas to document the ecology as well as vegetative and reproductive characters of the woody plants. A field key was prepared to aid in easy identification of the tree species which will be incorporated in the field guide on the Plants of Shivalik hills and Outer Himalayas. The work on application-based identification aid for the trees of the Shivalik region was initiated.

Outputs and Outcomes: A comprehensive photographic documentation of phenological stages of the plants of Shivaliks. A field key for the identification of trees of Shivaliks was prepared during the reporting period.

Milestones: Fieldwork was carried out for the study has resulted in some new records for the state including *Margaritaria indica*, *Prunus ceylanica* as well as the rediscovery of a rare root parasite after more than a century. Photographic documentation of more than 50% of the species to be included in the field guide was complete.



Taxonomic and Ecological Studies on Arachnids of Trans and Western Himalaya, India

Funding Source
Ministry of Environment, Forest and Climate Change, Govt. of India

Investigator
Dr V.P. Uniyal

Researcher

Irina Das Sarkar

Date of Initiation
January 2019

Date of Completion
March 2022

Objectives: The project has the following objectives (i) Detailed taxonomic studies and systematic assessment of Spiders diversity along the altitudinal gradient across Western Himalayan, India. (ii) Establishment of a geospatial and genetic digital database of Spiders. And (iii) To develop a team of para-taxonomists engaging local communities through local-level capacity building among students, teachers and NGO's in long-term monitoring through training programmes and publications.

Progress: Detailed review of the state of taxonomic knowledge of spiders was done at the national level. A detailed review of the state of Araneae documentation for Himachal Pradesh was also done with identified gaps to bridge with further research. Digital Elevation Map of the state of Himachal Pradesh covering all districts and the entire elevational gradient of the state was prepared during the reporting period.

Reconnaissance sampling was done at points in three representative districts, i.e. Mandi, Kullu, and Lahaul-Spiti, covering an ecologically sound elevational gradient to carry out the systematic sampling. Bilingual posters were prepared for the dissemination of knowledge regarding ecological and agricultural importance of spiders among common masses to aid scientific curiosity to sustain long-term monitoring. Sampling protocols and strategies were developed to assess ecological heterogeneity and health of study area, to aid in long-term ecological monitoring through assessment of changes in Araneae communities.

Outputs and Outcomes: An extensive survey of available Araneae literature from the country, sourced through World Spider Catalogue (21.5), revealed the fragmented and scattered state of knowledge of spiders of Himachal Pradesh. Except for Bastawade (2008), no other protected (or non-protected) area had been systematically sampled to ascertain a comprehensive bio inventory of spider fauna, highlighting the most urgent need to invest in building a sound taxonomic database for the state.

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A thorough review of available literature accounted for 59 species across from 10 families, of which 18 species from 7 families were reported only till the generic level, creating an information blind-spot of the true account of Araneae diversity of the region. A further revision of taxonomic revisions altered the original family records to 11 families. Additionally, a prominent number of species records occur as a reference to Himachal as their type locality with limited independent publications for state-specific records. The records also highlight a more dominant representation of non-web building/active hunting groups of Gnaphosidae and Lycosidae, along with what can be assumed to be under-representation of the more common human-adaptable families of Araneidae, Tetragnathidae, and Theridiidae. This skewness in diversity records can be considered as the reflectance of dedicated opportunistic reports, in the absence of taxon-specific surveys.

The current project team aims to systematically build on the identified research gaps, to produce a taxonomically and ecologically sound bio inventory database, through a citizen-science approach, that will also prioritize imparting valuable para-taxonomic knowledge about spiders to common masses, with the primary aim to dissipate misconceptions about the taxon and further scientific curiosity among the youth.

Biogeography of Eastern Borderland in India: Evidence from Ectotherms

Funding Source
Science and Engineering Research Board, Govt of India

Investigator
Dr Abhijit Das

Researcher
Bitupan Boruah

Date of Initiation
March 2019

Date of Completion
March 2022

Objectives: The objectives of the project are to (i) determine the biogeographic borderline separating the Indian and Indo-Chinese sub-regions in India; (ii) determine if this biogeographic borderline varies across taxonomic groups; and (iii) gather evidence of hybridization between or within groups from India and Indo-Chinese subregions in Northeast India.

Progress: Field survey conducted in Tale Valley Wildlife Sanctuary, Arunachal Pradesh and Barail Wildlife Sanctuary, Assam. During the survey period, specimens of Amphibians and reptiles were collected and deposited in the Wildlife Institute of India. Tissue samples were also collected for future systematic and phylogenetic work. Laboratory work on collected specimens is in progress.

Outputs and Outcomes: The research team recorded a total of 48 species of herpetofauna belonging to 37 genera and 14 families. The team also recorded rare species of reptiles such as Boiga quincunciata and Pseudocalotes austeniana. The research team recorded putative new species of amphibians from the genera such as *Raorchestes*, *Liurana*, *Nanorana*, *Fejervarya*, *Duttaphrynus*, and reptile from the genus Cyrtodactylus and Rhabdophis. Laboratory work (morphology and molecular) is underway for these species. The team recorded Impressed Tortoise, *Manouria impressa* for the first time from India.

Milestone: DNA sample from collected specimens were assessed for future phylogenetic study.

E-bird Technology for Tiger Conservation: Development and Integration of Unmanned Aerial Vehicles as a Surveillance and Monitoring Tool for Protection of Tiger and Capacity Building of Frontline Staff

Funding Source
National Tiger Conservation Authority (NTCA)

Investigators
Dr K. Ramesh, Scientist (WII),
Dr Vaibhav C. Mathur;
AIG (NTCA),
Dr Christy Williams (WWF)

Researchers
Project Engineer: Shashank Sawan, Krishna Kumar T;
Project Biologist: Tamali Mondal

Date of Initiation
June 2017

Date of Completion
May 2022

Objectives: The objectives of the project are to (i) integrate Un-manned Aerial Vehicle (UAV or Drone) in Panna Tiger Reserve, Madhya Pradesh based on pilot testing experience during 2013-14; (ii) undertake need and feasibility analysis for integration of UAV in representative Tiger Reserves of the country concerning poaching risk and conflict management strategies; (iii) map locations of poaching and conflict-prone areas in the tiger reserves, which would serve as a basis for technology integration; (iv) experiment and implement UAV technology in a phased manner in the representative Tiger Reserves for day-time aerial surveillance in strategic locations, night patrolling, mapping and monitoring of encroachment or degradation, data collection from camera traps and tiger monitoring involving RFID technology; and (v) undertake capacity building of field staff for technology transfer and implementation of UAV technology as a part of the regular management strategy.

Progress: Survey and data collection in Panna Tiger Reserve: Panna is one of the major sites of this project where the first UAV survey was conducted in 2015. As per the needs, habitat mapping in selected sites was completed using an aerial survey. Data collection were also completed on tiger, vulture, crocodiles and tourism activities. Training of staff from all levels on UAV handling was conducted for a one-week program. Ken river stretch was monitored using UAV, and the data was processed to prepare the map. Data collection on crocodiles was also done using drone covering the whole river stretch and compared with the ground survey. Thirteen village sites that were relocated from inside the Panna Tiger Reserves were surveyed and mapped to monitor changes.

Need and feasibility assessment for UAV: The need and feasibility assessment were crucial to select priority sites based on the data. For this, a questionnaire survey format was circulated through NTCA to the respective tiger reserves. Detailed need and feasibility analyses for the integration of UAV have been completed in Panna, Kaziranga, Sathyamangalam, Corbett, Rajaji and Dudhwa Tiger Reserves. So far, the research team has received details on need and feasibility from Bhadra, KMTR, Mudumalai, Sanjay, Nameri, Satpura and Satkosia Tiger Reserve. Five sets of questionnaires focusing on Poaching, Conflict, Forest Fire, Weed presence and Encroachment were completed in all Beats based on inputs from Range Officers and Beat Guards.

Experiment and Implement UAV technology: The Project Team developed One Urban Quad, One Quad-copter, One Fixed-wing and One Delta-

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wing Models and used them in-field activities. UAVs were used for various purposes in target sites and other sites where the local administration sought inputs.

Capacity Building and Technology Transfer: Technology transfer was completed in Panna and Dudhwa Tiger Reserve. One plane and one quad-copter were given to both the reserves for monitoring and survey. Capacity building for UAV training has been conducted in Corbett and Sathyamangalam Tiger Reserve this year. Previously the capacity building program was conducted in Panna, Dudhwa and Kaziranga Tiger Reserve.

Outputs and Outcome: Of the 13 priority sites, data collection, survey and capacity building program have been completed in five sites. In Sathyamangalam Tiger Reserve (STR), 50 forest staff were trained in UAV technology through a capacity building program. Arial Survey on invasive species along with Moyar River stretch and development of the tribal village was conducted during fieldwork in STR. Apart from that, the team members also assisted the Sathyamangalam forest department in various field requirements, including dealing with problem animals and encroachment. A total of 25 beat officers were trained in Corbett Tiger Reserve. Hands-on training and independent flight schedule helped the participants to gain the confidence to fly UAV. Need and feasibility assessment were conducted beat wise. According to the collected data need of UAV is high in the areas which share a boundary with local villages. Collection of fuelwood and dry leaves are the main concerns of the forest officials. Map of need and feasibility assessment of UAV in different tiger reserves were prepared according to the data.

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Milestones: One of the major objectives of the project was to develop a low-cost UAV model for the survey and wildlife monitoring, and accordingly, the research team developed two customized UAV successfully. The capacity building and technology transfer to staff was done in Panna, Corbett, Kaziranga, Dudhwa and Sathyamangalam Tiger reserves. Habitat and wildlife monitoring could be done, offering insights for field managers to upscale the UAV deployment. Need and feasibility assessment of UAV have been completed in 11 tiger reserves, which would rationalize the UAV deployment in the concerned reserves.

Recovery of Dugongs and their Habitats in India: An Integrated Participatory Approach

Investigators
Dr K. Sivakumar, Dr J.A. Johnson and Dr Samrat Mondol

Researchers
Dr Anant Pande, Swapnali Gole, Sameha Pathan, Sohni Dudhat, Rukmini Shekar, Chinmaya Ghanekar, Madhu Magesh, Diksha Dikshit, Sagar Rajpurkar, Himani Saini, Sohom Seal, Sumit Prajapati, Prachi Hatkar, Dr Swanti Sharma, Astha Walia, Vabesh Tripura, Srabani Bose, Shivani Patel, Gem Christian, Sharad Bayyana, Esha Gokhale, Devan Mehta, Rashmi Semwal

Date of Initiation
September 2015

Date of Completion
March 2023

Objectives: The objectives of the project are to (i) assess dugong population status through advanced census techniques and determine its abundance and distribution, identify critical habitats, classify threats and develop a site-specific monitoring plan to reduce hunting and incidental entanglements; (ii) characterize the critical dugong habitats, reduce direct and indirect threats, control modifications in and around the habitat and improve habitat quality through management interventions and participatory approaches; (iii) raise awareness on the species and encourage the participation of the local communities; include other stakeholders like fisheries department and religious heads in conservation efforts; enhance Dugong conservation program by spreading awareness on a national scale; (iv) enhance the capacity of the State Forest Department staff and develop/implement smart patrolling tools to improve protection enforcement; train forest staff and local communities in underwater surveys for long-term habitat monitoring.

Progress and Outcomes: Sea Cow *Dugong dugon*, occurs in Andaman and Nicobar Islands, Gulf of Mannar, Palk Bay, and Gulf of Kutch in India. Several reasons have been attributed to their population decline, some of which include seagrass habitat loss and degradation, boat traffic, gill netting, disease, chemical pollutants, consumptive use, and poaching. Therefore, recovering dugongs entails targeted, multidisciplinary research that flows into management actions and advocacy for policy changes. Therefore, dugong recovery program aims at (a) assessing and monitoring Dugong population and habitat status; (b) implementing site-specific management actions to recover populations, and restore critical habitats; (c) incentivizing participatory conservation efforts involving local stakeholders; and (d) improving the capacity of enforcement and management agencies to promote integrated protection and management of Dugong and associated species.

So far, more than 60,000 school students and fisherfolks have participated in awareness programs and taking part in the conservation of dugongs and their habitats in three Range States. Because of these awareness programs, few fishermen in Tamil Nadu, Andamans and Gujarat, who could successfully rescue and release 13 dugongs entangled in their fishing nets, were honoured with incentives. A total of 550 Forest Officers and Front line staff of Forest Department, Fisheries Department, Marine Police and Coast Guards have been oriented towards conservation of dugong and marine biodiversity in India. Of these, 62 frontline enforcement staff was trained in underwater biodiversity monitoring with scuba diving.

As part of 'Incentive for Conservation Programme', examinations were conducted among school-going children of fishermen community and selected 460 'Dugong Ambassadors' from these three dugong range States/UT. Education of these 'Ambassadors' has been supported with 'Dugong Scholarship,' i.e. Rs. 500/month for two years. Further, genetic analysis was carried out from the samples that have been collected from the stranded dugongs to study their genetic diversity and relatedness with global populations. A study on ecosystem services of dugong habitats has also been conducted in Tamil Nadu and Andaman. Management Plan of Gulf of Mannar National Park about dugong conservation has been developed and submitted to the Government of Tamil Nadu. Detailed mapping of seagrass with its status has been initiated in the Gulf of Kutch region.

A Friends of Dugong network has been established at the three field sites to report dugong sightings, strandings, illegal activities and assist in conducting outreach programs. Further, dugong conservation awareness and orientation workshops were conducted for Indian Coast Guard, Marine Police and other line agencies in all three regions. To reach out to the scientific community; forest managers and the public at large, several presentations were given at diverse platforms to apprise about Dugong Recovery program activities.

This multi-faceted approach to conserve dugong in India has helped to reach out to over 7500 stakeholders, including local communities. Over 300 research surveys have added crucial datasets to understand seagrass health status and mass boat surveys to locate and map dugong habitats has been a landmark initiative. Multiple such surveys over the next field season will help us to address the threats to dugong populations and mitigate them within a stipulated time frame.

Boats and drones were used to successfully monitor the dugongs in Andamans, Gulf of Kutch, Gulf of Mannar and Palk Bay. Frontline staff of forest departments has been trained towards the usage of drones for monitoring sea animals and illegal activities inside the PAs.

Further, the Management Plans of the Gulf of Mannar National Park and Rani Jhansi National Park have been prepared through this project. Moreover, chapters related to dugongs and sea turtles of the Management Plan of Gulf of Kutch have also been drafted by the project team.

Milestone: The multi-faceted but integrated approach to conserve dugong in India has helped to reach out to over 40,000 stakeholders including local communities that resulted in a significant reduction of poaching or bycatch of dugongs in the country. Further, this approach has helped us to rescue and rehabilitate more than ten dugongs that were incidentally entangled in the fishing nets. Over 300 research surveys have added crucial datasets to understand seagrass health status. Boats and drones were used to successfully monitor the dugongs in Andaman, Gulf of Kutch, Gulf of Mannar and Palk Bay. Dugong scholarships to the school going children of fishermen were received the attention of international communities as it helped in the conservation of dugongs in the field.

Augmentation and Recovery of Tiger Population in Satkosia Tiger Reserve, Odisha

Funding Source
Odisha Forest Department and National Tiger Conservation Authority

Investigators
Dr K. Ramesh and Dr S.K. Gupta

Researchers
Gatikrishna Behera and Vaishali Vasudeva

Date of Initiation
March 2018

Date of Completion
March 2023

Objective: The objective of the project is to (i) undertake post-release monitoring of tiger populations, including assessment of population growth, movement pattern, behaviour, genetic structure and physiological profile; (ii) estimate the population size of tiger, co-predator and prey species, and model the habitat correlates to understand the species-habitat relationship, and support the ongoing Phase IV monitoring activity; (iii) map landscape composition and configuration, and estimate patch properties, connectivity and landscape permeability within and across the landscape; and (iv) quantify human-wildlife interface issues and ecological correlates linked to economics and ecosystem services.

Progress: Post-release monitoring: Of the two translocated tigers, one was found dead, and the other had to be captured and kept in captivity due to serious conflict with local people.

However, daily activity and space use within the enclosure was studied and her interaction with a resident female tiger. Simultaneously, the movement pattern of the resident female tiger was studied with the help of camera traps.

Camera trapping: 357 single-sided camera traps were placed in 2 sq. km grid units in January-March 2020, covering the core and buffer area of Satkosia Wildlife Division, as well as the newly added area (Athamallik Forest Division, Athagarh Forest Division). Line transect study was carried out during post-monsoon (2019) session for herbivore/prey-base assessment.

Collection of existing baseline data: Procurement of spatial and non-spatial data (tiger conservation plan/working plans/reports/camera trap photos/shapefiles) was done from GIS Lab-Angul/and then prepared metadata file and consolidated spatial database.

Creation of spatial database: Creation of data in GIS domain in case the data was not already available or created in the past year. The research team also modelled habitat variables such as soil properties and forest cover change using satellite data.

Integration of spatial data in the android based application: The beat maps and grid layers were georeferenced and added to mobile application for easy installation of camera traps in the field. Each beat in all ranges was provided with the maps having administrative boundaries, topographic information and grid details.

Capacity building: Training of field level staff in GPS, GIS, map reading, camera trap installation and line transect data collection was done. The training sessions were organized at the range level, division level, as well as circle level.

Preparation of Prey Augmentation Proposal: A proposal for augmentation of Sambar Population was drafted and submitted to the Division Office for further necessary action.

Socio-economic Profiling of Villages: Baseline data were collected with the help of forest staff, and information was collected for 43 villages for their socio-economic status, livelihood opportunities, resource utilization, dependence on forest and attitude and perception towards conservation. The objective was to revise the village micro-plans and continue with village relocation on a priority basis.

Outputs and Outcomes: Community engagement and village relocation have come out to be a priority action in the present tiger recovery effort. Two villages located near the core have agreed for relocation. While grassland development and prey augmentation efforts are being taken up, protection is also increased as the tiger reserve boundary has been reorganized. The Continuous training and capacity building workshops have built confidence among the frontline staff in monitoring tigers, installation of camera traps and handling telemetry instruments. Efforts are being made to systematically collect and document scientific information on prey, co-predators, tigers and the habitat variables regularly. The entire tiger reserve is being camera trapped systematically for the first time to overcome the logistic problems.

Milestones: Systematic camera trapping of entire tiger reserve has been taken up with systematic monitoring protocol. The socio-economic survey was completed in one division. Village relocation has moved forward with two more villages giving their consent to relocate.

Augmentation and Long-term Monitoring of Tiger in Buxa Tiger Reserve, West Bengal

Funding Source
National Tiger Conservation Authority and West Bengal Forest Department

Investigator
Dr K. Ramesh

Researchers
Orvill Jude Nazareth, Shekhar Sarkar and Shikha Jasrrotia

Date of Initiation
April 2018

Date of Completion
March 2023

Objective: The objective of the project is to (i) undertake post-release monitoring of prey and tiger populations, including assessment of population growth, movement pattern, behaviour, genetic structure and physiological profile; (ii) estimate population size of tiger, co-predator and prey species, and model the habitat correlates with understanding the species-habitat relationship and supporting the ongoing Phase IV monitoring activity; (iii) map landscape composition and configuration, and estimate patch properties, connectivity and landscape permeability within and across the landscape; and (iv) quantify human-wildlife interface issues and ecological correlates linked to economics and ecosystem services.

Progress: At the landscape level, a database containing spatial data viz, boundary vectors (state, district, tiger reserve level), topography raster (STRM Dem, Aster Dem) and their products (slope, aspect, contour, hill shade), hydrological data (river, drainage, watershed, stream, flow direction, flow accumulation), disturbance data (roads, railways, cities, fire data, human footprint), climate (Bioclim), socio-economic data (night light, village boundaries), ecological data (Modis, FAO soil types), and sampling grids (100 km^2, 50 km^2, 25 km^2, 2 km^2, 1 km^2) was created. At the reserve level, the layers on protection (forest department offices, forest houses, check posts, watchtowers and machans, SSB camps), and management (waterholes, roads within the reserve, trails, fire lines) were included in the spatial database. Data was compiled and collected from the field, and online portals and these data sets will be annually updated and maintained with the forest department and WII.

Beat booklets were prepared to contain data on administrative and management information. Administrative layers included range office, beat office, guest house, SSB camp, motorable road, compartment boundary, beat boundary, tourist spots, railway line, watchtowers, check posts, transect lines, waterholes, 2 km^2 grids, drainage network and land cover types of dense, medium and sparse vegetation. This included information about the beat and was created at the beat level for individual beats, and ranges. Separate copies were compiled for the ADFOs, DFOs, and the Field Director, and WII.

Camera traps were deployed as planned keeping in mind the crucial areas where tiger movement was anticipated from the previous years. 2km^2 grids were used to sample the entire reserve. Grids were classified as non-focus grids and focus grids, where the movement of tigers was found or was anticipated to be found. Cameras in the focus grids were stationed throughout the sampling period, and the non-focus grids were covered blockwise with a target of 45 trap nights.

Each grid was sampled using single-sided camera traps and one location in each grid was sampled. Before the start of the exercise, one-day training was provided, for each range to staff on deployment and monitoring of camera traps in the field, and in addition to this, maps were prepared at a range and beat the level for the convenience of the ground staff. Apart from the systematic sampling, camera traps were also deployed opportunistically at sites were animal kills were reported.

Phase I and Phase IV monitoring exercises were conducted for BTR, coordinated with the forest department, over three days. Line transect sampling for direct sightings and forest trails were surveyed for carnivore and herbivore signs. Locations of each of the existing transects were evaluated for independence and repositioned where required. Additional transects were also added, where necessary to ensure complete and uniform coverage of the reserve. Sign survey effort was distributed compartment wise over the three days. Maps and relevant data were prepared for simplification and better understand for the ground staff collecting the data. One-day training organized in each range was attended by all the team leaders and staff undertaking the data collection during the exercise. Transect sampling was done in the early morning, at 6 am, while the sign survey exercise started at 8 am. Datasheets were checked and verified by WII team members and ADFOs at the end of the day.

An exercise for the estimation of herbivore densities for the other divisions in northern West Bengal was also planned and coordinated in Baikunthapur Forest Division, Darjeeling Forest Division (Mahananda Wildlife Sanctuary), Gorumara Wildlife Division, Jalpaiguri Forest Division, Jaldapara Wildlife Division, Kalimpong Forest Division & Kurseong Forest Division. The one-day training was also conducted in these divisions, and the training was attended by CCF Wildlife north circle, DFOs and ADFOs of respective divisions. Besides, a meeting was held to review the planning and discuss the analysis approach, which was attended by CCF Wildlife north, CCF Buxa Tiger Reserve, DFOs and ADFOs of all participating divisions, Dr K. Ramesh (Principle Investigator of the project) and researcher in the project from WII.

The information and data collected so far have been harmonized and placed in both digital and print formats with the forest department and WII research team. An album of species captured in BTR through camera traps from 2 years' records has been compiled along with information and key identification points for use in the field. In addition to this, a separate profile of individual leopards captured in the exercises, identified by the rosette patterns on their bodies, has been developed. Both these documents will be updated annually based on the future camera trapping exercises and are to help in management and protection purposes by the forest department.

Camera Trap Image

Outputs and Outcomes: A list of a total of 83 data layers was prepared for the spatial database. Shapefiles of national, state, district, village, protected areas, BTR ranges, BTR beats, and BTR compartments were obtained from online sources and the forest department. The Shapefiles of range offices beat offices, watchtowers, check posts, road network and waterholes were updated from the field.

The focus grids comprised 98 grids. Cameras were deployed in these grids throughout the sampling duration. The non-focus grids were covered in five blocks. Camera traps were deployed from November 2019, and at present, some are still in the field. A significant number of camera traps were stolen or damaged by elephants and other animals during the exercise. As a result, the target of covering the entire reserve with four blocks was increased to 5 blocks, and West Damanpur, Nimati, Bholka and Hamiltonganj were left out. Intensive sign surveys were carried out in these areas to supplement the camera trap data. There was no evidence of the presence established through camera trap data collected to date. Observation from the kills, it was determined that none of the kills was made by tigers, nor did camera traps deployed opportunistically at kill sites yield any images of tigers. Species wise capture rates and occupancy analysis will be run on the data once all the information is collected. On-going efforts and other activities of prey augmentation and habitat recovery and security by undertaking village relocation and enhanced protection strategies would provide a strong foundation for tiger recovery here.

Phase I and Phase IV monitoring was conducted between 12-14 March 2020. The exercise was done over 79 transects, with a total effort of 472 km. Similarly, the sign survey was conducted over 759 km, no evidence of tigers was reported from the survey and data on prey, and co-predators is in the analysis phase.

Herbivore estimation exercise throughout northern West Bengal comprised of 121 transects in total in a total area of 1413 km^2. Division wise data analysis is in progress. Both the species albums and leopard profile have been completed. The species album comprises of information of 31 species, including their images from the camera traps, a map with locations in BYR where species was captured, a description of the species and details of the species family was produced.

Milestone: Creating a catalogue of all spatial data available will be a useful tool for management and scientific planning. The results from Phase IV monitoring exercise is expected to yield a better result than compared to past exercises due to the increased effort and coverage. The coordinated effort to plan and conduct the herbivore estimation exercise throughout northern West Bengal Divisions was carried out successfully to enable these areas with scientifically planned research activities. Data on the recent exercise will help orient management actions in a scientifically planned manner and at the landscape level. Establishing population status of prey and co-predators is the first step toward identifying measures to be taken to increase the movement of tigers in the landscape and establish resident populations in these areas. Filling the gaps in the data and regular review of the various data present for the region can help identify the trends in the changing landscape and address the issues that arise. Making the data available to the ground staff and managers through beat books and species album is the key to this management.

Long-term Monitoring of Antarctic Wildlife and their Habitats in Antarctica

Funding Source
National Centre for Polar & Ocean Research (NCPOR), Goa, Ministry of Earth Sciences & WII Grants-in-Aid

Investigators
Dr K. Sivakumar,
Dr S. Sathyakumar, Dr S. Mondal and Dr Anant Pande

Researcher
Shashank Arya

Date of Initiation
September 2013

Date of Completion
August 2023

Objectives: The main aim of this programme is long-term monitoring of selected fauna that are indicators of Antarctic and Southern Ocean ecosystems in connection with climate change and therefore, strengthen the biological database of the NCAOR. The objectives of this programme are to (i) monitor indicator species such as penguins and birds in the Indian sector of operation in Antarctica using satellite telemetry; (ii) understand the movement of avifauna in and around the Indian sector of operation in Antarctica; (iii) assess habitat use by the tagged individuals and determine key habitats for the species; and (iv) monitor any changes in the movement patterns over the years correlated with climate change.

Progress and Outcomes: WII had earlier participated in the XIV, XV and XVI Indian Scientific Expeditions to Antarctica (1994-95 to 1996-97) to initiate and implement the Monitoring Programme entitled "*Developing a*

Long-term Monitoring Programme for Birds and Mammals in the Indian Ocean and Antarctica". During these three years of participation, WII could collect baseline data on status and distribution of mammals and birds of India Bay, Antarctica and also standardized the methodology for long term wildlife monitoring. During the 28th, 29th, 33rd, 34th, 35th, 36th, 37th and 38th In SEA, WII could collect the baseline data on status and distribution pattern of birds and mammals in Larsemann Hills areas and continued the wildlife survey along Princess Astrid Coast. Data collected during these expeditions were analysed and published during this reporting period. Details of nesting ecology, behaviour and habitat of individual birds have been studied. Genetic samples of birds (feathers) have also been analysed and published during this period.

Apart from Antarctica, the WII is also monitoring the changes in abundance and distribution of wildlife in the Southern Oceans both Indian and Atlantic. WII in its last nine expeditions could collect most valuable data on birds and mammals in the Indian Southern Ocean which could be used as a baseline data to detect changes in the wildlife populations in this region in relation with climate changes. Some of the research findings have been published as papers and chapter in the book. Two researchers Dr Anant Pande and Mr Shashank Arya from WII, are participating in the 39th InSEA and continuing the survey using various techniques and tools including drones.

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Milestone: The study found that average biomass of pelagic seabirds peaked at the south of the Sub-tropical convergence and identified the sea-pack-ice interface as the better habitat for high prey species abundances in Antarctica. WII has carried out the cross-species screening of a panel of 12 and 10 microsatellite markers in two relatively little studied seabird species in Antarctica, the Snow petrel, Pagodroma nivea and Wilson's storm, *petrel Oceanites oceanicus*, respectively. The panels developed by WII can unambiguously identify individuals of both species. Further, WII study forms a baseline for undertaking long-term genetic research of these Antarctic seabird species and provides critical insights into their population genetics. Weddell seal, *Leptonychotes weddellii* was the most commonly sighted species in India's study areas at Antarctica (94%) followed by Crabeater seal, *Lobodon carcinophaga* (3.2%) and Leopard seal *Hydrurga leptonyx* (0.8%).

Kailash Sacred Landscape Conservation and Development Initiative - Phase II

Funding Source
ICIMOD, Nepal through GBPNISHED, Almora

Investigators
Dr B.S. Adhikari and Dr G.S. Rawat

Researchers
Udita Garbyal and Rishabh Srikar

Date of Initiation
December 2018

Date of Completion
November 2023

Objective: The objective of the project is to understand the movement patterns of herders in upper Darma valley with focus on national policies and Programs.

Progress: Under KSL-Phase II, a reconnaissance survey was carried out during April-June amongst the villages in Darma and results affirmed the fact that pastoralism is on the decline. There has been a rise in trend of loaning out livestock to a few mass herders as opposed to self - rearing. Furthermore, livestock owners have been able to diversify their income sources through a mix of MAP - Keedajadi collection, homestays, tourism and/or having family members with stable jobs outside the valley. The major *bugyals* (alpine rangelands) lie past Sipu, the last village in the valley, and are currently accessed by about 15 mass herders annually (between May-October), of which six are from Darma and nine from outside. As herders use established grazing routes and halting points, areas of high grazing intensities were identified. East facing slopes in the valley have sprawling pastures on gentle slopes largely dominated by *Danthonia* tussocks and *Kobresia* sp. sedges interspersed with herbs such as *Teraxacum officinale*, *Gentianella moorcroftiana*, *SIbbaldia cuneata*, *Anemone rupicola*, *Fragaria* sp., *Thalictrum alpinum* and *Androsace globifera*. Camping sites are easily identifiable and abundant with Rumex nepalensis, which proliferates rapidly due to high concentrations of nitrogen in livestock droppings. *Bergenia stracheyi*, *Dactylorhiza hatagirea* and *Picrorhiza kurrooa* are some of the common MAPs of high

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monetary value and are used extensively in local medicine. Traditional institutions have withered, and establishment of grassroots organizations such as *Van Panchayats* and BMCs have lacked conviction. Livelihood support policies such as dissemination of camping equipment to herders and compensation for loss of livestock in case of accident or attack by wildlife have been improperly implemented. Line departments such as State's Department of Animal Husbandry and State Forest Department have largely failed in being able to provide an adequate framework for the management of pastures and/ or address day to day grievances of the people.

Long-Term Monitoring of Tigers, Co-predator and Prey in Tiger Reserves and Other Tiger Bearing Areas of Vidarbha, Maharashtra

Funding Source
Maharashtra Forest Department

Investigators
Dr Bilal Habib,
Dr Parag Nigam (WII);
Dr R.S. Gowekar, Sh. Praveen N.R.,
Shri Ramanujam R.M.,
Shri M.S. Reddy

Researchers
Aishwarya Bhandari,
Jaydeep Patil, Indranil Bhowmick,
Shreya Ray, Nilanjan Basu,
A. Krishnan, Lynette Gomes,
Nilanjan Chatterjee

Date of Initiation
February 2019

Date of Completion
January 2029

Objectives: The project has the following objectives (i) Long-Term Monitoring of Tigers, Co-predator and Prey in Tiger Bearing Areas of Vidarbha, Maharashtra; (ii) Identify potential areas in the State of Maharashtra for conservation translocation to reduce Human-Wildlife conflict; (iii) Understand the role of Wild dogs in Navegaon-Nagzira Tiger Reserve on Tiger recovery; (iv) Understand Ecology of Ratel in Melghat Tiger Reserve, and (v) Understand the movement of selected tiger females and their subsequent generations.

Progress: The abundance and density of prey species were estimated using distance sampling across the tiger landscape in Vidharbha Landscape, Maharashtra. 327 forest personnel (Guards and Foresters) were trained in 7 organised workshops to conduct transect surveys simultaneously across Melghat Tiger Reserve. A total of 131 participants were trained during the workshop at Bor Tiger reserve. A total of 222 participants (guards, rangers and ACFs) were trained during these workshops in NNTR. A total of 91 Forest staffs in Umred-Karandla wildlife sanctuary and 122 forest staffs in Brahmapuri Wildlife sanctuary have been trained in camera trapping and line transect. Transect surveys were conducted by the field staff of MTR from 12th December 2019 to 26th December 2019, by NNTR field staffs on 16th December 2019 to 27th December 2019, by TATR field personnel between 17th of February and 23rd of February.

To estimate density and demography of tigers and co-predators across tiger landscape in Vidharbha Landscape, Maharashtra (i) Camera trapping exercise was conducted in 2 blocks covering 618 grids out of 960 grids in MTR from 13 March 2020 to 4 June 2020; (ii) A specially trained team of 70 Forest Guards and Foresters was involved in placing 1,236 camera traps to carry out the above exercise throughout Sipna, Gugamal and Melghat Wildlife Divisions of MTR; (iii) Camera traps have been deployed in 90 grids of 2 sq.km in Umred-Paoni-Karandhla Wildlife Sanctuary; (iv) Cameras were placed on 79 grids in Bor Tiger Reserve following a 2 sq. km grid; (v) Camera traps have been deployed in 251 grids of 2 sq. km grids in Nagzira-Navegaon Tiger reserve; (vi) Cameras were placed in 431 grids in Tadoba-Andhari Tiger Reserve following a 2 sq. km grid; (vii) In Brahmapuri Forest Division 400 camera traps were deployed following the 2 sq. km sampling grid; (viii) The data collected from the camera trapping exercise is currently being processed.

Outcome and Outputs: Capacity building programmes for forest-staffs (guards, rangers and ACF) across forest divisions and Tiger Reserves of Vidharbha landscape, Maharashtra, India were organised. Phase-IV training report of forest personnel in Eastern Vidharbha Landscape, Maharashtra, India was prepared.

Prey, Predator and Habitat: Long-Term Monitoring of the Asiatic Lion Landscape

Funding Source
Gujarat Forest Department and WII Grant-in-Aid

Collaborating Agency:
Gujarat Forest Department

Investigator
Dr Y.V. Jhala

Researchers
Keshab Gogoi and Doli Bohra

Date of Initiation
April 2019

Date of Completion
May 2022

Objectives: The project objectives are to (i) Monitoring of lions, and their prey in the Greater Gir Landscape; (ii) Monitoring of lion habitats in the Greater Gir Landscape of Saurashtra; and (iii) Assess the attitude and perception of locals towards lion conservation in Saurashtra.

Progress: *Mapping of suitable habitat patches for lions in the Saurashtra landscape*: The research team used geographic locations of 27 radio-collared individuals from the long-term research project on Asiatic lions in Saurashtra landscape by Wildlife Institute of India, as well as direct sightings and indirect signs of lion presence. The detections resulted in >23,000 geographic locations across the landscape. The long-term ecological study on lion's habitat use in the human-dominated landscape reveals that the minimum patch size needed for the breeding lioness in the human-dominated landscape is >4 km^2 in size. Therefore, the research team have mapped all the habitat patches that are more than 4 km^2 in size outside the protected area boundary and subsequently ground validated through field visits. The team used Maxent software to model the habitat suitability of lions, wherein eco-geographical covariates of Drainage density, Distance to urban sprawl, Enhanced Vegetation Index (EVI), Distance to water sources, Elevation, and Distance to habitat patches were used at a scale of 1 km^2. Outside the protected area boundaries of Gir, in the north the forest patches around Hingolgadh area were found to be highly suitable for lions, in the west Barda-Alech forest complex were another suitable habitat for lions to thrive among the multi-used human-dominated landscape of Saurashtra. However, colonization of lions in these areas highly depends on the permeability of the matrixes and connectivity with the source populations.

The forest patches along river Shatrunjay and Palitana hill ranges in the districts of Amreli and Bhavnagar have been already colonized by lions, and these habitat patches are the lifeline of lions in the human-dominated landscape of eastern landscape. The coastal forest patches of Mangrol, Veraval, Sutrapada, Una, Rajula-Jafrabad and Mahuva were also found to be suitable to Asiatic lions, and a handful number of lions have already been colonized these forest patches in the last few decades. Due to rapid urbanization and land-use changes these suitable habitat patches, however, is vulnerable to anthropogenic alteration; therefore management authorities should emphasize in protecting these habitats for the long-term conservation of Asiatic lions in the human-dominated landscape of Saurashtra.

Outputs and Outcomes: *A breakthrough into the social system of female Asiatic lions*: An effort of 2040 hours of observation was invested in understanding the social system of female Asiatic lions, which was not documented earlier. The research team studied seven prides, that range from two to seven adult females and their offspring. The team identified each lioness individually based on their vibrissae and permanent markings, and collected fresh scat for genotyping each lioness. A panel of 15 microsatellites was used for genotyping lions and subsequently computing their kinship. The research team then constructed social networks, indices of dominance and correlated these with group sizes and age-category of lionesses. The results indicate a strict linear order of hierarchy (based on both affiliative and agonistic interactions) in the upper strata of the dominant females while in the lower strata this linearity tapers off into more amorphous dominant-subordinate relationships. Surprisingly, the team found unrelated lionesses within the pride of related individuals. These non-kin lionesses were usually at the lower strata of dominance within a pride. Dominance was seen to be age-related with older females, mostly being dominant over younger ones. The study opens up new questions for an in-depth, long-term study on kinship related fitness within social prides.

An Integrated Approach for Conservation of Takin, Budorcas taxicolor in North East India: Linking Species Ecology and Traditional Ecological Knowledge

Funding Source
MoEFCC

Investigators
Dr Gopi G.V., Dr S. Sathyakumar, Dr Bharat Bhatt, Dr K. Sivakumar and Dr Parag Nigam

Researcher
Pooja Chand

Date of Initiation
July 2019

Date of Completion
July 2022

Objectives: The objectives of the project are to (i) Assessment of distribution and status of Takin in select areas of Arunachal Pradesh; (ii) Understand the local and transboundary movement pattern of takin in the landscape; (iii) Identify threats including evaluation of traditional ecological knowledge, and (iv) Develop a conservation action plan for this species in Arunachal Pradesh

Progress: Research permission was granted by Government of Arunachal Pradesh vide letter no CWL/G/173/2018-19/pt.VII/570-572 dated 04 July 2019. After receipt of the permission, the project team was stationed in WII (HQs) due to monsoon to finalize the data sheets and procured field equipment. The team reached the field sites and met the concerned DFO's and got the requisite field permissions. The field data collection started in December 2019. Three districts were covered during the survey, namely Dibang Valley, Lower Dibang Valley and Lohit districts

Outputs and Outcomes: Due to Covid-19, the team could not carry forward the work as planned. Camera trapping details and number of camera traps that photo captured Mishmi Takin in the surveyed areas.

Study Area	Season	Total Numbers Camera Traps	No. of Cameras Traps Captured Mishmi Takin
Meaho WLS	Winter	60	3
	Summer	49	1
Dibang WLS	Winter	57	14
	Summer	25	5
Kamlang TR	Winter	37	5

Milestone: The remaining surveys and fieldwork will be carried out in the coming field season, i.e. from September 2020 - August 2021.

Status and Conservation of Tigers and their Habitats in Hill Ranges of North East India

Funding Source
National Tiger Conservation Authority

Investigator
Dr Gopi G.V.

Researchers
Project Fellows: Aisho Sharma Adhikarimayum, Arif Ahmad, Deepan Chakaravathi, Divya Deshwal, Himanshu C Lad and Lamgouhao Neishel
Project Assistants: Sidharth Srinivasan, Sirumai Khusiali Kri and Priya Hazra

Date of Initiation
July 2019

Date of Completion
July 2023

Objectives: The objectives of the project are to (i) Determine the status and distribution of tigers and associated species in the Mishmi Hills (Dibang Valley District, Lower Dibang District and Kamlang Tiger Reserve in Lohit District), Tamenglong District of Manipur and Dimapur and Peren District of Nagaland; (ii) Evaluate the effects of environmental features and anthropogenic pressure on the tigers and associated species occupancy patterns; (iii) Assess local people's knowledge, beliefs, attitudes and perceptions about conservation of tigers, co-predators and their prey species; and (iv) Identify areas that have high conservation value as well as those that are under threat for tigers, co-predators and their prey species, with the ultimate aim of planning future long term monitoring and conservation strategy.

Progress: The project was initiated after the signing of MoU between WII and NTCA on 27.03.2018. Research permissions were obtained from concerned state governments of Arunachal Pradesh, Manipur and Nagaland. 6 project fellows and three project assistants were engaged in the project to work in the selected landscapes. In Arunachal Pradesh three intensive field sites in Mishmi hills viz. Dibang Wildlife Sanctuary, Mehao Wildlife Sanctuary, Kamlang Wildlife Sanctuary and Tiger Reserve were chosen for monitoring. In Manipur, Tamenglong and Senapati districts were chosen for monitoring. In Nagaland Intanki National Park and Peren district were chosen for monitoring. As only limited funds were released, we weren't able to do intensive camera trapping based occupancy surveys; the research team limited our camera trapping exercise (with camera traps resourced from other projects) in Kamlang TR and Mehao WLS. In Dibang WLS, Manipur and Nagaland informal interviews with local people were conducted to understand tiger occurrence and issues concerning them.

Outputs and Outcomes: Due to Covid-19, the team could not carry forward the work as planned. Camera trapping details and number of camera traps that photo captured Mishmi Takin in the surveyed areas.

Kamlang Tiger Reserve with an area of 783 km^2 is a recently notified tiger reserve. During this survey season (December 2019 - April-2020) an area of 144 sq. km out of 196 km2 in the identified blocks were monitored using Camera traps and sign survey-based occupancy survey. Mehao WLS: The Mehao Wildlife Sanctuary encompass an area of 281.5 km^2 in the Lower Dibang Valley district. During this survey season (December 2019 – April 2020) 123 km2 out of 180 km2 in the identified blocks were monitored using occupancy-based camera traps survey.

The research team surveyed Tamenglong, Senapati and Peren districts having the maximum forest cover for Manipur and Nagaland.

Milestone: Camera traps were deployed in 37 locations in Kamlang TR with overall survey effort of 2,141 trap nights, and 63 km of sign survey was conducted at 26 different searches. The area coverage of this season was considerably less due to various field constraints; however, the species richness obtained through camera trapping and its associated surveys, revealed the occurrence of 32 mammalian species in the study area.

Camera traps were deployed in 41 different locations of Mehao Wildlife Sanctuary with overall survey effort of 2,172 trap nights. The team documented 24 mammalian species in the sanctuary.

A questionnaire-based survey in 17 different villages of Dibang Valley district was conducted, and 110 respondents were interviewed in the study area. Twenty-five mammalian species was recorded through a questionnaire-based survey.

From December 2019 to April 2020, 26 villages of Manipur and Nagaland were surveyed by conducting questionnaire surveys with the village chairman, elders, traditional healers, and hunters by asking open-ended to semi-structured questions (covering an area of more than 400 km^2. The findings have reported the presence of 27 species of mammals with rare and endangered species like Tigers, Clouded leopard, Bengal slow loris, Hoolock gibbon, Chinese pangolin, and three species of Otters.

Due to COVID-19, the team could not carry forward the work as planned. The remaining work will be carried out in the coming field season, i.e. from September 2020 - August 2021 (depending on the pandemic situation).

Preparation of Conservation Plan for Biodiversity likely to be Impacted by Greenfield Jewar International Airport, Gautam Budha Nagar, Uttar Pradesh

Funding Source
Yamuna Expressway Industrial Development Authority (YEIDA), Government of Uttar Pradesh

Investigators
Dr Bilal Habib, Dr S.P. Goyal, Dr Asha Rajvanshi, Dr A.K. Bhardwaj

Researchers
Athar Noor, Aimon Bushra, Rahul De, Ravi Kumar Sharma, Sultan, Akash Agrawal

Date of Initiation
August 2019

Date of Completion
July 2020

Objectives: The project has the following objectives (i) Identify the key sources of impacts and the nature of impacts (direct and indirect, long term and short term and irreversible impacts if any associated with the airport) that would help guide the preventive, ameliorative and restorative strategies to be adopted in the conservation planning; (ii) Identify the significant biodiversity values represented by rare, endangered and threatened (RET) floral and faunal species belonging to major taxa (herpeto-fauna, birds and mammals) within the zone of influence of the project; (iii) Assess the vulnerability of habitats and landscape features within 10 km radius to impacts during different phases of the airport development and the likely implications; (iv) Prepare conservation plan for rare, endangered and threatened (RET) faunal species (herpeto-fauna, birds and mammals) that is based on preventive and restorative measures for impact mitigation; and (v) Propose Phase-II plan (Five Years) for the "Post-Development Monitoring" for the status of RET species.

Progress: As the project initiated in October 2019, the primary aim was to survey the proposed airport area including a buffer of 10 km radius to understand the status and number of the associated flora and fauna of the landscape. The research team collected data on the birds, mammals and vegetation. The survey revealed that the Indian antelope or Blackbuck, *Antilope cervicapra* is the main species of conservation and management concern amongst large mammals in the surveyed landscape. Blackbuck populations are scattered and patchy throughout the landscape of varying population sizes (1 to 29). The largest population size (~29 individuals) observed, lies at the eastern side of

Jewar-Bulandshahar road which bisects the GJIA site. Most of the habitats used by the Blackbucks within the GJIA site is the agricultural land belonging to villages Ranhera, Rohi, Parohi, Banwaribas, and Bankapur. Outside the GJIA site, ~22 Blackbuck individuals were observed in agriculture land belonging to the villages, viz. Jhuppa, Shyam Nagar and Shamsham Nagar in the south-west of Jewar town. The team also observed another population of ~19 individuals around forest patch along the Jewar to Jewar Khadar road.

In the case of birds, Sarus crane, *Grus antigone* has been identified as the species of immediate conservation and management concern. It is well spread throughout the landscape and commonly observed species. In total, 64 birds in 21 independent observations were recorded across the landscape, and the flock size ranged from 1 to 5. The majority (n=18) of these were outside the GJIA site. The largest flock of 5 birds was observed within the GJIA site. Other birds of conservation importance include Egyptian vulture (*Neophron percnopterus*), a few individuals (n=6) of which were observed at four different occasions during the survey, suggesting its very low abundance whereas Indian. Peafowl (*Pavo cristatus*) which is very common, abundant and found distributed all through the landscape close to villages.

Output and Outcomes: The preliminary findings of the survey have been submitted to Yamuna Expressway Industrial Development Authority, Government of Uttar Pradesh, as an Inception Report of the project (titled as "*Conservation Plan for Biodiversity likely to be Impacted by Greenfield Jewar International Airport, Gautam Budha Nagar, Uttar Pradesh*") in January 2020 by Wildlife Institute of India. A workshop was also conducted "Planning Effective Biodiversity Conservation Strategies around the Greenfield Jewar International Airport, Gautam Budh Nagar, Uttar Pradesh, India" on 1 February 2020 to brief various stakeholders about the Framework of Biodiversity Conservation Plan for the wildlife recorded in and around the proposed Greenfield Jewar International Airport site. The stakeholders were also apprised about the preliminary findings from the field survey. A detailed conservation plan is being prepared to be submitted to YEIDA.

Understanding Large Carnivore Conflict Issues in Maharashtra for Suggesting Conflict Reduction Measures

Funding Source
Maharashtra Forest Department

Investigators
Dr Bilal Habib and
Dr Parag Nigam

Researchers
Advaita Ravindran and
R. Yashaswi Rao

Date of Initiation
September 2019

Date of Completion
August 2023

Objectives: The project has the following objectives (i) Development of Village-level database; (ii) Assess the present status of large carnivores and prey in the area; (iii) Assess the diet of large carnivores; (iv) Assess villages' vulnerability to conflict; (v) Suggest measures for mitigating conflict; and (vi) Develop early warning systems.

Progress: A baseline database of human-wildlife conflict incidents was developed for assessing Spatio-temporal trends. The research team developed a format for data collection and management. Three templates were developed, viz. human casualties (Fatalities/Injuries); livestock losses and crop damage. The templates were shared with the Forest Department as well. Historical past ten years data of large carnivore conflict were collected from Brahmapuri Forest Division, Chandrapur Forest Division, Central Chanda Forest Division and Tadoba Andhari Tiger Reserve. Distance sampling exercise using line transects was conducted in Protected Areas in the region (including Tadoba Andhari Tiger Reserve, Navegaon Nagzira Tiger Reserve, Melghat Tiger Reserve, Tipeshwar Wildlife Sanctuary, and Umred-Karhandla Wildlife Sanctuary) as well as outside Protected Areas (including Brahmapuri Forest Division and Pandharkawada Forest Division) to estimate the population of wild prey species (Nilgai, Chital, Sambar deer, Peafowl, Wild pig, etc.)

Scat samples of various species like tigers, leopards, dholes and sloth bears have been collected from the region to develop an understanding of the dietary habits of these species

Outputs and Outcomes: Camera-trapping exercise was carried out in the Protected Areas in the region (including Tadoba Andhari Tiger Reserve, Navegaon Nagzira Tiger Reserve, Melghat Tiger Reserve, Tipeshwar Wildlife Sanctuary, and Umred-Karhandla Wildlife Sanctuary) as well as outside Protected Areas (including Brahmapuri Forest Division) with a motive of population estimation for species with individual markers (tigers and leopards).

Management Plan Preparation and Population Monitoring of Turtles in Surinsar-Mansar Wetlands, Jammu & Kashmir, India

Funding Source
Department of Wildlife Protection, Jammu & Kashmir

Investigators
Dr Abhijit Das and Dr J.A Johnson

Researchers
Arushi Mahajan and Krishnendu Banerjee

Date of Initiation
September 2019

Date of Completion
July 2020

Objectives: The project has the following objectives (i) Biodiversity assessments of Surinsar-Mansar lakes. (ii) Population monitoring of two turtle species viz. *Nilssonia gangeticus* and *Lissemys punctata*. (iii) Impact assessments of several anthropogenic stress and potential habitat modification.

Progress: The species diversity of herpetofauna and avifauna was assessed. Water samples were collected for one season, and laboratory work is underway. Identification of potential basking site of turtles in Surinsar-Mansar wetland was done during the reporting period. Mapping of all the necessary components was done to best fit the management plan, and the final stage of map preparation is underway.

Outputs and Outcomes: The research team recorded three species of amphibians and ten species of reptiles. New records of Pangshura tentoria for Jammu and Kashmir were added. Three species of turtles such as *P. tentoria*, *P. tecta* and *P. smithii* to the Chelonian fauna of Surinsar-Mansar wetland were also added. Digital maps of depths at different regions of both the wetlands were procured. The team recorded 70 species of avifauna including waterbirds in and around these two wetlands.

Milestone: Community engagement is necessary to save the remaining biodiversity of these two wetlands and provide awareness alongside the species living there. The forest department was provided with the knowledge of the best possible method for sampling and monitoring turtles and successive techniques to monitor the breeding population, nesting individuals, taking care of eggs and safe rescue and rehabilitation of hatchlings as well as protecting the remaining natural basking sites of turtles.

Establishment of a Web Portal for Dissemination of Research Findings as a Decision Support System for Policy Makers and Wildlife Managers in Maharashtra

Funding Source
Maharashtra Forest Department

Investigators
Dr Bilal Habib and
Dr Parag Nigam

Researcher
Abhishek Krishnan

Date of Initiation
December 2019

Date of Completion
November 2024

Objectives: The project has the following objectives (i) Establishment of ArcGIS Server, and (ii) Deployment of Web Portal for the dissemination of research findings as a decision support system.

Progress: The research team proposed the Maharashtra Forest Department to build an online web portal for displaying spatial datasets and for the dissemination of research findings as a decision support system in 2019. After online surveys and requirement analysis, the team finalised upon installing GIS Servers inside campus instead of opting for cloud solutions, as this would give more physical control over the data and the infrastructure. The team tested the ArcGIS Enterprise software on different operating systems platforms, viz. Ubuntu, Windows and CentOS and tested its web portals for ease of deployment, ease of remote access to the server and ease of hosting services. The team researched on the best possible server hardware architecture which would best suit the needs and demands. They also tested different deployment modes of the software to review the pros and cons in each mode and choose the best suitable mode.

Available deployment models in ArcGIS Enterprise software are (i) *Single Machine Deployment*: In the all-in-one configuration of the base ArcGIS Enterprise deployment, all of the components are installed on a single machine.

(ii) *Multi-Machine Deployment*: In a multi-machine base ArcGIS deployment, the software components can be installed on two or more machines.

(iii) *High Availability Deployment*: In a highly available configuration, each ArcGIS Enterprise component is configured with redundancy, to minimize downtime in scenarios where one or more machines become unavailable

Outputs and outcomes: Three Dell PowerEdge servers were procured with a capacity of Twin 18 Core Intel Xeon Processors, 128 GB DDR4 Ram, 14.4TB Storage with two 500GB High-Speed SSD as cache storage and 8GB RAID Cache.

The research team finalized on Windows as the OS, since ease of deployment, technical support, and proper documentation is available ArcGIS Enterprise. Since other servers in the institute run on Windows, using Windows Server will bring all of their servers in one environment which will give an added advantage in the management of servers.

The research team chose Multi-Machine deployment of ArcGIS with a custom placement of components, which will maximize the through-out of the systems.

The research team proposed the deployment. The first server will contain ArcGIS Web Adaptor 1; and an ArcGIS Web Portal. The second server will contain Web Adaptor 2 and ArcGIS Server. The third Server will contain ArcGIS Data Store. Each of the servers will be interconnected using 10 Gigabit networks for the fastest data transfer speeds within the institution.

By using this type of deployment, the research team can scale any of the modules based on future requirements without altering operations in other modules. Multi-machine deployment can handle more than 5000 users at a time accessing the full capacity of the servers.

Milestones: The servers were procured and installed during the reporting period. ArcGIS Enterprise software was tested on different Operating systems. Static IP for servers was procured from the institution. A custom configuration of deployment was designed.

Planning and Management for Aquatic Species Conservation and Maintenance of Ecosystem Services in the Ganga River Basin for a Clean Ganga (NMCG-WII Phase II)

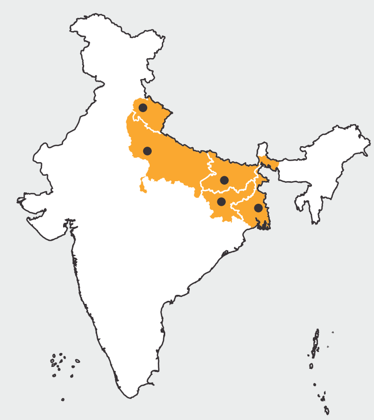
Funding Source
National Mission for Clean Ganga, Ministry of Jal Shakti

Investigators
Dr S.A. Hussain and Dr Ruchi Badola

Researchers
56 research personnel

Date of Initiation
January 2020

Date of Completion
December 2025



Objectives: Phase I of the project aimed to prepare a science-based aquatic species restoration plan for the Ganga River by involving multiple stakeholders. The project objectives are: (i) strengthen the aquatic biodiversity conservation measures at six identified biodiversity hotspots along the Ganga River and monitor status of other areas; (ii) explore the natural and assisted colonization of species of conservation significance to other stretches of mainstem Ganga River; (iii) determine the current state of aquatic environment and biodiversity of the major tributaries and wetlands in Ganga basin; (iv) identify direct and indirect drivers affecting the integrity of the aquatic environment and biodiversity in the Ganga basin; (v) pinpoint problematic areas and identify conservation priority zones; (vi) strengthen/ establish rescue and rehabilitation centres at strategic locations for aquatic species in distress; (vii) involve communities and other stakeholders in the conservation process through capacity building, innovation and strengthening existing institutions; (viii) garner support for aquatic biodiversity and Ganga conservation through education and outreach programs; (ix) identify and analyse the hydro-socio-ecological relations in the river basin for efficient and targeted conservation action; (x) prepare an action plan to minimize the negative impacts of the direct and indirect drivers on the aquatic environment and biodiversity of the select tributaries of Ganga basin; and (xi) develop a centralized facility of laboratories and resource centre for aiding in science based management of the Ganga River and its tributaries.

Progress and Outcomes: The objectives are being covered under three components: (i) Science-based aquatic species conservation and maintenance of ecosystem services in the Ganga River basin. (ii) Capacity building of the Forest Department and other stakeholders in managing aquatic and wetland resources. (iii) Develop community-based aquatic species conservation and outreach programmes for Ganga River basin.

Under the first component of phase II, the establishment of Ganga Centralized Aqualabs was initiated at WII. The foundation stone of the Aqualabs was laid by Dr Harak Singh Rawat, Hon'ble Cabinet Minister, Forests & Wildlife, Government of Uttarakhand on 28 November 2019 at WII campus.

Reconnaissance surveys were carried out in the seven tributaries of the Ganga River, *viz*. Ramganga, Gomti, Gandak, Yamuna, Chambal, Ajay and Rupnarayan. Six teams, including 15 WII researchers and 11 Ganga Praharis conducted the surveys within 30 days, covering 3300 km. A scientific assessment of terrestrial flora and fauna was conducted in 25 districts of Uttar Pradesh along the Ganga River by 11 Ganga Praharis, in a collaborative effort by WII and Global Tiger Forum (GTF). A Roundtable Meeting on Initiation of a blueprint for measuring Gross Environment Product (GEP) held at WII on 5th March 2020, in the gracious presence of Prof. K. Vijay Raghavan, Principal Scientific Adviser, Government of India, and Padma Bhushan Dr Anil P. Joshi. Indicators were defined and a road map prepared for GEP assessment.

Technical support was provided to Bihar Forest Department for the establishment of rescue and rehabilitation facility at Bhagalpur. The Spearhead Team of Uttar Pradesh Forest Department, along with Ganga Praharis rescued more than 600 turtles at Varanasi. These rescued turtles were taken to the Ganga Aqualife Rescue and Rehabilitation Centre, Sarnath and were successfully rehabilitated in the identified stretch within the HBZ III.

Under the second component of phase II, "Capacity building of forest department and other stakeholders" 50 Ganga Praharis from Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal were selected as the first spearhead team of the local communities. These selected Ganga Praharis underwent training at the Wildlife Institute of India, Dehradun from 3-10 February 2020. These trained members of the Ganga Prahari spearhead teams are leading the biodiversity conservation activities along the mainstream Ganga and its selected tributaries. The Bal Ganga Prahari programme has been initiated in the Ganga Basin. About 53 schools from Uttarakhand, Uttar Pradesh and New Delhi

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have enrolled in the Bal Ganga Prahari Programme. A total of 2,779 students and 141 teachers were sensitized about the Ganga and its biodiversity through various awareness activities and programmes.

Under the third component on "Community based aquatic species, conservation and outreach" awareness, consultation, sensitization and livelihood assessment activities were conducted (n= 80) at various locations in Ganga river basin with various stakeholders and Ganga Praharis. A total of 3,350 stakeholders were sensitized on biodiversity in the Ganga river basin, and project objectives and approaches. 50 new Ganga Praharis were identified from villages located along the various tributaries, and orientation training was conducted for them. During national training for Ganga Prahari spearhead team, they were trained in microplanning processes such as data collection, problem tree analysis and solution development. Site-specific livelihood strategies were developed, and modules were prepared. Five livelihood training programmes were conducted, and 100 individuals were trained. After the training, Ganga Praharis conducted 103 activities including awareness, plantation, cleanliness and rescue of aqua life in their respective fields. More than 200 school children participated in World Wetland Day celebration at Surajpur Wetland and Asan Barrage. Exhibitions on Ganga and its biodiversity were displayed in Haridwar during Makar Sankranti, Sur Sarovar, Agra and during inaugural of Antariksh Bhawan, Uttarakhand Space Application Centre, Dehradun.

Milestone: Six teams comprising 15 WII researchers and 11 Ganga Praharis surveyed seven tributaries of the Ganga River within 30 days and covered 3300 km of the river length. Spearhead team of 100 Ganga Praharis was established and trained.

Understanding Population Dynamics, Space Use, Movement and Diet of Leopards in Junnar Taluka, Maharashtra for Human Leopard Conflict Mitigation

Funding Source
Maharashtra Forest Department

Investigators
Dr. Bilal Habib,
Shri Vivek Khandekar,
Dr. Parag Nigam,
Dr Samrat Mondol and
Shri Jayaramegowda R

Researchers
Rucha Ghanekar and Kumar Ankit

Date of Initiation
February 2020

Date of Completion
February 2023

Objectives: The project has the following objectives (i) *Population estimation*: Population density, abundance and demographic structure of leopards in the landscape will be carried out. Capture-recapture sampling method and spatially explicit CR approaches will be used to achieve this objective. This exercise will be carried on an annual basis using camera traps. (ii) *Food habits of leopards*: Scat analysis is an indirect, non-invasive and unbiased technique for recording frequency of occurrence of prey in the diet of large carnivores and hence it is most widely used. (iii) *Genetic database of leopards*: This database can help us to identify individuals that are serial offenders in conflict cases and identify their family lineages. Further, intensive genetic data generated from faecal samples will also provide information on sex ratio and population dynamics. (iv) *Spatio-temporal use and movement*: The study will also highlight the Spatio-temporal pattern of the leopards in the Junnar Forest Division. The movement ecology will highlight the pattern of landscape use by the leopards and will try to identify parameters which govern the movement of the animals. (v) *Characterizing conflict sites:* Data on locations of the conflict sites will be collected to characterize the sites of the conflict within the landscape. (vi) *Socio-economic survey*: Village Surveys will be conducted to evaluate the dependency of local people on forest resource and to evaluate the magnitude of the conflict. All the events of depredation will be evaluated with respect to forest type, cover distance from village etc. to evaluate the potential areas of conflict with respect to the distribution of predators in the Junnar Division

Progress: *Understanding the magnitude of human-wildlife conflict for effective mitigation*: As the projected initiated last year our foremost aim was to understand the magnitude of the human-wildlife conflict in Junnar Forest Division for different objectives and study design. We collected conflict records of the last two decades from the Junnar Forest Division. The records suggest a total of 4648 incidents of livestock depredation and human injury/death attributed to large carnivores were reported at JFD in two decades. Leopard (n=4495) was the main carnivore species reported in the depredation cases along with occasional cases of wolves (n=99), hyenas (n=22) and unidentified wild animals (n=32). Also, an abrupt surge of conflict incidences was recorded after the year 2014.

Mapping of Spatio-temporal human-leopard conflict hot spots: As a part of one of the objective 'characterizing conflict site' we have mapped the human-leopard conflict hotspots of the two decades (1999-2018). Using the conflict records, the team identified different clusters of conflict hotspot using the tool optimized hotspot analysis. Further, the research team also analyzed the data of two decades to identify different categories of the conflict. The team used the tool emerging hotspot analysis, which identified three categories of the conflict in the study area. It will be effective in the implications of the management approaches and mitigation based on the conflict hotspot categories.

Figure 1: Year wise maps for optimized hot spot analysis in Junnar Forest Division, Maharashtra, India

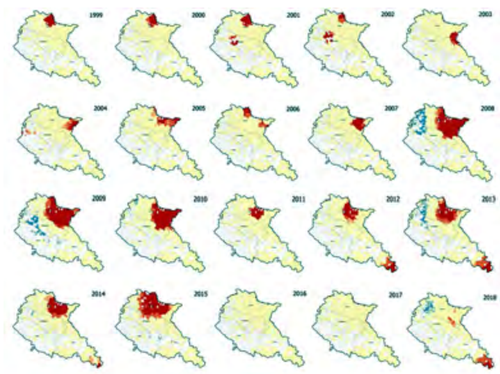
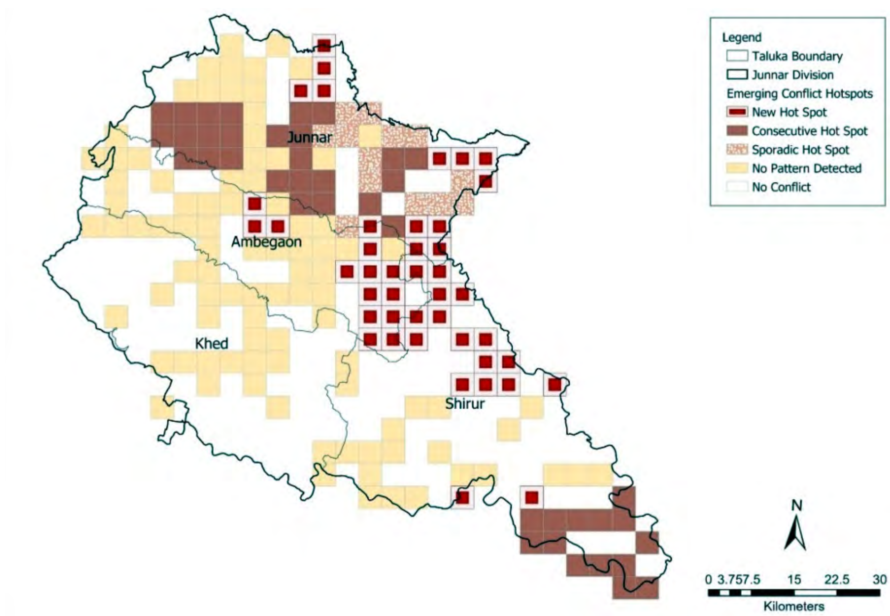


Figure 2: Results of emerging hotspot analysis showing new, consecutive, sporadic hot spots from the data of two decades.



Camera trapping exercise for population estimation of leopards: As per one of the objectives of the projects, the team conducted a camera trap exercise in 100 km2 in Shirur taluka of the forest division. The area is also in one of the new conflict hotspot region based on our emerging hotspot analysis results. Through the camera trap exercise, the team captured a leopard, hyena, rusty-spotted cat, jackals, and wild pig. The detailed analysis is currently in progress. Preliminary interactions with villagers at various locations have provided insights to design in-depth interviews.

Outputs and Outcomes: The findings were presented by the project researcher titled “Not so sweet! A case study of sugarcoated human leopard conflict in Junnar Forest Division, Pune Maharashtra” in 15th Internal Annual Research Seminar-2019.

Milestone: A technical publication on ‘Identification of human-leopard conflict hotspots for prioritizing the mitigation measures in Junnar Forest Division, Pune, Maharashtra’ was brought out during the reporting period.

During the reporting period, the Institute completed eleven research projects. A total of 48 projects were ongoing during the period and nine new research projects were initiated.

ACADEMIC AND TRAINING ACTIVITIES

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Academic Programme

XVII M.Sc. (Wildlife Science)

During the reporting period, the XVII M.Sc. students underwent I and II semesters of their course. Teaching inputs were given in both the classroom and the field. The study commenced on 1 July 2019.

All twenty students underwent a week-long orientation both within the Institute and also in the Rajaji National Park. The students were taken to their orientation tour to Lansdowne Forest division from 27 July to 1 August 2019 during which they walked from Sanne to Kolluchaur to Chaukhamb and finally to Noddy. The students went on their Techniques tour during 9-24 November 2019 to Beribada part of Western Rajaji National Park for ten days.

The second semester commenced on 11 January 2020. The students were mostly busy with theory and lab practical during the first half of the II semester. They were taken to Mussoorie and Dhanaulti in January for a day-long trip during which they were exposed to temperate vegetation communities. The wetlands tour took place in February, for which the students went to Bhitarkanika Wildlife Sanctuary and Chambal National Park. The students continued with their theory classes until 20 March 2020. The theory classes had to be discontinued from this point due to the COVID pandemic.

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First M.Sc. Course in Heritage Conservation and Management (2019-21)

Responding to the critical need for advancing heritage education, the UNESCO C2C-WII has introduced a two-year residential Master's Course in Heritage Conservation and Management since July 2019. Affiliated to Saurashtra University, Gujarat, the course is interdisciplinary and advances sustainability studies through the prism of heritage. The first batch of the course included seven students from diverse academic fields. The first six months of the course, i.e., from July to December 2019, saw a culmination of classroom study, self-study and three orientation and heritage study tours. At the beginning of July, the students were introduced to the various concepts and definitions of Heritage and the UNESCO World Heritage Convention. To learn more and get a first-hand experience of the periodic meetings of the World Heritage Committee, they watched the live telecast of the 43rd session of the Committee from Baku, Azerbaijan, from 2–8 July 2019.

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Visits to Mohand area of Rajaji Tiger Reserve, Forest Research Institute, Wadia Institute of Himalayan Geology were conducted for the students, who gave a perspective of wildlife science, forestry and geological heritage. An Orientation Tour was conducted in two parts: (i) Mussoorie, Hanifl Centre, Landour, Benog Wildlife Sanctuary, Jaberkhet Nature Reserve, Everest House, Kalsi-Yamuna Landscape, Colonial and Afghan Heritage of Dehradun in

Uttarakhand; and (ii) Humayun's Tomb, Sunder Nursery, Red Fort, Old Delhi, Qutab Minar, National Museum, UNESCO Delhi Office, Archaeological Survey of India, WWF-India Secretariat, INTACH Office Delhi. Eminent resource persons interacted with the students, and shared their perspectives on natural and cultural heritage conservation and management.

The students also visited Sarnath and Varanasi as part of their course's Techniques Tour from 11-18 November 2019. The students had an opportunity to learn about the history of Varanasi and the cultural importance of the Ganga Ghats in the course of a ferry ride. The second semester started in January 2020 has been designed with the interlinked modules related to Heritage Risk Management, Sustainable Tourism, Heritage Site Management, Culture-Nature Linkages, Heritage Economics and Creative Thinking. A diverse array of faculty interacted with the students. The visiting faculty included architects and heritage professionals, multi-disciplinary academicians, communication and conservation practitioners.

The students also made short visits in Uttarakhand to Devalsari in the Jaunpur range and Saklana in the Tehri Garhwal region. Besides these short visits, the students were also taken for a 15-day Heritage Sites Tour to eastern Rajasthan, where they studied cultural and natural management practices in locations as varied as Jaipur, Keoladeo National Park, Ajmer, Pushkar, Sariska Tiger Reserve and Abhaneri.

M.Sc. Dissertations Supervised

Aarti Rajput (2019). **Species distribution modelling of the host species of pied cuckoo using mobilised e-bird data.** University School of Environment Management, Guru Gobind Singh Indraprastha University, Dwarka, New Delhi. Supervisor: Dr G. Talukdar.

Aishwarya Joshi (2019). **Assessing impacts of powerlines on birds in a multiple-use grassland landscape of Abdasa, Gujarat, India.** Forest Research Institute, Deemed University, Dehradun. Supervisors: Dr Malvika Onial and Dr Sutirtha Dutta.

Apoorva Thapa (2019). **Evaluating the effectiveness of wetland monitoring framework in select wetlands of two biogeographic regions in India. Forest Research Institute, Dehradun.** Supervisor: Dr Gopi GV.

Astha Walia (2019). **Assessing polychlorinated-bi-phenyls contamination in the critical Dugong habitat: A case study from the Gulf of Kutch.** Forest Research Institute (Deemed University), Indian Council of Forestry Research and Education (ICFRE). Supervisor: Dr K. Sivakumar.

Bharti Tomar (2019). **Tracking the rain-bird: Modelling the potential seasonal distribution of a migratory bird using citizen science data.** University School of Environment Management, Guru Gobind Singh Indraprastha University, Dwarka, New Delhi. Supervisor: Dr G. Talukdar.

C. Lalremruata (2019). **Ethnobotanical knowledge of wild plants in Champhai, Eastern Mizoram, India.** Forest Research Institute, Dehradun. Supervisor: Dr Amit Kumar.

Dipty Ramteke (2020). **Population estimation and habitat association in Psammophilus blanfordanus in Hasdeo-Arand coalfield, Chhattisgarh.** Pondicherry University. Supervisor: Dr Abhijit Das.

Himashu C Lad (2019). **Factors influencing small carnivore community structure in Chandoli National Park, Northern Western Ghats.** Saurashtra University, Rajkot, India. Supervisor: Dr Gopi GV.

Indira S (2019). **Habitat use by gaur and assessment of human - gaur conflicts in human-modified landscapes of Nilgiris Forest Division, Tamil Nadu. Saurashtra University, Rajkot, India.** Supervisor: Dr Gopi GV.

Jahnabi Borah (2019). **Modelling carbon storage for Etalin hydroelectric power project in Dibang valley, Arunachal Pradesh with special reference to geospatial approach.** Kumaun University, Uttarakhand. Supervisor: Dr G. Talukdar.

Jaspreet Kaur (2019). **Molecular characterization and phylogenetic analysis of genus Ficus L. in New Forest campus, Dehradun using two DNA markers: ITS and matK.** Forest Research Institute, Dehradun. Supervisors: Dr Ranjana Negi and Dr Amit Kumar.

Laxmi Langlang (2019). **Mitigating wildlife conflicts in Pakke Tiger Reserve, Arunachal Pradesh.** Saurashtra University, Rajkot. Supervisors: Dr Abhijit Das and Dr Gopi GV.

Mohit Mudaliar (2019). **Patterns of foraging in Olive Ridley sea turtle, Lepidochelys olivacea population on the east coast of India, and habitat characteristics of the arribada nesting**

ground at Rushikulya. Saurashtra University, Gujarat. Supervisors: K. Sivakumar and Dr Gopi GV.

Nabam Sonia (2019). **Aspects of activity pattern, feeding habits and socio-cultural significance of Mithun, Bos frontalis in Papum Pare District of Arunachal Pradesh.** Forest Research Institute, Dehradun. Supervisor: Dr Gopi GV.

Nisam Mang L. (2019). **Assessing the impacts of livestock-induced disturbance on the vegetation composition and forest regeneration in Sikkim's mid-elevation forests.** Saurashtra University, Rajkot. Supervisors: Dr G.S. Rawat and Dr S. Sathyakumar.

Parul Kumar (2019). **Species distribution modelling of the vultures of India.** University School of Environment Management, Guru Gobind Singh Indraprastha University, Dwarka, New Delhi. Supervisor: Dr G. Talukdar.

Pooja Nautiyal (2019). **Molecular and phylogenetic analysis of genus Terminalia L. in New Forest campus, Dehradun using matK, nrITS, rcbL DNA barcode primers.** Forest Research Institute, Dehradun. Supervisors: Dr Ranjana Negi and Dr Amit Kumar.

S. Aaranya Gayathri (2019). **Factors that shape vegetation in the arid zone of India.** Wildlife Institute of India, Dehradun. Supervisors: Dr Malvika Onial and Dr Navendu Page.

Shailja Mamgain (2019). **Understanding factors influencing seabird assemblage distribution in the African sector of the Southern Indian Ocean and the Southern Ocean.** Forest Research Institute (Deemed University), Indian Council of Forestry Research and Education, Dehradun. Supervisor: Dr K. Sivakumar.

Shipra Khanduri (2019). **Movement pattern and mating in Indian rock python (Python molurus molurus, Linn. 1758) at Moyar river valley, Tamil Nadu.** Shri Guru Ram University, Dehradun. Supervisors: Dr Ramesh Chinnasamy and Shri Kamal Bijalwan.

R. Indira (2019). **Habitat use by gaur and assessment of human - gaur conflicts in the human-modified landscape of Nilgiris Forest Division.** Saurashtra University, Rajkot. Supervisors: Dr S. Sathyakumar, Dr Gopi, G.V. and Dr Ruchi Badola.

Srishti Semalty (2019). **Understanding the dynamics of Human-snake interaction: A study of indigenous perceptions in and around Moyar river valley, Tamil Nadu, India.** Pp 56. Shri Guru Ram University, Dehradun. Supervisors: Dr Ramesh Chinnasamy, Dr G. Mahesh and Dr Manisha Uniyal.

Sumashini P.S. (2019). **Impact of habitat fragmentation on diurnal squirrels in lowland forests of upper Assam, north-east India.** Wildlife Institute of India, Dehradun, Supervisors: Dr Manoj Nair, Shri Qamar Qureshi and Dr Amit Kumar.

Varun Kher (2019). **Patterns of bird community structure in relation to land-use driven habitat changes in the arid grasslands of Thar Desert.** Wildlife Institute of India, Dehradun. Supervisors: Dr Malvika Onial and Dr Sutirtha Dutta.

Vishakha Panwar (2019). **Natural Asset Mapping of Dehradun City: A Remote Sensing Approach.** Uttarakhand Open University, Haldwani, Uttarakhand. Supervisor: Dr G. Talukdar.

Status of Doctoral Research in WII

• Thesis Submitted

Mona Chauhan (2020). **Community structure of Dung beetles in Kailash Sacred Landscape, Pithoragarh, Uttarakhand, India.** Saurashtra University, Rajkot, Gujarat. Supervisor: Dr V.P. Uniyal.

• PhD Awarded

Anant Pande (2019). **Nesting ecology and population genetics of Snow petrel Pagodroma nivea at Larsemann Hills, East Antarctica.** Wildlife Institute of India - Saurashtra University. Supervisor: K. Sivakumar.

Priyamvada Bagaria (2019). **Land use change and its causes in the East Godavari River Estuarine Landscape using remote sensing and geographical information system techniques.** Wildlife Institute of India-Saurashtra University, PhD dissertation. Supervisor: Dr K. Sivakumar.

• Registered

Amira (2019). **The conservation of musk deer: Integrating ecology and genetics in North-western Himalaya.** Saurashtra University, Rajkot. Supervisor: Dr Ramesh Chinnasamy, Dr Lalit Kumar and Dr Mukesh Thakur.

Anindita Debnath (2019). **Ecosystem services provided by the mountain watersheds. Saurashtra University, Rajkot.** Supervisor: Dr G. Talukdar

Bhim Singh (2019). **Molecular phylogeny and population genetic structure of northern red muntjac, Muntiacus vaginalis in India.** Saurashtra University, Rajkot, Gujarat. Supervisor: Dr V.P. Uniyal.

Bitupan Boruah (2019). **Systematics and biogeography of Bush frogs (Anura: *Rhacophoridae*) of Northeast India.** Saurashtra University, Rajkot. Supervisor: Dr Abhijit Das and Prof. S.D. Biju.

Dimpi A. Patel (2020). **Resource partitioning and behaviour ecology of two sympatric Agamid lizards of Trans-Himalayan region of Leh-Ladakh, India.** Saurashtra University, Rajkot. Supervisor: Dr Ramesh Chinnasamy.

Jignasu Dolia (2019). **Distribution and nesting ecology of King Cobra, Ophiophagus hannah.** Saurashtra University, Rajkot. Supervisor: Dr Abhijit Das.

Kamalika Bhattacharya (2019). **Moth (*Lepidoptera*) assemblages along an altitudinal gradient in Singalila and Neora Valley National Park, Central Himalaya, an ecological and molecular approach emphasising on Noctuidae.** Saurashtra University, Rajkot, Gujarat. Supervisor: Dr V.P. Uniyal.

Kritesh Dey (2019). **Studies on assemblage of spiders (*Arachnidae: Araneae*) in different riparian zones of the river Ganga.** Forest Research Institute (Deemed to be) University, Dehradun. Supervisor: Dr V.P. Uniyal.

Kumari Vandana (2019). **Assessment of pollinators in indigenous farming systems in Garhwal Himalaya, Uttarakhand.** Forest Research Institute (Deemed to be) University, Dehradun. Supervisor: Dr V.P. Uniyal.

Kumudani Bala Gautam (2019). **Population genetic structure and differentiation of Monitor *lizard*, *Varanus bengalensis* for conservation and illegal monitoring.** Saurashtra University, Rajkot. Supervisor: Dr Abhijit Das.

Malyasri Bhattacharya (2019). **An ecological study on nesting patterns and behavioural dynamics of selected species of vultures from Himachal Pradesh.** Saurashtra University, Rajkot. Supervisor: Dr G. Talukdar.

Naitik Patel (2019). **Systematic and ecology of Amolops monticola species complex of Himalaya.** Saurashtra University, Rajkot, Gujarat. Supervisors: Dr Abhijit Das and Prof. S.D. Biju.

Pallabi Das (2019). **Assessment of insect pollinators in agroecosystem along the Gangetic plains of southern West Bengal.** Saurashtra University, Rajkot, Gujarat. Supervisor: Dr V.P. Uniyal.

Pankaj Tiwari (2020). **Experimental warming impacts on ecosystem respiration in an alpine meadow, Western Himalaya.** Saurashtra University. Supervisor: Dr G. Talukdar.

Pooja Rani Sinha (2019). **Prediction of quality of water emphasizing on nutrient dynamics in Kosi watershed Uttarakhand.** Forest Research Institute (Deemed to be) University, Dehradun. Supervisor: Dr V.P. Uniyal.

Priyanka Kashyap (2019). **Soil nematode community structure along the elevational gradient in Bhagirathi Basin, Uttarakhand - A morphological and molecular approach.** Saurashtra University, Rajkot. Supervisor: Dr V.P. Uniyal.

Ritesh Kumar Gautam (2019). **Plant - insect pollinator interactions along the elevational gradient in different habitat types of Kedarnath Wildlife Sanctuary, Uttarakhand.** Forest Research Institute (Deemed to be) University, Dehradun. Supervisor: Dr V.P. Uniyal.

Rommila Chandra (2019). **Assessment of socio-environmental adaptation strategies for sustainable livelihood development in the villages around Govind Pashu Vihar, Uttarkashi, Uttarakhand.** Forest Research Institute (Deemed to be) University, Dehradun. Supervisor: Dr V.P. Uniyal.

Shabnam Kumari (2019). **Ecological assessment of Geometridae moths (Lepidoptera: Heterocera) along an altitudinal gradient in Dhauladhar mountain range in Kangra (North Western) and Lahaul & Spiti (Trans Himalaya) regions of Himachal Pradesh.** Forest Research Institute (Deemed to be) University, Dehradun. Supervisor: Dr V.P. Uniyal.

Shuvandu Das (2019). **Diversity and distribution of Dragonflies and Damselflies (Insecta: Odonata) assemblages along the altitudinal gradient in Bhagirathi and Teesta River Landscape.** Saurashtra University, Rajkot. Supervisor: Dr V.P. Uniyal.

Sneha Pandey (2019). **Assessments of ecosystem services provided by urban forests in Dehradun.** Forest Research Institute. Supervisor: Dr G. Talukdar

Uttaran Bandyopadhyay (2019). **Diversity and distribution pattern of moths (*Lepidoptera: Heterocera*) with special emphasis on family Noctuidae in Askot Wildlife Sanctuary, Uttarakhand.** Saurashtra University, Rajkot. Supervisor: Dr V.P. Uniyal.

Fulbright Specialist Programme
Dr Denice Adkins visited Wildlife Institute of India as part of the Fulbright Specialist program. She has interviewed senior staff at WII regarding open access and resource sharing. She taught a brief module about open access and social science sources to students of M.Sc.Heritage Conservation & Management.

- **Internship**

Aastha Saini (6 June 2019 to 1 -11 August 2019). **Torrent Frog project.** Delhi University. Supervisor: Dr Abhijit Das.

Agnish Das (Dec 2019 to June 2020). **Plausible alternative futures of Island mangroves in the Asia-Pacific with reference to Andaman Island, India.** FRI University, Dehradun. Supervised by UNESCO C2C-WII faculty.

Anjali Negi (20 May to 19 November 2019). **Survey of wetlands around Keoladeo National Park, Bharatpur with emphasis on water quality and monitoring.** Graphic Era University, Uttarakhand. Supervised by UNESCO C2C-WII faculty.

Daiophika Thangkhiew (15 May to 30 June 2019). **The biodiversity of the Narpuh Wildlife Sanctuary and the Saipung Reserve Forest, as well as the socio-economic dependence of the people on the forest.** Tata Institute of Social Sciences, Guwahati. Supervised by UNESCO C2C-WII faculty.

Dev Sankha Goswami (30 September 2019 to 31 March 2020). **Torrent Frog project.** Calcutta University. Supervisor: Dr Abhijit Das.

Kritika Trigunayat (September 2019 to July 2020). **Identification and prioritisation of potential World Heritage Sites in Madhya Pradesh.** Rajasthan University. Supervised by UNESCO C2C-WII faculty.

Nirmala Sharma (January to July 2020). **Assessment of cultural and sacred natural sites of Kailash Scared Landscape, India, using remote sensing and GIS tools.** Kumaun University, Almora. Supervised by UNESCO C2C-WII faculty.

Parul Singh Umrao (February to July 2020). **Identification and prioritisation of potential World Heritage Sites in Madhya Pradesh.** Graphic Era University, Uttarakhand. Supervised by UNESCO C2C-WII faculty.

Shruti Arora (1-30 September 2019). **Torrent Frog project.** University of Rajasthan. Supervisor: Dr Abhijit Das.

Swagata Das (1 May to 30 June 2019). **Wild tigers of Similipal: A study on spatial distribution, abundance and population genetics at Similipal Tiger Reserve.** Flame University, Pune. Supervised by UNESCO C2C-WII faculty.

Training Programmes

XL Post Graduate Diploma in Advanced Wildlife Management Concluded, Dehradun, 1 September 2018 to 30 June 2019.

The 40th PG Diploma Course in Advanced Wildlife Management commenced from 1 September 2018 and concluded on 30th June 2019. Thirteen officer trainees of the rank of DCF/ACF from 10 States participated in the course. The Management Term Paper Exercise at Valmiki Tiger Reserve, Bihar from 15-22 April 2019, and the Management Plan Exercise was conducted at Parambikulam Tiger Reserve, Kerala from 13 May - 6 June 2019. All the officer trainees have successfully completed the course. The list of officer trainees who secured awards for their meritorious performance are given below:

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Institute's Gold Medal for the 'Top Trainee'; and NR Nair Memorial Silver Medal for 'Best

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Management Plan' were bagged by Shri Bijo Joy of Rajasthan cadre. The 'Wildlife Preservation Society Silver Medal for the 'Second in Merit' and Silver Medal for the 'Best All Round Wildlifer' were given to Shri Pradyumn Gaurav of Bihar cadre. The Best Management Term Paper A.K. Chatterjee Silver Medal was awarded to Shri S. Vysak from Kerala cadre. The 'Top Trainee' in Wildlife Biology (Book Prize) was given to Ms Esther Laltankim Serto of Manipur cadre.

XLI P.G. Diploma Course in Advanced Wildlife Management Commenced, Dehradun, 1 September 2019 - 30 June 2020.

The 10-month P.G. Diploma Course in Advanced Wildlife Management commenced on 1 September 2019 at this Institute with twenty officer trainees of the rank of Deputy Conservator of Forests/ Assistant Conservator of Forests and equivalent levels. Among them, fifteen officers represented Indian States (three from Chhattisgarh, two each from Maharashtra and Tamil Nadu, one each from Kerala, Himachal Pradesh, Uttarakhand, Maharashtra, Madhya Pradesh, Rajasthan, Assam and Arunachal Pradesh). Besides, five foreign nationals from Myanmar (2) and Bangladesh (3) have also joined the course.

The Orientation Tour to Koluchaur, Chowkhamb, Lansdowne Forest Division, Pauri Garhwal and its adjoining areas was conducted from 23-28 September 2019. During the reporting period, the High Altitude Ecology tour was organised from 4-10 November 2019. The officer trainees were taken to Kedarnath Wildlife Sanctuary and Nanda Devi Biosphere Reserve. The techniques tour was organised in Rajaji Tiger Reserve during 9-31 December 2019. The officer trainees learnt various techniques of wildlife management including estimation of prey and predator population, studying animal behaviour, carrying out radio-telemetry, chemical immobilization and restraint of wild animals, wildlife health monitoring, vegetation sampling, habitat quantification and occupancy survey. The last part of the program focused on the analysis of data that was collected by the officer trainees.

XXXV Certificate Course in Wildlife Management Concluded, Dehradun, 1 November 2019 – 31 January 2020.

The XXXV Certificate Course in Wildlife Management started on 1 November 2019. In all, 19 officer trainees of the rank of Range Forest Officers and equivalent levels underwent the training course at WII, which included one each from Madhya Pradesh and Mizoram, two from Uttarakhand, six each from Malaysia and Myanmar and three from Bangladesh.

The course curriculum was divided into six modules and ten units covering wide-array of theoretical and hands-on training. Total eight weeks were spent at Institute's for learning, while the remaining five weeks were spent in field tours in the various Protected Areas across India and Sri Lanka. As an integral part of the course, field tours for providing field exposure were undertaken to Mussoorie, Asan Conservation Reserve and Dehradun Zoological Park. The officer trainees undertook the Orientation-cum-Techniques Tour at Chilla Range of Rajaji Tiger Reserve from 23 November to 4 December 2019. The Management Tour was conducted from 3-22

January 2020 at various protected areas in India and Sri Lanka in India. After the successful completion of the tour, the trainees made presentations on 24 January 2020 detailing their learning during the visit.

Before the end of the course, the feedback session on 27 January 2020 and Viva-Voce for officer trainees was held on 27 January 2020 respectively to bid farewell to the officer trainees on successful completion of the course a Valedictory Function was organized on 31 January 2020 at this Institute. All the officer trainees have completed the course. The following officer trainees received medals and

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prizes:

Wildlife Conservation Gold Medal for `Top Trainee'; Institute's Medal for Wildlife Management; and Institute's Medal for the Best Foreign Trainee were bagged by Ms Noraini Binti Nasaruddin from Malaysia. Institute's Prize for Best All Round Wildlifer was given to Ms Salvia Sembai Anak Ettin from Malaysia.

Capacity Building & Professional Exchange

Organised by WII

Training Workshop on Wildlife Techniques and Wildlife Conservation, Dehradun, 3-8 April 2019.

The training workshop was organised at WII for the students of Serampore College, University of Calcutta, and the University of Burdwan. Twelve students, accompanied by Dr S. Banerjee, Assistant Professor, Serampore College, participated in the training program. Both presentations and hands-on training were given on different tools and techniques such as trail transect, point count, sampling of macro-invertebrates, radio-telemetry and camera trapping. The participants were trained in the use of various software, such as DISTANCE, PRESENCE and MARK. Students were also exposed to the wildlife forensic techniques, use of Drone in wildlife studies, GIS and M-STrIPES software. The students underwent a field visit to Rajaji National Park and Tiger Reserve. Day-to-day assessments of the students on the training imparted were carried out.

Bird Sound Recording Training Programme, Dehradun, 13-16 April 2019.

It was organised by WII in collaboration with Macaulay Library at Cornell lab of ornithology. The objectives of the programme were to (i) introduce bird sound recording in the field as well as sound file and metadata organization; and (ii) understand how sightings and media contribution to e-bird are shaping the ways to engage communities with birds. In all 20 participants attended the programme. The four-day event introduced the participants about bird sound recording techniques in WII campus, Sal patch near WII and Maldevta. Lectures were given on field recording techniques, microphones and recorder, audio editing for long-term preservation, properties of digital sound, visualizing and interpreting sound and finally uploading recordings to the e-bird platform. As a whole, in the four days, the team has submitted four group checklists with more than 70 sound recordings from WII campus as well as the field. The program continued with certificate distribution to the participants.

Wildlife Restraint and Immobilization Workshop with Special Reference to Elephants and Carnivores, Dehradun, 15-20 April 2019.

A six-day field workshop was jointly organized by Wildlife Institute of India together with Tsavran Pharmaceuticals Limited, South Africa and Estonian University of Life Sciences, Estonia. The workshop was aimed at sensitizing the participants on a variety of aspects related to wild animal capture, including field demonstration of advanced techniques in wild animal capture and post-capture monitoring. A total of 18 veterinary medical professionals, zoo veterinarians, and university veterinary personnel participated in the workshop. The inputs were provided by the subject experts on various themes like Human-wildlife conflict regarding large carnivores and elephants - systematic vulnerabilities, challenges & options; Basic pharmacology & physiology; Chemical immobilization of carnivores & ruminants and remote injection systems; Immobilization of an elephant (Captive Elephant Facility); and Immobilization of free-ranging deer. The major part of the training programme was conducted in the Rajaji Tiger Reserve.

IAIA Pre-Conference Training Course on Ecological Solutions and Planning Options for Greening the Transport Infrastructure, Brisbane, Australia, 27-28 April 2019.

The training course was sponsored by the Asian Development Bank. The objectives of the training course were to (i) Reiterate the relevance of transportation ecology in promoting smart and responsible development; (ii) Evolve consensus for promoting 'green growth models' of developments; (iii) Share best practices for steering eco-friendly developments in linear infrastructure sectors; (iv) Present successful case examples of mitigation actions in transportation projects; and (v) Explore the options for win-win for both conservation and development.

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Sixteen participants from India, Sri Lanka, Iraq, New Zealand, Australia, Nepal, Bhutan, South Africa, Colombia, Angola, Papua New Guinea and the Republic of Korea attended the training course. IAIA-19 was held from 29 April to 2 May 2019 in Brisbane, Australia, with training courses and technical visits before and after the conference. A total of 885 delegates from 77 countries attended the program. Dr V.B. Mathur and Dr Asha Rajvanshi participated in the conference and provided inputs.

Training Workshop on Wildlife Techniques for Frontline Staff and Veterinarians of Gangotri-Govind SECURE Himalayan Landscape, Uttarakhand, Dehradun, 29 April - 1 May 2019.

The training workshop was held at the Wildlife Institute of India, Dehradun. A total of 43 participants, including nine veterinary officers of the Forest Department of Uttarakhand, were trained on different wildlife monitoring tools and techniques during the three-day training

program. The veterinary officers, along with the forest staff of Gangotri National Park, Govind Wildlife Sanctuary and Uttarkashi Division, were also trained about wildlife veterinary techniques and standard operating procedures for handling conflict situations. The training programme was organised as a part of ongoing "Secure Himalaya" project of the Wildlife Institute of India.

One-week Special Course on Wildlife Protection, Law and Forensic Science for Officer Trainees of Indian Revenue Service (Customs & Central Excise) Group-A, 70th Batch, Dehradun, 6-11 May 2019.

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The Wildlife Institute of India conducted this special course for officer trainees of 70th Batch of Indian Revenue Service (Customs & Central Excise) Group-A. A total of 67 IRS Probationers participated in the course. The course provided extensive inputs on forensic science and its relevance in combating wildlife crimes. The

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officer trainees were taken to the Corbett Tiger Reserve, Ramnagar, where they interacted with the park manager and visited the reserve to understand the challenges in the protection of the animals from the poachers.

Orientation Programme on World Heritage for Government of Himachal Pradesh, Dehradun, 14-15 May 2019.

UNESCO C2C-WII conducted an 'Orientation Programme on World Heritage' for capacity-building of officials from the Department of Culture, Government of Himachal Pradesh, at WII. The objective was for the officials to understand the World Heritage process and take forward the nomination of potential sites from the State. Five members from the Department of Culture participated in the programme with sessions on the World Heritage Convention, Operational Guidelines, Outstanding Universal Values, Criteria and Categories, Nomination, Evaluation, Interpretation, Reporting and Monitoring. Along with interactive lectures, a simulation exercise was undertaken for filling up a sample nomination format by the participants. The programme provided an essential overview of the World Heritage system to the participants.

Two-day Training Workshop on Management Effectiveness Evaluation of Protected Areas, Dehradun, 6-7 June 2019.

The Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India entrusted Wildlife Institute of India (WII) to conduct a 'Training workshop on Management Effectiveness Evaluation of Protected Areas' for Indian Forest Service Officers. A total of 21 IFS Officers attended the training workshop. Apart from technical sessions on MEE Framework, discussions including group work for building convergence between PARIVESH, DSS, MEE and

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Wildlife Clearances for enhancing Compliance Monitoring was organised for the participants. The workshop received excellent feedback from the participants.

Strength & Opportunity – Capacity Building Training Programme for the Frontline Staff of Nanda Devi & Valley of Flowers (VoF) World Heritage Site, Dehradun, 11-13 June 2019.

UNESCO C2C-WII organized a three-day capacity building training programme for frontline staff of Nanda Devi and Valley of Flowers World Heritage Site at UNESCO C2C-WII. Fourteen forest guards and forest rangers participated in the training. The training included classroom lectures on the overview of Outstanding Universal Values (OUVs) for Natural World Heritage Sites; Nanda Devi World Heritage Site - Criteria & Reporting Obligations; Wildlife Management in India - Concept and Principles; Wildlife Sample Collection and Processing including Wildlife Forensics; Wildlife Population Estimation & Monitoring in the Himalayas; Human-Wildlife Conflict/ Interaction; Emerging Technology like Camera Traps, Remote Sensing, GIS and GPS etc. On the specific demand of the DFO, Nanda Devi National Park, a half-day session on 'Wild animal

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capture techniques: A tool for wildlife management' was organized.

Two-day Workshop on "Rescue and Rehabilitation Techniques", Bhagalpur, 18-19 June 2019.

Wildlife Institute of India under the aegis of National Mission for Clean Ganga organized a capacity building two-day workshop for field forest officers at Bhagalpur, Bihar. The workshop was aimed at sensitizing the forest officials in managing emergent situations arising from Aquatic Macro-fauna. The workshop was instrumental in enhancing capacities of 32 officials including Divisional Forest Officers, Assistant Conservator of Forests, Range Forest Officers and the front line staff from various forest divisions of Bihar State that included Patna, Bhagalpur, Munger, Supoul and Purniya.

Training Workshop on "Communities and their Role in Rescue and Rehabilitation of Select Aquatic Wildlife along Ganga Basin", Bhagalpur, 22-23 June 2019.

Community representatives act as first responders for reporting and managing emergencies arising from strayed and injured aquatic macro-fauna. They play a key role in directing the cases to the Forest department and participating in the effective rescue and rehabilitation of animals in distress. Capacity building of these stakeholders is essential for sensitizing them and making them aware of the essentials for rescue and rehabilitation of such animals. A State-level training workshop for community representatives of Bhagalpur was organized at Aranya Bhavan, Bhagalpur, Bihar. The workshop was attended by 35 Ganga Praharis and University Students from Patna, Bhagalpur, Munger, Naugachia and Barari.

Workshop on "Approaches for Rescue and Rehabilitation of Aquatic Macrofauna" for Officials of Kashi Forest Division, Varanasi, 27-28 June 2019.

The Ganga basin extending across approximately one million square kilometres has a vast network of tributaries and distributaries that support a diverse faunal assemblage. The basin also supports a high density of human population that exploits water and other resources for fulfilling needs for agriculture, industry and other consumptive and non-consumptive use. Conservation strategies for freshwater aquatic fauna that includes rescue and subsequent rehabilitation amongst others are increasingly gaining acceptance. The Kashi Forest Division has seen an incremental rise in cases of confiscations of freshwater chelonians and brought forward the need for capacity building of forest department officials.

The workshop was organized for the stakeholders of Kashi Forest Division, Varanasi. The workshop deliberated on discussing various facets of the process of rescue and rehabilitation of aquatic macro-fauna including species identification, ethical and humane handling approaches, transport and rehabilitation. The workshop was attended by 24 forest department staff from Mughalsarai, Chahania, Patna Bird Sanctuary Etah, Sur Sarovar Bird Sanctuary Agra, Bah Range of NCS, and Chakia ranges.

IPCC Working Group II Second Lead Author Meeting of the Sixth Assessment Report, Kathmandu, Nepal, 14-19 July 2019.

The objective of the meeting was to prepare an internal First Order Draft (FOD) for the Sixth Assessment Report (AR6) of Working Group II. It was organised by IPCC. In-depth discussions were held regarding the comments received for the internal draft as well as the revised outline of the chapter, and a consensus was reached. Authors were assigned responsibilities to develop specific portions of the chapter. It was decided to hold Skype meetings every two weeks until the deadline for the first order draft. The lead authors of chapter 2 would submit their internal draft portions by 23 September 2019 which would allow sufficient time to the coordinating lead authors to check for consistency and flow before the final submission on 4 October 2019. The first order draft will be made public, and all comments received will have to be addressed. Similar deadlines were also set for the cross-chapter on Biodiversity Hotspots. Dr G. Talukdar represented the Institute in the meeting.

Training programme on "Building Capacity for Conserving and Managing Natural Capital during the Planning and Implementation of Transportation Projects in South Asia" under WII-ADB Project, Wildlife Institute of India, Dehradun, 15-19 July 2019.

The purpose of the international training programme was to broaden and deepen understanding of issues related to biodiversity conservation and green infrastructure. The workshop brought together representatives from sectoral development agencies for roads and highways, railways as well as from development banks, from Bangladesh, Bhutan, Nepal, India and Sri Lanka. It sought to build the capacity of individuals and organizations working in the implementation of Green Linear Infrastructure projects in the transportation sector in South Asia.

The main objectives were to (i) Enhance capacity for promoting green infrastructure; (ii) Bring benefits of green infrastructure to a human society based on the principles that protect and enhance nature, and natural processes; (iii) Integrate principles of green growth, and concepts of smart planning into transport infrastructure development; (iv) Institutionalise biodiversity mainstreaming as an approach for meeting a range of multifunctional objectives: (a) Promote sensitive planning and designing of development corridors for biodiversity conservation; (b) Optimise the use of natural capital for the sustainability of natural resources, and (c) Achieve greater acceptability of development goals and enhancing the quality of life.

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It was organised by the Asian Development Bank (ADB). A total of 20 participants attended the workshop. The participants found the training programme well-structured, comprehensive and rich in content.

Meeting of Coordinating Lead Authors – National Strategy and Action Plan & Standard Operating Procedures, New Delhi, 17 July 2019.

The meeting was organized under the project "Knowledge Support to Development of Guidelines, Specialized Field Studies and Training on Human-Wildlife Conflict Mitigation in India", funded by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH under the Indo-German technical cooperation project, which is being jointly implemented by the Ministry of Environment, Forest and Climate Change (MoEFCC) and GIZ. This workshop was organized to discuss the overall concept plan and the approach for developing N-HWCM-SAP and draft content of SOPs for ten species. The primary agenda of the workshop was to initiate discussion among the SOP teams and to finalize the dates of further meetings for drafting N-HWCM-SAP and SOPs. This workshop was attended by coordinating Lead Authors (LA) of N-HWCM-SAP and SOPs, Technical Experts from GIZ and Project team from WII. The workshop included presentations on N-HWCM-SAP and SOPs by respective Coordinating Lead Authors. It was decided that the framework of SOPs will remain flexible, and each CLA can add a section to the SOPs. However, the information should be presented succinctly.

National Consultative Workshop on Nature-Based Solutions for Climate Resilience - Future of Indian Mangroves, Delhi, 5 August 2019.

The workshop was held at YMCA, Delhi. The overall objective of the workshop was to address the issue and create a platform for collaboration between the multidisciplinary stakeholders for a resilient future of Indian and Asian Mangroves. The event was organized by the National Institute of Disaster Management (NIDM), India in collaboration with Institute for Global Environmental Strategies (IGES), Japan; WII, Dehradun; CSIR-NEERI, Nagpur and IUCN CEM South Asia.

Fourth Ten-day Orientation Workshop on "Wildlife and Health Management" for Veterinary Officers of Uttarakhand, Dehradun, 5-14 August 2019.

The fourth ten-day workshop was organized by Wildlife Institute of India for Veterinary Officers of Uttarakhand. The workshop was organized to provide exposure on various aspects of wildlife management and included topics ranging from basics of species biology, behaviour and ecology to conservation challenges in Uttarakhand, dimensions of human-wildlife conflict, wildlife forensics, emerging zoonoses, ex-situ management, rescue and rehabilitation as well as legal issues for relevant field investigations.

The workshop included theoretical inputs at Wildlife Institute of India and field exposure at different facilities and institutions provided by both internal and external experts. The field component included a visit to Chidiyapur Wildlife Transit Rehabilitation Centre, Haridwar, Wildlife SOS's facility (Elephant Conservation & Care Centre and Bear Rescue Facility) at Agra, Keoladeo Ghana National Park and Sariska Tiger Reserve. Hands-on training on a variety of immobilization equipment besides physical capture techniques is planned. The workshop was attended by 24 Field Veterinary Officers including ten lady officers. The workshop was aimed at providing an insight into the ethical, scientific and professional management of wild animals. The workshop was supported by Uttarakhand Forest Department and CAMPA, Uttarakhand. With this, the Wildlife Institute of India has trained 100 vetnarians of Uttarakhand since 2017.

Training Workshop on "Mainstreaming Biodiversity in Impact Assessment" for Indian Forest Service Officers, Wildlife Institute of India, Dehradun, 8–9 August 2019.

The objectives of the workshop were to (i) improve the mechanisms for mainstreaming biodiversity in the impact assessment for sound decision making and long term gains for conservation; (ii) enhance understanding of the issues and conflicts related to the role of impact assessment in meeting conservation and development goals vis-à-vis ground realities; and (iii) review options for professionalizing EIA for positive outcomes for biodiversity conservation. It was sponsored by the Ministry of Environment, Forest and Climate Change (MoEFCC). 21 participants attended the workshop. The course was very well received as was evident from the course feedback provided by the participants.

Capacity-Building Workshop for Stakeholders of Majuli Cultural Landscape, Assam, Guwahati, 19 August 2019.

The Cultural Affairs Department, Government of Assam invited Wildlife Institute of India to conduct a capacity-building workshop for stakeholders of Majuli Cultural Landscape, Assam, a tentative world heritage site in Guwahati. UNESCO C2C-WII conducted the programme. Thirty members representing major departments of the Government of Assam including Culture, Tourism, Water Resources, Forest and Geology participated in the workshop.

As part of the agenda, presentations were made on nomination and evaluation process, protection and management requirements, and comparative analysis for Majuli with similar heritage sites. The team also conducted a participatory exercise for identifying threats and its analysis with specific reference to Majuli. The key outcomes were related to a better understanding of the world heritage system processes and procedures by the stakeholders, and additional inputs were received from the stakeholders for incorporation into the nomination dossier.

XV Internal Annual Research Seminar, Dehradun, 19-20 August 2019.

XV Internal Annual Research Seminar (IARS) was chaired by Dr S.K. Khanduri, Former IG (WL), Ministry of Environment, Forest and Climate Change. Twenty presentations were made in five technical sessions, viz., Status and Distribution; Ecology & Behaviour; Human-Wildlife Interface; Vegetation Science; and Taxonomy, Genetics & Anthropogenic Impacts. The presentations were based on recently initiated and ongoing research studies and were made by research fellows of the Institute. Seventeen poster presentations were also made during the IARS. The following oral and poster presentations were declared as best presentations:

Oral Presentation

First Prize	N. Lakshminarayanan
Second Prize	Harshvardhan S. Rathore
Third Prize	Harindra Baraiya

Poster Presentation

First Prize	Navin Kumar Das
Second Prize	Sunanda Kumari Bhola
Third Prize	Umar Saeed

4th Himalayan Research Seminar, Dehradun, 21 August 2019.

4th Himalayan Research Seminar (HRS) was chaired by Shri B.S. Bonal, Former ADG (WL), MoEFCC & Member Secretary, NTCA. A total of 15 presentations were made in four technical sessions viz., Conservation Status & Ecological Patterns; Vegetation and Habitat Monitoring; Climate Change, Vulnerability and Adaptation; and Human-Wildlife Conflict. Fourteen poster presentations were also made in the HRS. The following oral and poster presentations were declared as best presentations:

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Oral Presentation

First Prize	Aashna Sharma
Second Prize	Ranjana Pal
Third Prize	Meghna Bandopadhyay

Poster Presentation

First Prize	Nidhi Singh and Shiv Yadav
Second Prize	Meghma Ghosh and Bhawna Pandey
Third Prize	Mona Chauhan

2nd Biodiversity and Ganga Conservation Seminar, Dehradun, 22 August 2019.

The 2nd Biodiversity and Ganga Conservation seminar was organised at the Institute for showcasing the work done under National Mission for Clean Ganga. Padma Shri Dr Anil

Joshi, HESCO graced the seminar as the Chief Guest.

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A total of eleven presentations were made in three technical sessions, *viz.*, Ganga River Ecology and Management; Aquatic Species Conservation; and Community Participation, Nature Interpretation and Awareness. Twenty-three poster presentations were also made during the seminar. The following oral and poster presentations were declared as best presentations:

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Oral Presentation

First Prize	Sangeeta Angom
Second Prize	Shivani Barthwal
Third Prize	SK Zeeshan Ali

Poster Presentation

First Prize	Deepika Dogra
Second Prize	Hemlata Khanduri, Sunita Rawat and Sonal Jain
Third Prize	Dipti Dey

Seminar on Endangered Species Recovery Programme, Dehradun, 23 August 2019.

The seminar was chaired by Dr S.K. Khanduri, Former IG (WL), Ministry of Environment, Forest and Climate Change. A total of fourteen presentations were made in two technical sessions viz., Aquatic Species; and Terrestrial Species. Seven poster presentations were also made in the seminar. The following oral and poster presentations were declared as best presentations:

Oral Presentation

First Prize	Sameeha Pathan
Second Prize	Sourav Supakar
Third Prize	Merin Jacob

Poster Presentation

First Prize	Sumit Prajapat
Second Prize	Nongmaithem Bijyaluxmi Devi
Third Prize	Tennison Gurumayum

XXXIII Annual Research Seminar (ARS), Dehradun, 26-27 August 2019.

Dr H.S. Pabla, Chairman, WII–Training, Research and Academic Council was the Seminar Chairperson of Annual Research Seminar. A total of seven publications were released in the inaugural session of the seminar. Twenty-seven presentations were made in six technical sessions viz., Species Recovery & Wildlife Monitoring Programmes; Climate Change in the Himalaya and Ganga Rejuvenation; Large Carnivore Ecology; Human-Wildlife Interface and Conservation-Development Issues; Landscape Ecology and Wildlife Forensics; and A Mixed Bag (Poster Presentations and M.Sc. Dissertations: Three Minute Talks – TMT). The presentations were based on the ongoing/completed research studies and were made by research fellows and faculty members of the Institute. The

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Photographic Competition Awards and best presentation awards were given to the winners in the concluding session. The following oral and poster presentations were declared as best presentations:

Oral Presentation

I Prize	Tista Ghosh,	DNA Detective: Population assignment

	of seized rhino horns back to its origin
II Prize Shrutarshi Paul,	Grasslands on the wane: Assessing Swamp Deer habitat dynamics over the last three decades along upper Gangetic plains
III Prize Shrusti Modi,	Individual identification to dispersal dynamics: Insights from dhole genetics in Eastern Vidarbha Landscape, Maharashtra, India

Poster Presentation

I Prize Azaz Hussain,	Tiger conservation initiative in Nandhaur landscape: An update
II Prize Swapnali Gole,	Dugongs, Seagrasses and Fisheries: Tales of fisherfolk from the Andaman Islands
III Prize Priya Gusain,	Population Management of Species in Conflict

More than 600 delegates attended the ARS that included senior officials of MoEFCC, Principal Chief Conservators of Forests, Chief Wildlife Wardens and representatives from NTCA and WWF, scientists, wildlife experts, National Mission for Clean Ganga, NGOs, faculty members, IFS Probationers, CASFOS officer trainees, researchers and students of the Institute.

National Repository Facility Inaugurated at Wildlife Institute of India, Dehradun, 26 August 2019.

The National Biodiversity Authority has designated the Wildlife Institute of India as one of the National Repository under Section 39 of the Biodiversity Act 2002. This repository serves as safe custody of the different categories of

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Biological Resources, including voucher specimens from Protected Areas of India. To maintain the deposit, the Wildlife Institute of India has established National Repository in the Institute, which was inaugurated by Dr Erach Bharucha, Chairman, WII Faculty Assessment and Promotion Committee. During the occasion, Dr


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H.S. Pabla, Chairman, WII-TRAC, Dr V.B. Mathur, Director, Wildlife Institute of India, Dr J.A. Johnson, Nodal Scientist, NBA National Repository, WII Centre and other faculty members were present.

One-day Sensitization Workshop on "Rescue and Rehabilitation of Aquatic Macro-Fauna along Ganga River" for Local Community Members and Forest Officials of Uttarakhand, Laksar, 29 August 2019.

The workshop was organized to create awareness amongst frontline staff and community members on proper and scientific management of aquatic macro-fauna in distress. The workshop was organised at Laksar, Uttarakhand. A total of 27 forest officials and 15 Community Members participated in the workshop.

2nd National Training Workshop on "Ganga Biodiversity Conservation and Monitoring of Aquatic Species of Ganga River", Dehradun, 3-9 September 2019.

The Wildlife Institute of India (WII), Dehradun under the project "Biodiversity Conservation and Ganga Rejuvenation" conducted one-week training workshop for spearhead teams of Forest Departments of the Ganga River states on "Biodiversity Conservation and Monitoring of Aquatic Species of Ganga River". The main objective of this workshop was to train the officers and frontline staff with the skills and capacities required for the biodiversity monitoring, conservation and management of the riverine species along the Ganga River. During the workshop, spearhead teams were exposed to tools and techniques of aquatic biodiversity monitoring for practical and action-oriented implementation of science-based research carried out by the WII. The training workshop was attended by 37 forest officials from Uttarakhand and Uttar Pradesh.

One-day Sensitization Workshop on 'Rescue and Rehabilitation of Aquatic Macro-Fauna' for Community Members and Forest Officials, Sahibganj, Jharkhand, 14 September 2019.

The workshop was organized to create awareness amongst frontline staff and community members on proper and scientific management of aquatic macro-fauna in distress. The workshop was organised at Sahibganj as part of a collaborative initiative between WII and NMCG. A total of 31 forest officials and 33 community members participated in the workshop.

International Day for the Preservation of the Ozone Layer, Dehradun, 16 September 2019.

Wildlife Institute of India organised one-day programme to celebrate the International Day for the Preservation of the Ozone Layer. Digital posters and presentations were displayed throughout the Institute to create awareness amongst all the staff and researchers. A documentary on "The Arctic and the Ozone" was screened followed by messages and videos released by various organizations like the United Nations Environment Programme for the day. A debate was held amongst the M.Sc. students of WII on the motion "32 years and healing" which is also the theme for this year. The book prizes along with certificates were given to the winners of the debate competition.

One-day Sensitization Workshop on Rescue and Rehabilitation of Aquatic Macro-Fauna, West Bengal, 18 September 2019.

The workshop was organized for community members and forest officials, Barrackpore Forest Division to create awareness amongst frontline staff and community members on proper and scientific management of aquatic macro-fauna in distress. The workshop was organised at Barrackpore, West Bengal. A total of 15 forest officials and 36 community members participated in the workshop.

One-day Workshop on Secure Himalaya Web Portal, Dehradun, 26 September 2019.

A one-day workshop was organized by Wildlife Institute of India, Dehradun as a part of GoI-UNDP-GEF funded SECURE Himalaya Project titled "Conducting a baseline study and establishing a database on biodiversity conservation, sustainable natural resource management in SECURE Himalaya project landscapes in selected districts of Jammu & Kashmir, Himachal Pradesh, Uttarakhand and Sikkim".

Twenty-five participants attended the workshop. The first technical session started with the demonstration of live, dynamic and interactive web portal for SECURE Himalaya project. The demo web portal, along with different database pages, was also presented in the meeting. The second technical session started with a brief discussion about the technology/ framework used to develop the portal, followed by an interactive and detailed discussion about the future of the web portal amongst all the participants.

First Landscape Level Stakeholder Consultation Workshop, Pangi, 27-28 September 2019.

The workshops were conducted in the landscape to make the stakeholder participation more inclusive and to discuss the project findings and address conservation issues at the grassroots level. It was organised by Wildlife Institute of India. In all 46 participants attended the workshop. The workshop helped the stakeholders, such as officials of the forest department, school teachers and local traders for their capacity building.

Second Landscape Level Stakeholder Consultation Workshop, Keylong, 11 October 2019.

The workshop was conducted in the landscape to make the stakeholder participation more inclusive and to discuss the project findings and address conservation issues at the grassroots level. It was organized by Wildlife Institute of India. Seventy participants attended the workshop. The intensive individual interactions and group discussions with various stakeholders revealed a seasonal decline in demand of MAPs and unavailability of the state-of-the-art technologies for storage of perishable plant parts; thus the raw materials were sold at less than half the original price.

3rd Annual Group Monitoring Workshop on 'Technology Intervention for Mountain Ecosystem-Livelihood Enhancement through Action Research and Networking (DST TIME-LEARN) Programme' Dehradun, 26-27 December 2019.

The 3rd Annual Group Monitoring Workshop of the Department of Science and Technology (DST) was held at Wildlife Institute of India. The workshop commenced with an exhibition of the technologies developed under the TIME-LEARN programme. TIME-LEARN project performance cards and a book on the success stories of the projects were released on this occasion. A field visit to village Pasoli, where an essential oil distillation unit has been installed under one of the projects, was organised for the experts and coordinating agencies. In all, 49 participants attended the workshop.

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Training Course on Biodiversity Conservation, Dehradun, 4-9 November 2019.

Following the mandate of training personnel at various levels for conservation and management of wildlife, the Wildlife Institute of India organised a week-long training programme for scientists and technologists working in government sector. This course was sponsored by the Department of Science and Technology, Govt. of India. The objective of the programme was to apprise the participants about the basics of wildlife and biodiversity conservation. Seventeen participants belonging to diverse fields joined the programme. The participants were given a direct experience of the recent advancements in the field of biodiversity conservation and also exposed to its issues and challenges. The participants were given field exposure with a trip to the WII Nature Trail and Jhilmil Jheel Conservation Reserve.

Session on Conservation beyond Borders: Heritage as a Connecting Link in the Eastern Himalayas, Guwahati, Assam, 5-6 November 2019.

UNESCO C2C-WII conducted a session on "Conservation beyond Borders: Heritage as a connecting link in the Eastern Himalayas" at the 7th Eastern Himalayan Naturenomics Forum organised by the Balipara Foundation, an NGO working towards community development and environment protection. The session was facilitated by Dr Sonali Ghosh, former faculty, UNESCO C2C-WII and Shri Niraj Kakati, Technical Officer. The keynote address was given by Shri A.M. Singh, Principal Chief Conservator of Forests, Government of Assam. The panellists at the session included Dr Shiela Bora, Convenor, Indian National Trust for Art and Cultural Heritage – Assam Chapter; Ms Rita Banerjee, Founder, Dusty Foot Production and GreenHub, a

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video documentation training enterprise for youth; and Dr Bibhuti Lahkar, IUCN Heritage Hero & Program Director, Aaranyak, a conservation society in Northeast India. Other key participants included representatives from current and potential World Heritage Sites of the region, as well as from neighbouring countries of Nepal and Bhutan. The dialogue served to renew the conversation on heritage as a connecting link between nature and culture, promote the prospects of transboundary conservation and also strengthen the network of heritage practitioners in the Eastern Himalayas. A total of 50 participants attended the session.

GET SET GIS Workshop, Dehradun, 11 November 2019.

The objectives of the workshop were to (i) to impart basic cartography skills to the participants; and (ii) to provide hands-on training for beginners, covering the basics of GIS software, Google Earth and Maps. In all 80 participants attended the workshop, which was organised by WII. Different maps, prepared by the researchers of WII from different projects and by the IT, RS & GIS Lab were showcased to the students to demonstrate the context and various applications of maps. An ArcMap Story of WII Nature Trail was presented. The participants prepared study area maps of which the best three were awarded prizes. The program ended with certificate distribution to the participants, followed by the Director's concluding remarks.

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Certificate Course on Nature Interpretation for Zoo Guide Training Programme under Green Skill Development Programme (GSDP), Ahmedabad, 30 November - 9 December 2019.

A Certificate Course on Nature Interpretation for Zoo Guide Training programme under Green Skill Development Programme (GSDP) funded by Ministry of Environment, Forest and Climate Change (MoEFCC), ENVIS Secretariat, New Delhi was organised by Wildlife Institute of India, Dehradun; in association with Central Zoo Authority; and Kamala Nehru Zoological Garden, Ahmedabad at Ahmedabad. The purpose of this course was to create a pool of skilled zoo guides who would help in disseminating information to visitors in the zoo in an entertaining manner.

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Twenty-five participants were selected for the course. The resource persons delivered lectures during various interactive sessions, viz. Role of zoos in conservation; Effective communication techniques; Management of disaster in zoos; Herpetofauna and basics skills of snake handling; and Urban wildlife etc. The trainees were taken to Kamala Nehru Zoological Garden, Kankaria; Sundarvan, Gandhinagar; and Indroda Nature Park, Gandhinagar for hands-on training.

One-Week Compulsory Training Programme for IFS Officers on 'Illegal Trade in Wildlife and Role of Wildlife Forensics in Dealing with Wildlife Crime', Port Blair, 2-6 December 2019.

The Wildlife Institute of India conducted the one-week compulsory training programme for IFS officers. A total of 33

IFS officers participated in the course. The inaugural session on 2 December 2019 was graced by Shri Tarun Coomar, Principal Chief Conservator of Forests of Andaman & Nicobar Islands. The course provided extensive inputs on forensic science and its relevance in combating wildlife crime. After the theoretical inputs, the trainees were taken to Jolly Boy Island; Mahatma Gandhi Marine National Park; Swaraj Dweep (Havelock Island); and ZSI during 3-5 December 2019 where they were given inputs on the investigation, crime scene analysis, evidence collection and mock exercises. The course winded up on 6 December 2019 with a valedictory function at Chidiya Tapu, Port Blair.

Consultation Workshop on Potential World Heritage Sites in Madhya Pradesh, Bhopal, 7 December 2019.

UNESCO C2C-WII conducted a consultation workshop on "Inventorization and Prioritization of Potential World Heritage Sites in Madhya Pradesh State" in Bhopal. This was organized as a part of the project funded by Madhya Pradesh Tourism Board, Bhopal. The workshop was attended by 26 participants including senior officials of MP Tourism Board, MP Forest Department, NGOs and Senior Professionals having sound knowledge and experience of Madhya Pradesh and its cultural and natural heritage. Invited members suggested and presented unique values of their sites. A matrix exercise was carried out to do a preliminary ranking of the identified sites, and the results are now being examined to prioritise potential sites that may be considered for Tentative Listing as World Heritage Sites.

Scaling Up and Coordination Workshop, Dehradun, 27 December 2019.

The 'Scaling Up and Coordination Workshop' focussed on "Technology Scaling and Outreach for Livelihood Enhancement in Mountain Areas." A group discussion on up-scaling, replicability and sustainability of the technologies developed under the Technology Intervention for Mountain Ecosystem - Livelihood Enhancement through Action Research and Networking (TIME-LEARN) Programme. The 49 participants included experts, project Investigators of 20 projects and representatives from the government and non-government organizations. The participants were divided into four working groups. Each group was assigned with one major issue to be addressed in up-scaling the technological interventions in mountain landscapes.

Landscape-Level Stakeholders/ Experts Consultation Workshop, Panna Tiger Reserve, Madhya Pradesh, 18-19 January 2020.

The two-day workshop was organized as a part of 'Development of Landscape Management Plan and Monitoring regarding the Ken-Betwa River Linking Project in Panna Tiger Reserve, Madhya Pradesh.' The workshop, organized by Wildlife Institute of India, was mandated by National Tiger Conservation Authority in collaboration with Madhya Pradesh and Uttar Pradesh Forest Departments and supported by National Water Development Agency. The agenda of the workshop was to consult with stakeholders/ experts for identifying gaps in completed work and prepare an outline of the landscape management plan. Seventy-five participants attended the workshop. Besides presentations, a field trip was organized for the participants in Panna Tiger Reserve to understand various issues concerning Landscape Management Plan.

National Workshop on Habitat Management for Elephants to Mitigate Human-Elephant Conflict, Dehradun, 20-21 January 2020.

Managing elephant habitat in rapidly changing landscapes is a considerable challenge. For effective management of elephant habitats, a comprehensive understating of the elephant - habitat interactions, population dynamics, social organization and dietary needs of elephants is essential. The threats to elephant habitats due to fragmentation and degradation have increased. Understanding these threats to elephant habitat and how the interventions like restoration of corridors could help in improving the resilience of habitats are essential to deliberate. There is also a necessity to understand management practices across different elephant habitats in the country and flag best practices that can be shared.

With these objectives, the Project Elephant Division of the Ministry of Environment, Forest and Climate Change, Government of India in partnership with the Wildlife Institute of India organized a two-day workshop in Dehradun. A total of 59 participants, which included foresters, serving young officers, wildlife scientists and young field biologists, attended the workshop.

Officers from Assam, Tamil Nadu, Uttarakhand, Karnataka, Kerala and West Bengal made their presentations on the best practices to manage elephant habitats. Working groups on the suite of habitat management themes deliberated on challenges and best practices.

Five-day Course on "Health Management of Captive Wild Animals, Dehradun, 21–25 January 2020.

Based on the request from Bihar Forest Department, the Wildlife Institute of India organized a five-day course on "Health Management of Captive Wild Animals". The target group included eleven faculty members of Bihar Veterinary College and one Veterinary Officer each working with Bihar and Uttar Pradesh Forest Department.

The course was aimed at sensitizing the participants on various aspects of ex-situ management and included deliberations on issues related to biodiversity conservation, species biology and behaviour, husbandry & animal care, wild animal nutrition, mortality investigations, reptile husbandry and care, quarantine essentials, population management, wildlife forensics, and outreach. The sessions were delivered by eminent scientists and resource persons. The course was attended by a total of 13 veterinary professionals.

Field Course on Interventions in Wild Animal Health, Sariska Tiger Reserve, 27 January – 13 February 2020.

The Zoological Society of London (ZSL), Wildlife Institute of India (WII) and University of Edinburgh (UoE) organized a study abroad program on Interventions in Wild Animal Health (a component of the MVetSci Conservation Medicine, an online course) at Sariska Tiger Reserve. The course was specially designed for practising veterinarians and aimed at developing skills in human-wildlife conflict management, translocation techniques, disease outbreak investigation and the monitoring of the health of declining species including techniques for field monitoring of wildlife (using a range of techniques from animal tracks and signs surveys to camera trapping and radio telemetry), biological management, visual health monitoring of free-living animals, best practice of wild animal anaesthesia techniques, demonstration and hands-on practice, clinical examination in the field, sampling techniques for infectious disease screening, pathological examination in the field, and scanning disease surveillance scenarios.

The course was attended by 26 veterinary professionals from India (15), United Kingdom (3), United States of America (2) and one each from Holland, Ireland, Mauritius, Nepal, New Zealand, and Taiwan.

Certificate Course on Bird Identification and Basic Ornithology, Dehradun, 30 January - 13 February 2020.

ENVIS Resource Partner 'Wildlife and Protected Areas', Wildlife Institute of India, Dehradun, Uttarakhand organized a residential course under Green Skill Development Programme of Ministry of Environment, Forest and Climate Change, Government of India in Wildlife Institute of India. Twenty participants from Uttarakhand, Leh-Ladakh, Assam, West Bengal, Andhra Pradesh, Odisha, and Mizoram joined the course. The main aim of the course was to skill the participants in Bird Identification and Basic Ornithology so that they can create employment opportunities and become self-dependent. National Skill Development Authority approved the course with an NSQF Level 5. Besides course modules, group exercises and practical exposure were also emphasized. Bird-watching sessions and visits to Asan Conservation Reserve, Rajaji Tiger Reserve, Jhilmil Conservation Reserve, Benog Wildlife Sanctuary, and Forest Research Institute were conducted for field exposure.

Management Effectiveness Evaluation (MEE) of National Parks and Wildlife Sanctuaries, 2018-19, New Delhi, 3-4 February 2020.

The objective of the MEE was to discuss the findings, sharing the outcomes and publication of the report of MEE of 146 PAs evaluated during 2018-19. It was organised by WII and MoEFCC, Govt. of India. In all 33 participants attended the programme. The results of MEE of 146 National Parks and Wildlife Sanctuaries were shared by Dr Gautam Talukdar. Chairmen of Independent Regional Expert Committees shared their observations and experiences of the field visit made for evaluation of PAs through MEE process. In the 'Way Ahead' session, important discussions were made to improve the MEE process and to take the MEE Exercise in a bigger way. In the end, it was requested from all CWLWs to submit their observations in the MEE report to WII within 15 days. The meeting was ended with the vote of thanks to all the participants.

National Training Programme for Ganga Praharis Spearhead Team, Dehradun, 3-10 February 2020.

Under the Wildlife Institute of India - National Mission for Clean Mission Ganga project 'Biodiversity Conservation Initiative Phase II, an 8-day national training programme was conducted at the Wildlife Institute of India for spearhead team of Ganga Praharis from the five Ganga States. The objective of the training was to train the spearhead team of Ganga Praharis - Guardians of the Ganga. They will lead the conservation activities in their respective areas especially conducting cleanliness and plantation drive, volunteering with State forest departments in the population census of different aquatic species of Ganga River and mobilization of

school children at their respective states. The training workshop was attended by 50 Ganga Praharis from Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal. Detailed information on technical issues of biodiversity conservation activities was shared with the participants to enable them to lead and carry forward the Ganga conservation activities. During the training, the participants were also imparted with relevant IT skills and the usage of various applications like Bhuvan Ganga App, Aqualife Data App and the App Digital Micro Planning of Villages. These IT-based applications will enable the Ganga Praharis to monitor and report the issues about the Ganga River in their surrounding area.

One-Week Training Course on "Management of Coastal and Marine Biodiversity in India: Challenges and Prospects", Port Blair, Andaman & Nicobar Islands, 10-14 February 2020.

One week refresher training course for Indian Forest Officers on "Management of Coastal and Marine Biodiversity in India: Challenges and Prospect" was inaugurated by Mr Tarun Coomar, PCCF of Andaman and Nicobar Islands and Dr V.B. Mathur, Chairperson, National Biodiversity Authority. This one-week course was jointly organized by Wildlife Institute of India in association with Department of Environment & Forest, Andaman & Nicobar Islands.

Management agencies in India are still having a limited understanding of the management of multiple-use coastal and marine areas. Given this scenario, the challenge lies in reconciling livelihood needs and development vis-a-vis conservation. Therefore, this course was conducted to address the following issues: (i) promoting the integration of biodiversity conservation and livelihood enhancement? (ii) What are the existing and potential threats to the conservation of coastal and marine biodiversity? (iii) What are the current policy and governance challenges to coastal and marine biodiversity conservation? What is the role of community in the governance and management of marine protected areas and ecologically sensitive coastal areas? Thirty IFS officers from eleven state cadres participated in the course.

Meeting on Compilation of Bio-Diversity Accounts, Dehradun, 11 February 2020.

Smt. P. Bhanumati, Deputy Director-General; Smt. Kajal Jain, Director, Social Statistics Division, National Statistical Office, Ministry of Statistics and Programme Implementation, and Ms Aastha Dwivedi, Assistant Director, Ministry of Environment, Forest and Climate Change, Govt. of India, New Delhi visited Wildlife Institute of India for the compilation of biodiversity accounts and to discuss the following issues: (i) Biodiversity information: Flora and Fauna, endangered Species, Red List and management; (ii) Data availability, level of disaggregation and frequency; (iii) Methodology of data collection; (iv) Evaluation of Protected Areas; and (v) Institutional system for availability of regular data.

A team of faculty members, researchers and officers of the Institute discussed with the visiting group and made presentations on the above topics. Additionally, other relevant issues on environment/ecosystem accounting were also discussed. The delegation also visited the Computer & GIS Laboratory and Forensic Laboratory of the Institute.

Thirteenth Conference of Parties of Convention on Migratory Species of wild animals (CMS CoP13), Gandhinagar, 15-22 February 2020.

"*Migratory species connect the planet, and together we welcome them home*" was the theme of a major UN Wildlife Conference dedicated to migratory species in India that was held at Gandhinagar, Gujarat. The CoP13 was officially inaugurated by the Prime Minister of India, Shri Narendra Modi on 17 February 2020. Senior government officials, environment advocates, activists, researchers and biodiversity leaders from as many as 130 countries participated in this conference.

Wildlife Institute of India (WII) has showcased the conservation efforts of India to several threatened migratory species such as Dugongs, Great Indian Bustard, Gangetic Dolphin, Amur Falcon and Snow Leopard etc. in its Exhibition Hall. WII stall was one of the most visited stalls of the conference by delegates and students. WII has conducted a side event on behalf of MoEFCC with the partnership of CMFRI and WTI on 'Marine Animals Conservation Programme: Sea turtles, whale shark, Arabian Sea Humpback Whales and Dugongs in India' on 19 February 2020. This side event was co-chaired by Shri Soumitra Dasgupta, IGF (WL), MoEFCC, GoI with Dr Dhananjai Mohan, Director, WII. Further, WII, especially the NMCG Team, has organized a side event at the Indian Pavilion and showcased the conservation efforts of WII to migratory species of Ganges. More than 20 scientists and researchers from WII participated in this conference and spoken in the various side events organized at the conference.

Stakeholder Consultation on Kailash Landscape as a Proposed World Heritage Site, Dharchula, 17 February 2020.

UNESCO C2C-WII, in collaboration with Rung Kalyan Sanstha (RKS), organized a stakeholder consultation on Kailash Landscape as a proposed World Heritage Site at Dharchula, Pithoragarh. The objective was to share information and deliberate on World Heritage with the local authorities and community members as well as present the documentation on the site prepared by RKS. Shri B.S. Bonal, RKS shared the background and context of the consultation. Special remarks were made by Shri N.S. Napalchiyal, RKS. Dr Vinay Bhargava, DFO talked about the role of the Forest Department in protecting the biodiversity resources of the region.

Shri Niraj Kakati, UNESCO C2C-WII provided an overview of World Heritage and the nomination process. Subsequently, he provided a presentation on the status of the proposal of the Kailash landscape as a proposed World Heritage Site, including the proposed cultural and natural criteria. A documentary on Kailash was also screened for the audience. The consultation was attended by 84 participants including civil administration and forest department officials, college lecturers, gram panchayat members and other eminent local community members

Capacity Building Programme for Safeguarding Natural Heritage through Education, Awareness and Network Building, Manas World Heritage Site, Assam, 23-25 February 2020.

UNESCO C2C-WII organized a capacity-building programme for teachers and students towards the purpose of 'Safeguarding Natural Heritage through Education, Awareness and Network Building' at Manas World Heritage Site. The purpose of this programme was to build capacity and sensitize teachers of schools located in the proximity of the World Heritage Site of Manas National Park. The expected outcome of such a programme was to convey the message of World Heritage conservation through the teachers to the larger student population, who belong to the local communities of the fringe villages of the national park. The training provided valuable information on World Heritage, OUVs of the site, major challenges and opportunities in management, and the importance of community participation for sustainable conservation. Dedicated sessions were held on local biodiversity registration, PRA techniques and ecosystem services associated with the site. A hands-on field visit to the Manas World Heritage Site was also organised for the participants. In all, 20 participants from schools near the National Park attended the training programme, which was held in collaboration with Aaranyak, a biodiversity conservation society of Northeast India.

Certificate Course on "Wildlife Management using Geospatial Techniques", Dehradun, 24 February - 21 March 2020.

The Certificate Course was organized by the Institute under Green Skill Development Programme (GSDP) of Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India at Wildlife Institute of India for science graduates. A total of 20 candidates participated in the course.

The course had both the theory and practical sessions efficiently managed to enable the trainees with geospatial skills for applicability in wildlife management. During the course, two separate field visits were arranged keeping in view various geospatial and wildlife management practices, one to Asan Conservation Reserve and other to Rajaji National Park. The last week of the course comprised of guided project work, wherein the participants were divided into six groups. A project was assigned to each group based on which evaluation was done.

Special Course on Wildlife Protection, Law and Forensic Science for Officers of Customs & CGST, Rajasthan Zone, Dehradun, 27-29 February 2020.

The Wildlife Institute of India conducted a three-day special course for the officers of Customs & CGST of Rajasthan zone. A total of 30 Officers (28 participants and 2 faculty members) participated in the course. The course provided extensive inputs on forensic science and its relevance in combating Wildlife crime. The first day concentrated on theoretical inputs on forensic and hands-on training for identification of wildlife products. Training on second-day was conducted with the classroom inputs. The trainees were taken on a field trip to Rajaji Tiger Reserve, where they understood the challenges in the protection of the animals from the poachers. All the 30 officers completed the course and obtained certificates. The overall feedback for the course was very good.

A 'Training of Trainers Program on Training Excellence (Teaching methods)', Bengaluru, 13-15 March 2020.

The 'Training of Trainers Program' was organized under the project entitled 'Knowledge Support to Development of Guidelines, Specialized Field Studies and Training on Human-Wildlife Conflict Mitigation in India' at Angsana Oasis Spa & Resort, Bengaluru. The objective of this training program was to train faculties and experts from WII for effective implementation of various modules and courses, particularly on human-wildlife conflict, currently being conducted at WII for a diverse target audience. The training was facilitated by Ms Paayal Varma, Senior Training Consultant with Dale Carnegie India and the globally acclaimed Dale Carnegie's training materials and methods were used.

Apart from the scheduled topics, aspects of training and coaching were discussed dealing with participant behaviour and reinforcing positive behaviour using a human relations approach, particularly managing difficult attitudes and behaviours of participants. Various participatory methods viz., knowledge café, role plays, fishbowl were discussed. Constructive feedback was deliberated on as a tool to deal with the audience and to create an environment of acceptance and encouragement. Several self-evaluative or learning exercises were used for better understanding of the training and coaching methods. Fifteen participants attended the training programme. The training program was appreciated by the participants.

Workshops on International Day of Action on Rivers, Kalagarh Tiger Reserve and Sarnath, Varanasi, 14 March 2020.

On the occasion of International Day of Action on River, 2020, a workshop was organized at Dhautiyal Village near Kalagarh Tiger Reserve, along with Offbeat India. A total of around 21 female members participated in the workshop and were explained the theme "Women, Water and Climate Change". The explanation was followed by a round of activities, such as studying their agricultural cropping patterns and human-wildlife conflicts that they face on an everyday basis. The idea behind conducting the activities was majorly focused on understanding their modes of the utilization of their water and other resources. The material distribution was done, and all the women who wholeheartedly participated in the workshop were appreciated for their sincere efforts.

International Day of Action on Rivers was celebrated at Sarnath too. The NMCG team decided to hold a workshop with only women and make them understand how they can play a role in conserving water. The workshop was conducted in the Interpretation Center in Sarnath, Varanasi. A total of 58 women gathered for the workshop from the nearby villages. The workshop started with a short film, which showed them how women in different parts of India are working together towards getting a regular and cleaner supply of water. The concept of Jal Panchayat and various issues related to the water were discussed.

Attended by WII Personnel

Project Snow Leopard Meeting, Lucknow, 11-13 April 2019.

The meeting was organized by the Ministry of Environment, Forest and Climate Change, Govt. of India. Dr S. Sathyakumar attended the meeting and made a presentation on SPAI and provided other inputs.

Second State Level Technical Committee Meeting, Shimla, 16 April 2019.

The meeting was organised by Himachal Pradesh Forest Department. The objective of the meeting was to understand the progress and as a follow-up of the ongoing project activities. Intensive discussion on ecological and economical aspects of MAPs amongst the stakeholders, SLTC endorsed the idea of selecting ten species for an in-depth study based on two criteria, viz. high threat perception and high quantum of collection of MAPs. Subsequently, 10 MAPs species were selected for detailed study. Dr Amit Kumar attended the meeting.

Annual Coordination Meeting of UNESCO C2Cs, Manama, Bahrain, 22-23 April 2019.

UNESCO C2C-WII participated in the 7th Annual Coordination Meeting of the UNESCO World Heritage related Category 2 Institutes & Centres (C2Cs) hosted by the Arab Regional Centre for World Heritage (ARC-WH) at Manama, Bahrain. Representing the Centre, Mr Niraj Kakati, Technical Officer, made a presentation of its activities and also released the Spring Issue of its quarterly newsletter - Natural Heritage Bulletin. He further contributed to the discussions of the meeting which focused on the review of previous coordination meetings, Periodic Reporting for World Heritage Sites, Historic Urban Landscapes, interregional cooperation among C2Cs, communication and resource mobilisation. A field visit was also organised to Qal' at al-Bahrain World Heritage Site, demonstrating its interpretation museum and conservation efforts.

Plenary Session of the United Nations Intergovernmental Platform on Biodiversity and Ecosystem Services (UN - IPBES) in Paris, France, 28 April - 4 May 2019.

Dr V.B. Mathur represented India as Head of the Indian Delegation in the 7th Plenary Session of the United Nations Intergovernmental Platform on Biodiversity and Ecosystem Services (UN-IPBES) in Paris, France.

National Workshop to Evaluate Scientific Proposals for the 39th Indian Scientific Expedition to Antarctica', Goa, 15-16 May 2019.

The workshop was held at National Center for Polar and Ocean Research, NCAOR, Goa. It was organized by NCAOR & MoES. Dr S. Sathyakumar evaluated proposals and provided inputs.

SETAC Europe 29th Annual Meeting, Helsinki, Finland, 26-30 May 2019.

The meeting was organised by the Society of Environmental Toxicology and Chemistry (SETAC). Dr Anju Baroth attended the meeting and presented a paper titled 'Spatio-temporal Trends of Microplastics Loading in the Sediments of River Ganga.'

Workshop on 'Leveraging the World Heritage Convention for Transboundary Conservation in the Hindu Kush Himalaya, Kathmandu, Nepal, 30-31 May 2019.

Dr Manoj V Nair, Scientist-F, UNESCO C2C-WII participated in a two-day workshop titled 'Leveraging the World Heritage Convention for Transboundary Conservation in the Hindu Kush Himalayas organized by International Centre for Integrated Mountain Development (ICIMOD), Wild Heritage and International Union for Conservation of Nature (IUCN) at ICIMOD Headquarters in Kathmandu, Nepal. Dr Nair contributed to the workshop by highlighting the activities of UNESCO C2C-WII and discussing the areas that have global significance and potential outstanding value with transboundary World Heritage potential.

Brainstorming National Project Steering Committee (NPSC) Meeting, New Delhi, 3 June 2019.

The objective of the meeting was to review the proceedings of the ongoing project activities, including field data collection. It was organised by MoEFCC, GoI. The review committee emphasized on the abundance of the selected MAPs and ABS village model in the focal landscape. Dr Amit Kumar represented the Institute in the meeting.

Meeting with Chief Minister of Uttarakhand on Kailash Landscape, Dehradun, 4 July 2019.

A meeting with the Hon'ble Chief Minister, Government of Uttarakhand, Dr Trivendra Singh Rawat and the officials of the State Government of Uttarakhand was held at the State Secretariat, Dehradun with UNESCO C2C-WII represented by Dr V.B. Mathur, Shri Niraj Kakati and Dr Malvika Onial to brief the state government about the Kailash landscape's nomination as a proposed World Heritage Site. The meeting attendees included Shri Amit Negi, Finance Secretary, Shri Dilip Javalkar, Tourism Secretary and Shri Mahendra Singh Kunwar, Secretary, Himalaya Action Research Centre. The Hon'ble Chief Minister was informed that the Kailash landscape in India is located within the Pithoragarh District of Uttarakhand and has been proposed on the Tentative List of Indian World Heritage Sites owing to its significant cultural and natural values. The subsequent detailed nomination of the site on UNESCO's World Heritage List would require extensive documentation and consultations with all relevant stakeholders. The Chief Minister assured the support of the Government of Uttarakhand in this process, in particular, the Departments of Culture, Tourism and Forest. He hoped that this World Heritage designation would be a matter of pride for India and Uttarakhand.

Workshop on Regional Engagement Meeting and Data Mobilization, Hanoi, Vietnam, 8-12 July 2019.

The workshop was organized by the Global Biodiversity Information Facility (GBIF). The objective of this workshop was to enhance the capacity to plan and implement to biodiversity data mobilization efforts effectively and according to GBIF standards. The strong focus was on the technical aspects of data mobilization – in particular everything related to the data lifecycle: planning, mobilization, management and online publishing in order to increase the amount, richness and quality of the data published through the GBIF network. It was attended by thirty-three participants from different countries with an online and onsite component with a strong practical approach. Shri Dinesh Singh Pundir, Senior Technical Officer attended this workshop.

The Hon'ble Prime Minister of India Released the Tiger Population Estimation 2018 Report, New Delhi, 29 July 2019.

The World Tiger Day, 2019 was celebrated on 29 July 2019 in which two reports viz. Tiger Population Estimation 2018 and Management Effectiveness Evaluation of Tiger Reserve 2018 were released by the Hon'ble Prime Minister of India, Shri Narendra Modi. These reports were jointly prepared by the Wildlife Institute of India and National Tiger Conservation Authority (WII-NTCA). WII-NTCA teams collected; compiled and analyzed the data from various tiger occupied areas spread across the country and finalized the Tiger Population Estimation 2018 report. The Hon'ble Prime Minister congratulated all the agencies, organizations and the teams involved in the task. He said on this occasion that India achieved its target of doubling the tiger count four years ahead of 2022. He further said that it is one of the finest examples of 'Sankalp Se Siddhi' (from the pledge to fulfilment). The Hon'ble the Minister of Environment, Forest and Climate Change, Govt. of India, Shri Prakash Javadekar, the Hon'ble Minister of State for Environment, Forest and Climate Change, Govt. of India, Shri Babul Supriyo, the Hon'ble Cabinet Minister of Forests & Wildlife, Govt. of Uttarakhand, Shri Harak Singh Rawat, senior officials of MoEFCC, Dr V.B. Mathur, Director, WII and other dignitaries were present on occasion.

Brainstorming Session on Conservation of Geoheritage in India, New Delhi, 6 August 2019.

The Society of Earth Scientists (SES) jointly with Indian National Science Academy, Delhi organised a brainstorming session on 'Conservation of Geoheritage: Current Scenario and Future Action Plan' at INSA, Delhi. Various lawmakers, technocrats, government officials and senior geoscientists were invited to discuss the issue and to provide their support. Dr Chitiz Joshi, Assistant Technical Officer, represented UNESCO C2C-WII in the session. Issues, including threats from urbanization and development that are destroying the unique geo-heritage and strategies to ensure successful geo-heritage conservation were discussed.

Stakeholder Dialogue on Exploring Options for Transboundary Cooperation towards Resilience Building in the Eastern Himalayas, Thimphu, Bhutan, 29-30 August 2019.

The International Centre for Integrated Mountain Development (ICIMOD) and UN Environment in close collaboration with Governments of Bhutan, India and Nepal and other partners were developing a proposal for a project, focused on the promotion of transboundary cooperation for resilience building in the Eastern Himalayas, with a specific focus on the improved management of transboundary landscapes, particularly the Khangchendzonga (Kangchenjunga) and Manas landscapes and connectivity between these landscapes. Towards this end, a regional stakeholder dialogue was organised in Thimphu, Bhutan, which was attended by 30 participants from Bhutan, Nepal and Bhutan. Shri Niraj Kakati, Technical Officer, participated in the meeting and presented a paper on 'Manas and Kangchenjunga Landscapes: A World Heritage Perspective for Transboundary Cooperation.'

Mountain Conference 2019, Austria, 8-12 September 2019.

Dr V.P. Uniyal participated in Mountain Conference 2019: at University of Innsbruck, Austria and presented a paper on the diversity of moths in the protected area of Uttarakhand.

7th World Congress on Mountain Ungulates, Bozeman, Montana, USA, 10-13 September 2019.

The world congress was organised by the Wild Sheep Foundation and IUCN Caprinae Specialist Group. Dr S. Sathyakumar attended the congress and made a presentation.

Capacity Building Workshop on Nature-Culture Linkages (CBWNCL) in Heritage Conservation in Asia and the Pacific-Mixed Cultural and Natural Heritage, Tsukuba, Japan, 24 September – 4 October 2019.

CBWNCL 2019 was organized at the University of Tsukuba on the Theme of "Mixed Cultural and Natural Heritage". Shri Anuranjan Roy, World Heritage Assistant, participated in the workshop. He delivered a presentation on the Sacred Mountain Landscape and Heritage Routes of India, a site encompassing the Indian portion of the transnational Kailash Sacred Landscape. The two-week workshop discussed mixed sites as defined by the World Heritage Convention. The participants visited Mt. Fuji as a study site to look at its potential as a mixed site.

National Symposium and Annual Convention on "Sustainable Improvement of Animal Health and Production-Bridging Science and Policy for Economic Upliftment of Farmers", Mathura, 8-9 November 2019.

The objective of the workshop was to promote and encourage the development, advancement and research in the science of veterinary clinical, preventive medicine and veterinary ethics and jurisprudence and its related fields. It was organised by DUVASU Veterinary University, Mathura and ICAR, CIRG Mathura. Dr Kafil Hussain presented the invited lead paper in wildlife medicine session on "Approaches for

Wildlife Healthcare in India" and chaired the poster session in the conference.

Seminar on 'Solutions of Monkey Menace Problems', Mathura, 11 November 2019.

Dr Kafil Hussain participated in the seminar organised by DUVASU, Mathura and ICAR, CIRG Mathura at Veterinary University (DUVASU) Mathura. The objective of the seminar was to share the experiences for the possible solutions for monkey conflict problem in Mathura. Dr Kafil Hussain shared the experiences to tackle the problem and suggested the possible answers for monkey problem in Mathura.

Workshop on Biodiversity Conservation through Management of Human-Wildlife Conflicts, Gangtok, Sikkim, 15-16 November 2019.

The workshop was organized by the Department of Forest, Environment & Wildlife, Sikkim. Dr S. Sathyakumar provided inputs in the workshop.

International Conference on Heritage Management Education and Practice, Ahmedabad, 6-8 December 2019.

Shri Anuranjan Roy, World Heritage Assistant, represented UNESCO C2C-WII at the 3rd International Conference, which was organized by Ahmedabad University's Centre for Heritage Management in Ahmadabad. The conference was a venue for practitioners and educators in the field of heritage to come together to share ideas and new developments. Shri Roy discussed the newer initiatives taken by UNESCO-C2C at WII to promote heritage conservation and education, including ensuring the availability of its nature writing anthology "Wild Treasures" and the introduction of the M.Sc. in Heritage Conservation and Management aimed at fulfilling the need for heritage management professionals. He also participated in a panel discussion on 'Access and Inclusion in Heritage'.

Regional Conference on "Himalaya Matters in the Changing World", GBPNIHE Kosi-Katarmal, Almora, 9-11 December 2020.

The regional conference was jointly organized by G.B. Pant 'National Institute of Himalayan Environment; Ministry of Environment, Forest and Climate Change; Wildlife Institute of India and others. Dr S. Sathyakumar attended the conference and coordinated the session on wildlife habitats.

AGM of Indian National Science Academy, National Institute of Oceanography, Goa, 16-18 December 2019.

The Annual General Meeting was organized by the Indian National Science Academy (INSA). Dr S. Sathyakumar participated in the meeting. He also received the INSA Teacher award during the Annual General Meeting.

National Multi-sectoral Health Workshop for Prevention of Zoonotic Diseases, Jaipur, 10-12 February 2020.

The workshop was organised by the Directorate Health Services, Government of Rajasthan in collaboration with U.S. Centers for Disease Control and Prevention (CDC). The objective of the workshop was to identify the most urgent zoonotic disease threats and develop a roadmap for targeted lab capacity building, routine lab base disease surveillance and outbreak response, preparedness activities, and mechanisms for data sharing between the different sectors/ stakeholders. Various national and international subject matter experts from public health, veterinary, wildlife, food and environment sectors supported the workshop. Dr Kafil Hussain participated as resource persons and gave the inputs in a plenary discussion on the ranking of criteria for disease prioritization.

3rd Review Meeting of NMHS, Indian National Science Academy (INSA), Delhi, 29 January 2020.

The meeting was organized by G.B. Pant National Institute of Himalayan Environment and Ministry of Environment, Forest and Climate Change. Dr S. Sathyakumar participated in the meeting and provided inputs.

Brown Bear Conservation Sprint Workshop, Suraj Kund, 4-6 February 2020.

The workshop was organized by The Nature Conservancy. Dr S. Sathyakumar participated in the workshop and provided inputs.

Workshop on "Possible Solutions for Wild Boar Problem in Odisha", Bhubaneshwar, Odisha, 26 February 2020.

The Forest and Environment Department, Government of Odisha, organised a workshop on 'Possible solutions for wild boar problem in Odisha'. The objective of the workshop was to share the experiences for the possible solutions for wild boar problem in Odisha. Dr Kafil Hussain participated in the workshop as a resource person from WII and shared the experiences to tackle the problem and suggested the possible solutions for wild boar problem in Odisha.

IPCC Working Group II Third Lead Author Meeting of the Sixth Assessment Report, Venue: Gambelas Campus, University of Algarve, Faro, Portugal, 26 January - 1 February 2020.

The objective of the meeting was to prepare internal Second Order Draft (SOD) for the Sixth Assessment Report (AR6) of Working Group II. It was organised by IPCC. In-depth discussions were held regarding the comments received for the First Order Draft (FOD) as well as the revised outline of the chapter, and a consensus was reached for preparation of Second Order Draft (SOD). Authors were assigned responsibilities to develop specific portions of the chapter and also respond to the comments received. It was decided to hold Skype meetings every two weeks until the deadline for the second-order draft. The lead authors of chapter 2 would submit their SOD draft portions by June 2020. The second-order draft will be made public, and all comments received will have to be addressed. Similar deadlines were also set for the cross-chapter on Biodiversity Hotspots.

The IUCN South Asia Freshwater Fish Assessment Workshop, Kandy, Sri Lanka 24 February - 1 March 2020.

The objective of the workshop was to assess the IUCN status of freshwater fishes of the Indus river basin. It was organized by Zoo Outreach Organization, Coimbatore. This was the first South Asia Freshwater Fish Re-assessment Workshop specifically meant for re-assessment of IUCN status of freshwater fishes of Indus river basin. In the capacity of a regional freshwater fish expert, Dr J.A. Johnson was invited to contribute and review the assessment process. The experts from other parts of India and fisheries scientist from Pakistan also participated in the workshop.

ICHRA 2020: International Conference on Herpetology, Reptiles and Amphibians, Dubai, UAE, 19-20 March 2020.

The conference was organised by International Research Conference - World Academy of Science, Engineering and Technology. Dr R. Chinnasamy made an online presentation on the study 'Understanding the dynamics of human-snake negative Interactions: A study of indigenous perceptions in Tamil Nadu, Southern India' in the conference. The study aims at understanding the level of awareness, knowledge and attitude of the people towards human-snake negative interaction and role of awareness programmes in the Moyar river valley, Tamil Nadu.

Study Tour

Students visit from Griffith University, Australia

A group of students and faculty from the Department of Tourism, Griffith University, Australia visited WII, Dehradun during November - December 2019. The visit was part of a three-year 2017-2019 scheme funded through the Australian Federal Government's Department of Foreign Affairs & Trade, to increase Australian students' knowledge of the Indo-Pacific region. The students undertook classroom lectures and field visit to study issues of ecotourism. UNESCO C2C-WII hosted the visiting group and talks on heritage in Australia as well as facilitated talks by the Centre members on World and India's natural heritage.

ACTIVITIES & PROFESSIONAL SUPPORT

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Cells

Information Technology and Geo-informatics

Information Technology, Remote Sensing and Geographic Information System facility is part of almost all wildlife research projects, education and training. The facility is available for 24x7 to the faculty members, trainees, researchers, students and collaborators working with the Institute. A large number of desktop computers configured with MS Windows, Linux and specialized analytical software for data processing are made available in the dedicated laboratories.

The computer facility is provided by a wide array of hardware setup connected to Local Area Network (LAN). There are Intel Xeon servers with Storage Area Network (SAN) and Network Attached Storage (NAS) system for the Internet, Intranet, database management and library automation services. There are more than 400 nodes and 700 users on WII LAN. Wi-Fi connectivity is provided in Hostels, Guest Houses, Classrooms, Auditorium, Board Room and Porta Cabin. The Institute has dedicated and unshared 200 Mbps (fibre) and 30 Mbps (Radio Frequency, Microwave) internet leased line connectivity via ISPs, BSNL and Reliance Communications.

The Geoinformatics laboratory caters to research and training program of the Institute. The laboratory is equipped with several high-end workstations, A0 scanner-cum-plotter and software packages viz. ArcGIS, ERDAS Imagine software for landscape-level analysis. A dedicated team provides support and training in IT and Geoinformatics. The module on Remote Sensing, GIS and Landscape Ecology is conducted for students of M.Sc. in Wildlife Science; and officer trainees of PG Diploma and Certificate Courses in Wildlife Management conducted by the Institute. Hands-on training is also provided to other graduates, post-graduate students and interns. Open-source software, *viz.* QGIS, GRASS and R are also used for teaching and training.

WII has video conferencing facility consisting of Polycom HDX 8000 VC systems with high definition cameras and displays based on IP Internet Leased Line connection. These systems are regularly used for conducting lectures, meetings, classes, interviews and presentations within the country and abroad.

Safety Measures: User policy is put in place to keep safe distancing in the Computer and GIS laboratory to contain the spread of Noval Corona Virus. Also, the strategy is in place for staying safe in the computer user facility.

New activities accomplished by the IT and RS/GIS Cell during the reporting year:

Implementation of SSL Certificate: Secured Sockets Layer (SSL) certificates are a global standard security technology that provides secured communication between a web browser and a web server. It prevents the risk of sensitive information of the individual from being stolen or tampered by hackers. SSL Certificates enabled websites to move from HTTP to a secured HTTPS protocol.

The SSL certificates were implemented to the following domain and subdomains of the Institute.

https://wii.gov.in

https://mail.wii.gov.in

https://lams/wii.gov.in

https://ibif.gov.in

Implementation of Virtual Private Network: Virtual Private Network (VPN) is successfully implemented on the WII network to access the Institute's LAN facilities from outside the WII campus. The VPN is configured on Institute's Sophos firewall. This VPN facility is used by faculty members and officials of the Institute.

Implementation of Visitor Management System: Visitor Management System software provides tracking and managing of visitors entering WII premises. The visitor is required to provide their details, whom to meet and get photographed by web camera at the WII Main Gate. The system will then generate an e-pass for the visitor. The visitor will submit this e-pass at the Main Gate before leaving WII premises duly signed by the person he met in the Institute. This software system is also linked with the Institute's biometric attendance database.

Probity Portal: NIC, New Delhi has provided the Institute with VPN connection for uploading the probity data every month from WII network on probity portal (https://10.21.8.4/probitynew/home.aspx).

Application of Geoinformatics in Research Projects: Geoinformatics technology is being used in most of the research projects of the institute for wildlife research and conservation.

Work is in progress on the development of a spatial database on the boundaries of all the national parks, wildlife sanctuaries, conservation reserves and community reserves in the country and procurement of beat boundaries of the 17 tiger range states in the country has been done. The country-level data on animal distribution is done through All India Tiger Monitoring Project, which is maintained in the cell. Spatial data for 17 tiger range state is developed and maintained.

Wildlife Forensic and Conservation Genetics

The Wildlife Forensic and Conservation Genetics (WFCG) Cell was established to strengthen the enforcement of Wildlife (Protection) Act, 1972 of India. The main functions of the Cell include identification of species from a variety of wildlife parts and products for forensic investigation, along with expanding an already available repository of wildlife reference samples and R&D on newer forensic tools. It is a recognized laboratory for conducting the wildlife forensic research and casework for supporting the judiciary process. WFCG Cell has been involved in sensitizing enforcement agencies in crime scene examination and proper collection of evidence through regular training and workshops. The WFCG Cell provides its molecular ecology and conservation genomics services to various ongoing research projects with objectives on phylogeny, evolutionary and population genetics.

During 2019-20, the Cell received a total of 244 wildlife offence cases from enforcement agencies across the country, of which one from administration, one from CBI, 24 from honourable courts, 17 from customs, two from DRI, one from foreign (CITES authority), 174 from forest departments, 19 from police, two from MoEFCC and three from hospitals. An assortment of biological products was received for species identification, and of these, 180 cases contained tissue samples requiring DNA based techniques,

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57 cases requiring morphometric technique and seven cases requiring both DNA and morphometric techniques for species identification. The Cell provided reports on species identification for 282 cases, and a further 24 summons were received from various honourable courts for appearances as an expert scientific witness during this period. WFCG Cell has assisted foreign nationals for the wildlife crime investigation.

Field exercises and lectures were conducted on "Crime scene management and evidence collection for officer trainees of the Diploma and Certificate courses of the Institute, Officer Trainees at IGNFA, CASFOS and Forest Officers. Hands-on-training was also conducted on the identification of various body parts and products encountered in the illegal wildlife trade for the Forest Officers, and Customs probationers. Along with these training, popular lectures were undertaken for various visitors/ classes at WFCG Cell and in the IGNFA and CASFOS, Dehradun. WFCG Cell was also working in partnership with TRAFFIC, India for the sensitization and training of the enforcement agencies across the country. Experts of WFCG Cell are providing input in the workshops organized by the National Academy of Custom and Indirect Taxes (NACIN) at their regional offices and headquarter for the training of customs officers in controlling illegal wildlife trade.

The WFGC Cell is involved in researching the field of 'Conservation Genetics' and 'Wildlife Forensics', where cutting-edge molecular tools are being used to understand species biology. The conservation genetics laboratory also contributes to the objectives of several projects at the institute and deposited several sequences in NCBI GenBank for helping other researchers working in this field. In doing so, WFCG Cell also sequenced and characterized complete mitochondrial genome of Mishmi takin, Budorcas taxicolor taxicolor and northern Indian red muntjac, Muntiacus vaginalis and performed a study on taxonomy of cryptic species in the Cyornis rubeculoides complex in the Indian subcontinent and involved in other publications.

WFCG Cell study exhibited that great Indian bustard (GIB) possess low mt-DNA (haplotype diversity: 0.554 and nucleotide diversity: 0.001) and microsatellite (allelic diversity: 0.31) with Rajasthan population being most diverse. Bayesian clustering analysis identified three genetically distinct populations, i.e. Gujarat;

Andhra Pradesh; and Rajasthan-Maharashtra-Madhya Pradesh. Asymmetric migration between the subpopulations was observed to be low and significant, except Rajasthan into Maharashtra (9%) and Madhya Pradesh (4%). The Rajasthan population was found to be genetically the most diverse and ideal for sourcing birds as founders for conservation breeding; however, securing individuals from Andhra Pradesh and Gujarat for conservation breeding would add substantially to securing the extant gene pool of GIB.

WFCG Cell conducted a study on Indian dugongs (n=23) to describe genetic lineage and phylogeography of the Indian dugongs in relation to other dugong populations at the global scale and the genetic diversity, differentiation and demographic patterns of dugong populations in India using 750 bp Control region and 16 nuclear microsatellites. Multiple analyses suggest that the Indian dugong populations are part of a single genetic cluster, comprising south Asia, northwest Indian Ocean and southwest Indian Ocean populations. Despite small population size, they retain high genetic diversity with unique mitochondrial DNA haplotypes within south Asia. Within India, novel haplotypes were observed from all sampling sites with overall high haplotype diversity but low nucleotide diversity.

Indian populations exhibit high genetic differentiation with higher within-population variance (63.41%) than among populations (36.59%), signalling population structure. India has eight species of canids but still, there is hardly any molecular studies focusing on these Indian canids, except for Indian wolves and Jackal. The molecular studies on Indian wolves highlighted them to be unique and ancient lineages. Also, the molecular study on Indian jackals highlighted its uniqueness in the presence of more number and unique haplotypes in comparison to other Jackals available globally.

WFCG Cell generated molecular data to gain insights understand genetic diversities, population genetic structure, levels of hybridization and introgression between Indian wolves, dogs and jackals. The mitochondrial data will also be used to construct a phylogenetic tree to understand the status of Indian canids in context with other globally available canids. The analysis work is going on for many canids.

Environmental Impact Assessment Cell

An Advanced Payment Facility (APF) was signed between WII and Asian Development Bank (ADB) on 21 January 2019 under ADB's "Protecting and Investing in Natural Capital in Asia and the Pacific under the Knowledge and Support Technical Assistance (KSTA) - 9461" for the duration of 2019-20. The project 'Knowledge and Capacity Building Activities for Natural Capital' has the objective to build the capacity of stakeholders working in the implementation of Green Infrastructure (GI) projects in transportation sectors in South and South-East Asia.

The Environmental Impact Assessment Cell of WII continued to undertake R&D related studies, provide professional support in capacity building initiatives at WII and other institutions; professional bodies; and Government and Corporate organizations. Efforts of networking with global and regional institutions and collaborations with international agencies also continued to expand and diversify.

Endorsement by IAIA for EIA Cell

The IAIA (International Association for Impact Assessment) is the leading global authority for advancing innovations and communication of best practices in all forms of impact assessment. It grants endorsements to training courses conducted by IAIA endorsed trainers after rigorous scrutiny of proposals. The EIA cell of WII has conducted two training courses in the area of Impact Assessment for which IAIA endorsement was received. This endorsement upscales the recognition of such training programmes for the professional advantage of the participants.

A one-week Asian Development Bank-supported training workshop to build capacity for conserving and managing natural capital during the planning and implementation of transportation projects in South Asia was held at WII, Dehradun. Another training workshop on 'Mainstreaming Biodiversity in Impact Assessment' for Indian Forest Service Officers.

Library & Documentation Centre

The Library and Documentation Centre (L&DC) of WII plays a vital role in the dissemination of information to a wide range of users, including scientists, researchers and wildlife managers. It was established in line with WII's mission as multidisciplinary information and learning resource centre on biodiversity conservation and

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management. It has the following objectives: (i) To serve as a repository of all wildlife-related literature published in India; (ii) To acquire, organize and disseminate all relevant literature on biodiversity conservation and related fields; (iii) To serve the user readership through normal and special library & information services; (iv) To establish and maintain links with other national information systems in India and other countries to ensure the free flow of information at national and international levels; (v) To serve as a training centre for information personnel and users; and (vi) To bring out periodic updates/bulletins on Current content of periodicals, Research in progress, unpublished research literature, i.e. dissertations, thesis, Compilation of bibliographies on various themes for ENVIS bulletins and database for WII publications.

The L&DC now holds approximately 29,000 books, 8,800 maps/ toposheets, more than 7,500 bound volumes of old and rare journals. The library also maintains a good collection of the scientific paper number to 11,200. It subscribes to more than 500 Journals (print+online). The L&DC is fully automated using automation software, i.e. Web-centric LIBSYS 10 (Library Management Software) and RFID technology. All library users can access online journals and online databases subscribed by the L&DC through Intranet. Users can access the Online database, i.e. Indiastat.com through Intranet. The L&DC provides a variety of Library & Information Services to its user.

Infrastructure and physical environment of L&DC is renovated during 2019-20. RFID technology is implemented in the Library & Documentation Centre. Library documents tagged with RFID chips and RFID gate is installed to restrict unauthorized access of library documents. During this period, approximately 30,000 documents were issued and consulted. Value Added Service/ Ready Reference Service was provided to approx. 800 users. Approximately 300 queries were attended from outside users, and more than 4500 bibliographic references were provided to the users. E-Document delivery service was also provided to outside users during this period. In-house databases were regularly updated during the reporting period. The WII publication database was updated by adding the research papers, thesis, reports, popular articles, paper presented and other categories in this period. Specialized bibliographies were also compiled for different courses and on user request.

Wildlife Extension & Audio Visual

The Cell caters to the needs of various requirements of academic activities. It maintains 16 mm films, video films, CDs/DVDs, a conference system, a projection system, various audio-visual equipment, still cameras and video cameras with accessories and a photo library. During the reporting period, the Cell provided support for all the workshops, seminars, meetings and courses; visiting classes; guest lectures and celebrations of important days or events.

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

International Day for Biological Diversity Celebrated at WII, Dehradun, 22 May 2018.

International Day for Biological Diversity (IBD) is celebrated every year on a global scale on 22 May 2018. This year's celebrations focussed on biodiversity as the foundation for the food and health and a key catalyst for transforming food systems and improving human health. The aim was to leverage knowledge and spread awareness of the dependency of the food systems, nutrition, and health on biodiversity and healthy ecosystems. Wildlife Institute of India organised celebrations in the Institute by reviving the tradition of drinking 'Nariyal Pani' instead of the popular aerated drinks. Over 400 officials, staff and researchers participated in the event.

'World Elephant Day' Celebration at WII, Dehradun, 12 August 2019.

The World Elephant Day was celebrated at the Wildlife Institute of India (WII) on Monday, 12 August 2019. The Hon'ble Minister, Forests and Wildlife, Govt. of Uttarakhand, Dr Harak Singh Rawat graced the occasion as Chief Guest. Elephant Cell of WII was also inaugurated on this day. A video message was sent by Shri Prakash Javadekar, the Hon'ble Minister for Environment, Forest and Climate Change, Government of India on this occasion. Shri Noyal Thomas, IGF & Director (Project Elephant) welcomed the august gathering. Dr V.B. Mathur, Director, WII, Shri Praveen Garg, AS&FA, MoEFCC, Shri M.S. Negi, ADG (WL), MoEFCC, Shri Jairaj, PCCF & HoFF, Uttarakhand and Shri Siddhanta Das, DGF&SS, MoEFCC also addressed the gathering. A short video film on 'Glimpses of technology application for addressing rail-induced elephant mortality' was screened.

An elephant art piece signifying the importance of elephant corridors was unveiled by the Chief Guest. Prizes were also distributed by the Chief Guest to the winners of Elephant Quiz Competition; and Painting Competition, which was organised in schools around Rajaji National Park. A cultural programme was presented by the

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children of WII community. A puppet show on elephant conservation was also staged. Over 500 participants including faculty, staff, researchers of WII, guests from sister organisations, officials from Uttarakhand Forest Department and participating schools from Dehradun and around Rajaji National Park participated in the celebration.

XVII WII- FODS Wildlife & Environment Quiz at WII, Dehradun, 1 October 2019.

On the occasion of Wildlife Week, Wildlife Institute of India (WII) organised the annual 'WII-

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FoDS Wildlife & Environment Quiz' for schools of Dehradun and Mussoorie. The quiz aims at spreading awareness about Forest, Wildlife, and Environment; and encourages the students to contribute to its conservation. Eighteen schools participated with three members in each team belonging to Classes IX-XI. Wynberg Allen, Mussoorie emerged as the winner taking with them the Samir Ghosh Rolling Trophy and cash prizes presented by the Friends of the Doon Society. Dr G.S. Rawat, Director, WII and Dr A.J.T. Johnsingh addressed the gathering on this occasion.

Swachhata Hi Seva Programme, at WII, Dehradun, 2 October 2019.

On the occasion of Gandhi Jayanti, under the Government of India's Swachhata Hi Seva Programme, Wildlife Institute of India (WII) organised a cleanliness and awareness drive in and around WII. The programme was attended by Director, faculty members and research scholars of WII; students and teachers of Galaxian International School; Shri S. Butola, *Parshad*, Chandrabani Ward and residents. Approximately 500 people participated in the programme.

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The cleanliness rally started with the cleaning of the Chandrabani area, wherein locals, nearby shopkeepers were made aware of using dustbins and avail services of the Nagar Palika. Street plays were organised at three locations to attract the crowd towards the cause. Ganga Champion competition was also held for school students. For the competition, each student was provided with a form with the cleanliness pledge. The form was signed by more than 4,300 people, who pledged to support the goal of Swachhata Hi Seva programme. In the evening, the cultural programmes were organised in the WII auditorium focusing on the theme of Swachhata Hi Seva Programme.

Other Outreach Activities of the Institute

Celebration of World Heritage Day, Dehradun, 18 April 2019.

The UNESCO C2C-WII celebrated World Heritage Day (WHD) 2019 on organizing a series of events. An anthology of nature writing, "Wild Treasures: Reflections on Natural World Heritage Sites in Asia" was released in a launch function held at WII with Dr Sanjeev Chopra, IAS, Director, Lal Bahadur Shastri Academy of Administration, Mussoorie as Chief Guest and Dr Asad Rahmani, Former Director, Bombay Natural History Society, Mumbai as Guest of Honour. The anthology is a selection of 45 articles on 18 natural World Heritage Sites across Asia. The day's celebrations involved school students from three WHS of

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India namely, Nanda Devi and Valley of Flowers National Parks (Uttarakhand), the Great Himalayan National Park Conservation Area, Himachal Pradesh; and Keoladeo National Park, Bharatpur, Rajasthan; as well as from Model School, National Institute for the Empowerment of Persons with Visual Disabilities (Divyangjan), Dehradun. The children participated enthusiastically in a drawing competition and a quiz contest centred on the natural and cultural heritage of India. A cultural function in the evening witnessed performances by students and researchers, featuring traditional dances, songs, and poetry to commemorate the occasion.

National Outreach for Awareness Generation on Urban Biodiversity, Wildlife Institute of India, Dehradun, 14-15 November 2019.

The objectives of the programme were to (i) Appraise the participants about the current conservation scenarios and the ongoing issues and trends in biodiversity conservation; and (ii) Aware the participants about Legislations for Biodiversity Conservation (NBSAPs and SBSAPs), Impacts of urban expansion on Biodiversity & Ecosystem Services, City Biodiversity Index. It was organised by ICLEI South Asia. Thirty participants attended the outreach programme. The workshop dealt with various aspects relating to urban biodiversity. The technical sessions

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included discussions on legislation, policy and finance in the context of urban biodiversity, Ecosystem-based Adaptation (EbA)/ Nature-based solutions and the tools and techniques for decision making, monitoring and regulation of urban biodiversity. The participants were subsequently taken to the field in Rajpur and Mussoorie to experience how urban biodiversity links with the history and cultural heritage of a city.

Natural Heritage Bulletin

The UNESCO C2C-WII publishes a quarterly e-bulletin that is a compilation of news and relevant articles about Natural World Heritage sites in the Asia-Pacific region and activities of the UNESCO C2C-WII. Four issues have been published for the respective quarters during 2019-20 viz. Spring, Summer, Monsoon and Winter.

Exhibition at Shiv Ghat on Makar Sankranti, Haridwar, 14 January 2020.

On the occasion of Makar Sankranti, Wildlife Institute of India (WII) under the project "Namami Gange" conducted an awareness campaign in Shiv Ghat, district Haridwar. The team of WII organized an exhibition under the banner named "Biodiversity Conservation and Ganga Rejuvenation". It was an environmental awareness program that emphasized problems of Ganga and its effects on its aquatic biodiversity. The aim of the campaign was to aware and motivate people to save the pious status of river Ganga and also discourage the single-use of plastic and aware people how plastic is a significant threat to environment, human and animal health. People participated in a signature campaign to show their support for cleaning and to rejuvenate the river Ganga. More than 150 people participated in the campaign. Awareness was raised by distributing pamphlets, stickers, bookmarks and badges.

Celebration of World Wetland Day 2020, in Asan Wetland Conservation Reserve; Surajpur Bird Sanctuary; and Soor Sarovar Bird Sanctuary, 2 February 2020.

On the occasion of World Wetland Day, 2020 Awareness Programs were conducted in three sites namely, Asan Wetland Conservation Reserve in Uttarakhand; and Surajpur Bird Sanctuary and Soor Sarovar Bird Sanctuary, both in Uttar Pradesh.

Bird festival was celebrated in Soor Sarovar (Keetham Lake) Bird Sanctuary, Uttar Pradesh. The festival was inaugurated by the Hon'ble Minister of Environment, Forest and Climate Change, Uttar Pradesh, Shri Dara Singh Chauhan. The festival had many events like bird watching, photo exhibition, an exhibition by different institutions, drawing and painting competitions and cultural programs. The Institute under the National Mission for Clean Ganga (NMCG) set up an exhibition on wetlands and its biodiversity. The theme declared by Ramsar for the wetland day was “Wetlands and Biodiversity”. The exhibition had a huge footfall and was appreciated.

Two student awareness workshops in Asan Wetland Conservation Reserve and Surajpur Bird Sanctuary were organized. A total of 58 and 141 students participated in the workshops, respectively. A small presentation on wetland conservation followed by painting and quiz competition was organized. All the students were distributed with awareness materials, and the winners were given prizes and certificates. The events were organized with the support of Uttarakhand and Uttar Pradesh Forest Department.

Wall Painting Competition – Doon Smart City, Dehradun, 8-18 February 2020.

A wall painting competition was organized by Doon Smart City, which involved the painting of various walls of Dehradun to make the city beautiful and colourful. The theme of the painting competition was “Wildlife of Dehradun”. The team and the eco-club were formed in school “Eklavya Adarsh Awasiya Vidyalaya” involving four children and two teachers. The paintings were made during 8-18 February 2020.

Exhibition Inaugurated at USAC, 10 February 2020.

On the auspicious inauguration of USAC Uttarakhand Antariksh Bhawan on Uttarakhand State Geo-informatics Meet on 10 February 2020, a one-day exhibition was organized to represent Wildlife Institute of India. The auspicious occasion was honoured by the presence of the Hon’ble Chief Minister Uttarakhand Shri Trivendra Singh Rawat. ISRO former Director Kiran Kumar conducted lecture sessions explaining the use of Geoinformatics in Spatial sciences. Awareness was conducted actively and meaningfully to share information on the work being done by WII on Namami Gange, explaining the importance of biodiversity and river conservation. More than 80 people visited at the stall and showed keen interest in learning about the priority species of Ganga.

World Wildlife Day Celebration, Chakrata, 3 March 2020.

World Wildlife Day was celebrated under the theme "Sustaining all life on Earth", encompassing all wild animal and plant species as key components of the world's biodiversity. To conduct a workshop, the NMCG team of WII tried to find a village with more human-wildlife conflicts so that their issues may be addressed. The workshop was conducted in collaboration with the Chakrata Forest Department at a village in Chakrata named “Sawai”. A total of 52 members including the Gram Pradhan, Shri Preetam S Chauhan became part of the workshop.

An activity was performed with the villagers, which involved villagers mapping down their village, then marking the resources. An open discussion was held to know about their issues and any suggestions. The village kids came up with a skit, which showed the importance of wildlife. They even made masks of various animals found there and wore them while acting. The workshop ended with the closing remarks by the SDO Chakrata Forest Department, Shri Vijaypal S Patwal.

Tiger Cell

In order to achieve the goal of tiger conservation through a holistic approach based on science, the Tiger Cell (in collaboration with the National Tiger Conservation Authority – NTCA) was initiated at WII in April 2016. The main mandates of the Cell include (i) periodic, country-wide assessment of tigers, co-predators, prey and their habitat; (ii) ecological monitoring of the Tiger Reserves; (iii) implementation of MSTrIPES in Tiger Reserves: (iv) site appraisals and evaluation of development projects vis-à-vis tiger distribution, dispersal and corridor network; (v) maintain National Tiger Photo Database for controlling illegal wildlife trade-related to tigers; and (vi) provide training as and when required for ecological monitoring, research and management.

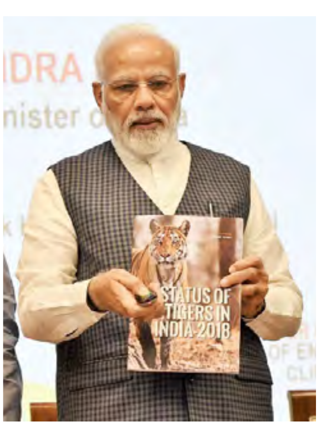
Major activities of the Cell during past one-year include:

Countrywide assessment of tigers, co-predators, prey and their habitat

(i) Coordinated with the States and provided scientific and technical inputs to conduct Phase I survey in all potential tiger habitats of 20 states of the country; (ii) Customized shapefiles for 615 Forest Divisions of the country for systematic collection of Phase I data in MSTrIPES framework; (iii) Analyzed Phase I data from about 491 Forest Divisions of India to generate country-wide occupancy and distribution maps for tigers, co-predators and prey; (iv) As a part of Phase II,

covariates on habitat characteristics and human impacts were obtained from remotely sensed data for modelling tiger occupancy and abundance; (v) Processed and analyzed about 3.48 crores camera trap photographs received from 141 sites with 26,838 camera trap locations; (vi) Analyzed 76,651 tiger images and 51,777 leopard images in program ExtractCompare and Hot Spotter for their identification; (vii) A total of 1,546 genetic samples were analyzed for individual identification of tigers to arrive at minimum tiger numbers; (viii) Twelve sites were sampled for estimating prey abundance from camera trap-based distance sampling using Random Encounter Model (REM) framework. Testing and development of a REM data processing tool is underway; (ix) Showcased all India tiger estimation process to three International peers (Dr Chris Carbone, Dr Joseph Bump and Dr Matt Hayward); and (x) Prepared a summary report titled "Status of tigers in India 2018" which was released by the Honorable Prime Minister of India on 29 July 2019 the occasion of the Global Tiger Day.

Monitoring System for Tigers- Intensive Protection and Ecological Status (MSTrIPES): An image processing software known as CaTRAT (Camera Trap data Repository and Analysis Tool) was developed and used for geo-tagging of camera trap images obtained from the field. A web-server which is a systematic database of the data generated using the MSTrIPES program from across the implementation sites, has been hosted at Tiger Cell. This makes the server the largest repository of information on the wildlife crimes, illegal activities, human disturbances, ecological status of important species, habitat parameters and human-wildlife conflict. Currently, apps are being developed for the higher version of Android (Android 7.0 onwards). MSTrIPES Polygon search module app developed for North East, Jammu & Kashmir and Jharkhand.



Picture showing Honorable Prime Minister of India releasing Tiger Status Report 2018 on the occasion of Global Tiger Day on July 29, 2019.

Management Effectiveness Evaluation (MEE) of Protected Areas and Tiger Reserves: The Cell provided inputs by reviewing MEE draft reports from 20 sites.

National Repository for Camera Trap Photographs of Tigers (NRCTPT)

Over 40,000 tiger photographs maintained under National tiger photo database library at the Cell. New tiger photographs obtained as a part of national tiger assessment 2018 are being archived. Matching was done with the pictures of the tiger carcasses, tiger skins seized and snared tigers to ascertain the identity of the individuals and their photo-capture histories and information shared with the NTCA and State Forest Departments.

Training and Capacity Building

During the reporting period, three regional workshops were conducted with the assistance of WII's MSTrIPES team to train about 400 officials, frontline staff, computer operators, GIS technicians and field biologists of Forest Departments of Jharkhand, Rajasthan, Arunachal Pradesh and WWF-India on MSTrIPES patrol module and ecological protocols.

Research and technical assistance to NTCA, Government of India and State Forest Departments

(i) Evaluation of about 28 proposals on developmental projects in the tiger landscapes of the entire country and reports communicated to NTCA and Wildlife Division of MoEFCC for Standing Committee of National Board for Wildlife; (ii) Supervision of a research project on tiger and prey augmentation in Palamau Tiger Reserve, Jharkhand; (iii) Participated and prepared posters and standee for NTCA stall in India Pavilion at 13th Conference of Parties of Convention on the Conservation of Migratory Species (CMS-COP) held at Gandhinagar, Gujarat; (iv) Inputs in 14th Conference of the Parties to the UN Convention to Combat Desertification (UNCCD COP) held in New Delhi; (v) Inputs on the assessment of tiger reintroduction program in Sariska Tiger Reserve, Rajasthan; (vi) Mapping of structural connectivity for Panna Landscape, Madhya Pradesh; (vii) Corridor mapping for Sunabeda landscape, Odisha; (viii) Inputs in the investigation of tiger death (ST 16) in Sariska Tiger Reserve, Rajasthan as a part of NTCA appointed committee; (ix) Participated and presented in Capacity building workshop on countrywide assessment of Tiger, Prey and Habitat organized by Global Tiger Forum in Kathmandu, Nepal in July 2019; (x) Presented MSTrIPES conflict module in the "Collaborative approaches for Human-Wildlife Conflict" meeting organized by Uttarakhand Forest Department; (xi) Inputs in vertical training organized by NTCA at Palamau Tiger Reserve, Jharkhand; (xii) Inputs on the revision of tourism carrying capacity within the core zone of Kanha Tiger Reserve, Madhya Pradesh as a part of NTCA appointed committee; (xiii) Regular inputs in review meetings, Technical Committee Meetings, Chief Wildlife Warden and Field Directors' meetings organized by NTCA; (xiv) Regular inputs in PG Diploma, Certificate, M.Sc., PhD courses of WII; and (xv) Regular inputs for visiting classes at WII.

WII- Category 2 Centre 'Under the auspices of UNESCO'

(Erstwhile UNESCO Category 2 Centre for World Natural Heritage Management and Training for Asia and the Pacific Region)

The Centre's overall objective is to focus on Natural Heritage conservation issues with the aim to (i) contribute to the strengthening of capacities in the management of Natural World Heritage in the region; (ii) contribute to achieving a more balanced representation of properties from Asia and the Pacific on the World Heritage List; (iii) raise awareness among the general public and the youth in particular of the importance of Natural World Heritage and the need to protect it, and (iv) foster international cooperation on Natural World Heritage initiatives.

A key objective of the Centre is to contribute towards enhancing the representation of properties on the World Heritage List. Towards this end, the Centre offers technical support to State Parties in the process of nomination of World Heritage Sites.

World Heritage Nomination Dossier Preparation for Garo Hills Conservation Area, Meghalaya, India:

Field tours were undertaken during February 2020 to assess the status of the site and acquire key information for the nomination documentation. Preliminary biodiversity and geological exploration were made to the following sites: Tura peak, Nokrek, Imangrae, Siju, Baghmara and Balpakram, Reserve Forests and National Parks of the site. Significant meetings were held with relevant stakeholders including Forest Department, Geological Survey of India, North Eastern Space Applications Centre based in the region.

Proposal for nomination of Sacred Mountain Landscape and Heritage Routes within the Kailash Landscape of India on the Tentative List of World Heritage Sites in India:

A proposal for inclusion of the 'Sacred Mountain Landscape and Heritage Routes', encompassing the Pithoragarh District of Uttarakhand on the tentative list of World Heritage Sites in India was forwarded to the World Heritage Centre in April 2019. Following discussions at the World Heritage Session held in Baku, Azerbaijan in July 2019, it was decided to temporarily withdraw the proposal from the Tentative List process for carrying out technical modifications to the proposal. Efforts have since continued to strengthen the documentation on the site during the year 2019-20. UNESCO C2C-WII has engaged with the Rung Kalyan Sanstha (RKS), a civil society organisation comprising of members from the local ethnic community, to reinforce information on key cultural attributes of the proposed Kailash landscape.

Project on potential World Heritage Sites in Madhya Pradesh, India: Madhya Pradesh Tourism Board has signed an agreement with UNESCO C2C-WII for a project titled, 'Identification and prioritization of potential World Heritage Sites in the Madhya Pradesh State of India'. For this purpose, the Centre is undertaking various activities for documenting potential sites with Outstanding Universal Value in Madhya Pradesh that may be included in the Tentative List of World Heritage Sites of India. Inception meeting and a consultation workshop were conducted with key stakeholders in Madhya Pradesh for preliminary identification of potential sites in the State. Further, questionnaire surveys were also initiated in select sites to acquire information and assess perceptions of the local inhabitants towards the World Heritage process.

Advisory Services

The UNESCO C2C-WII offers advisory services and technical inputs on World Natural Heritage issues, including for conservation and management of World Heritage Sites; State of conservation reports; State Party interventions at World Heritage Centre sessions among others to Central and State Governments of India; other countries on request; UNESCO Advisory Bodies; and other relevant institutions.

State of Conservation Report 2019 for World Heritage Sites:

As part of the advisory and technical support mandate of UNESCO C2C India, the Centre provided necessary inputs for preparation of the World Heritage State of Conservation (SoC) Report 2019 for Keoladeo National Park for onward submission to UNESCO World Heritage Centre, Paris. Besides, decisions on Great Himalayan National Park Conservation Area and Manas Wildlife Sanctuary were made by the World Heritage Committee at its annual session in July 2019 based on reports submitted in the preceding year.

Technical Advice to Central and State Governments of India:

The Centre provided inputs on the official response to the Government of India on several Parliamentary Questions related to natural World Heritage Sites in India. Specialised orientation programmes were held for members of Department of Textiles, Government of India and Department of Culture, Government of Himachal Pradesh for professional advice related to World Heritage potential and establishment of C2Cs.

Inputs for IUCN World Heritage Outlook 2020: IUCN has initiated expert consultation for its third edition of World Heritage Outlook due in 2020. For this purpose, IUCN has sought inputs and information on natural World Heritage Sites of India from UNESCO C2C-WII and has indicated further necessary engagement as this process is carried forward.

Research & Monitoring

A function of the Centre is to research on identified priority areas related to natural World Heritage protection and management, including a focus on models of community participation. The World Heritage Committee also encourages State Parties to support research, since knowledge and understanding are fundamental to the identification, management and monitoring of World Heritage properties.

Monitoring Outstanding Universal Values of Manas World Heritage Site with Special Emphasis on Terai Grassland and Dependent Species:

UNESCO C2C-WII has initiated a long-term OUV monitoring programme focusing on the endangered grassland mammals of Manas World Heritage Site (WHS), Assam. Following the rapid assessment of the presence of Hispid Hare in the Manas National Park carried out in the past, this year, the focus was on the conservation needs of the species for which a robust methodology has been designed to estimate its population and habitat use in the Terai grassland. Forest officials, especially the patrolling staff, were trained to monitor the hispid hare in the grasslands of Manas. Besides, six awareness programmes have been organized, highlighting the importance of hispid hare and grassland habitat in the region. Over 40 teachers and 300 students have taken part in various awareness programmes. Subsequently, a scholarship programme has been started for the winners of the painting competition as a part of awareness activity in the fringe areas of Manas National Park. A network of teachers and students has been formed in the fringe area of Manas to strengthen awareness activity.

Plausible Alternative Futures of Island Mangroves in the Asia-Pacific: Scenario-based Analysis and Quantification of Mangrove Ecosystem Services in Coastal Hazard Mitigation and Climate Change Adaptation in Andaman Island, India

A collaborative research study under a project funded by Institute for Global Environmental Strategies (IGES), Japan is being carried out on the mangroves of the Andaman Islands in India to combat the possible adverse impacts of climate change. In the preliminary phase, an extensive literature review was carried out to understand the mangrove change patterns over time. The Land Use Land Cover of Andaman Island is mapped using different period satellite images. A study team from UNESCO C2C-WII and IGES Japan visited the island from 6-8 August 2019. The purpose of the visit was to get ground-level information of the mangrove-bearing sites and to collect both primary and secondary data from the forest & tourism department of the Andaman. An initial dialogue was made with higher officials of the forest department with the discussion of the aim and scope of the project.

Survey for World Heritage Perceptions in Madhya Pradesh

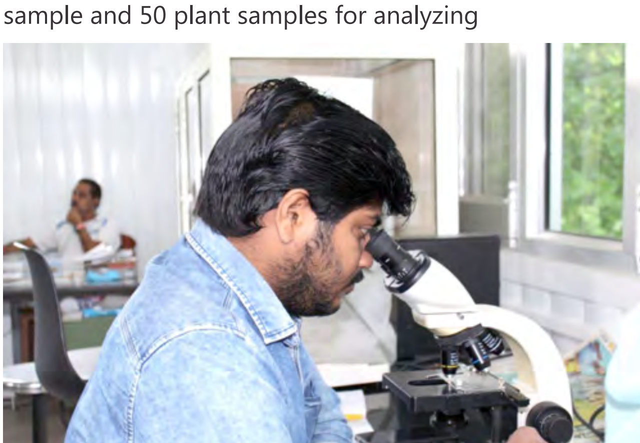
As part of the Madhya Pradesh Tourism Board project on "Inventorization and Prioritization of Potential World Heritage Sites in Madhya Pradesh State", a team from UNESCO C2C-WII conducted a questionnaire survey for understanding the World Heritage perceptions of the local communities around select sites in Madhya Pradesh namely, National Chambal Sanctuary, Bandhavgarh Tiger Reserve and Satpura Tiger Reserve in the first phase during February 2020.

Research Laboratory

The Wildlife Institute of India has three different research lab units (Research lab, Biology lab and Analytical lab), which are well equipped with advanced instruments like Gas Chromatography (GC), High-Performance Liquid Chromatography (HPLC), Solid Phase Extraction Unit, Soxhlet Apparatus, UV-Visible Spectrophotometer, Fiber Analyzer and Fully Automatic Nitrogen Analyzers, Digital pH & Conductivity Meters, Flame Photometer, Digital Analytical Balances and Stereomicroscope.

The Biology Laboratory is recently renovated with separate for teaching and keeping biological repository and processing biological samples. Besides teaching, around 500 carnivore scats, 200 herbivore pellets and 350 invertebrate (Nematode and Polychaete) slides were prepared in the lab. Specimen of reptiles, amphibians, fishes, insects and other invertebrates were catalogued for reference study materials.

In the Analytical Laboratory, nutrient analysis of biological samples was carried out. In the reporting year, researchers from WII carried out their experiment and analyzed different biological samples, which include 600 river sediments, 300 seagrasses sample, 80 faecal sample and 50 plant samples for analyzing various nutrients. Similarly, in the Research Lab, experiments on the pesticide and toxic contaminant in water, soil and biological samples were carried out. There are 200 soil samples, 200 water samples and 25 fish samples from different parts of River Ganga were analyzed for various parameters. In addition to this, few samples of bird, sediment and water samples from Sambhar Lake were also analyzed for Sodium, Potassium, Fluoride, OCPs, OPPs and PCBs.



National Wildlife Database

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

During 2019-20, the main thrust of the activities has been on the updating of the databases on Protected Areas, Species and Wildlife Bibliography, based on the collection of current information from various published/unpublished sources during the above mentioned period. The Protected Area Database of the country has been updated, and presently there are 903 Protected Areas including 101 National Parks, 553 Wildlife Sanctuaries, 163 Community Reserves and 86 Conservation Reserves in the country, covering 1,65,013 km2 which is 5.02% of the total geographical area of the country.

Species Database was updated by adding information on the distribution of mammalian species in various protected areas. Bibliographic Database was also updated by adding current literature published on Indian wildlife in various issues of journals/ periodicals. Protected Area Network report has been updated by incorporating the latest information. Trainees Database has been updated further, and now there are 728 Diploma and 627 Certificate officers trainees trained in various courses including 284 foreign nationals. Website of the national wildlife database has been updated further by incorporating the latest information. One hundred sixty queries were received, and outputs were provided in various desired formats.

Herbarium

During the reporting period, the herbarium staff provided their inputs in various field activities and surveyed different protected areas.

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Approximately, 675 plant specimens were identified, which were collected by research scholars, diploma and certificate trainees and faculty members from various parts of the country, such as Pin Valley National Park, Panna National Park, Rajaji National Park, Corbett National Park, Kedarnath WS, Gautam Buddha WS and along entire river Ganga and its tributaries. The plant specimens collected under various projects were also identified.

Campus Development

During the reporting period, the construction work of Porta Cabin for researchers; Extension of research laboratory; Supplying and installation of gas fire suppression system with the addressable fire alarm system in Library Block; Upgradation/ installation of modern AC system using Variable Refrigerant Volume (VRV) Technology in WII Auditorium; Construction of kitchen extension at existing guest house; Construction of cement

concrete road in front of New Guest House and Visiting Faculty Guest House; and Repair/ renovation work in Library Block have been completed. The works related to the conversion of existing AC Plant Room into Reproductive Control Laboratory; and Construction of Animal Housing Facility at WII was in progress.

Sports Activities

WII participates annually in the All India Forest Sports Meet (AIFSM). The Silver Jubilee edition of AIFSM was held at Bhubaneswar during 3-7 March 2020 under the aegis of Odisha Forest Department. WII's contingent of 13 players participated in the events of Squash, Billiards & Snooker, Lawn Tennis, Table Tennis, badminton, Athletics and Shooting.

Shri Shashank Kashyap, IFS, Diploma Trainee bagged the Gold Medal in Men's Singles Squash. Shri Kushagra Pathak, IFS, Diploma Trainee achieved IV position in Men's Open Billiards and Shri Harendra Kumar, Senior Technical Officer (1) also achieved IV position in Men's Singles Lawn Tennis.

Information on Details of Vigilance Cases for the Year 2019-20 of Wildlife Institute of India, Dehradun

Vigilance Cases as on 01.04.2019	No. of vigilance cases added during the year	No. of vigilance cases pending as on 31.03.2020
Nil	Nil	Nil

(Dr. Monali Sen)
Chief Vigilance Officer

Right to Information

RTI Cases	Opening Balance as on 1st April 2019	No. of new applications directly received from Indian Citizens during 2019-20	No. of new applications received as transferred from other Public Authorities during 2019-20	2019-20 No. of applications transferred to other Public Authorities during 2019-20	No. of applications as on 31.03.2020	No. of applications rejected during 2019-20	No. of applications disposed off during 2019-20	No. of applications not disposed off/rejected and hence carried forward to next year 2020-21
(a)	(b)	(c)	(d)	(e)	(f) (b+c+d)-(e)	(g)	(h)	(i) {f-(g+h)}
RTI Application	02	76	12	03	87	02	79	06
First Appeal	00	09	00	00	09	00	08	01
CIC Cases	00	00	00	00	00	00	00	00

CPIO (RTI)

VISITORS

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- B.Sc. Forestry students from Institute of Forestry, Hetauda, Nepal, 1 April 2019.
- B.V.Sc. & A.H. students from Rajiv Gandhi Institute of Vet. Education & Research Kurumbapet, Puducherry, 2 April 2019.
- B.Sc. Forestry students from Institute of Forestry, Hetauda, Nepal, 4 April 2019.
- Forest Guards Trainees from Rampur Mandi, Uttarakhand, 5 April 2019.
- ISS Probationers from Forest Survey of India, Dehradun, 10 April 2019.
- M.Sc. students from Central University of Himachal Pradesh, Kangra, 24 April 2019.
- Students of Environmental Studies from Goshen College, Indiana, USA, 6 May 2019.
- Students of B.Sc. Forestry from College of Horticulture & Forestry, Jhansi, 6 May 2019.
- Students from College of Forestry, Nanichauri, Tehri Garhwal, 9 May 2019.
- B.Sc. Forestry students from Institute of Forestry, Hetauda, Nepal, 20 May 2019.
- Range Forest Officers from Training Academy, Haldwani, 28 May 2019.
- Students from IIRS, Dehradun, 21 June 2019.
- Study tour from IIPA, New Delhi, 26 June 2019.
- Range Forest Officers from Training Academy, Tamil Nadu, 26 June 2019.
- B.V.Sc. & A.H. students from Veterinary & Animal Health University, Bikaner, Rajasthan, 9 July 2019.
- M.Sc. Forestry students from Forest Research Institute, Dehradun, 19 July 2019.
- State Forest Officers from Central Academy of State Forest Service, Dehradun, 24 July 2019.
- Participants from Lal Bahadur Shastri National Academy of Administration, Mussoorie, 22 August 2019.
- State Forest Officers from Central Academy of State Forest Service, Dehradun, 23 August 2019.
- State Forest Officers from Central Academy of State Forest Service, Dehradun, 3 September 2019.
- B.Sc. (Life Science) students from Graphic Era University, Dehradun, 6 September 2019.
- State Forest Officers from Chail, Himachal Pradesh, 19 September 2019.
- State Forest Officers from Central Academy of State Forest Service, Dehradun, 19 September 2019.
- IFS officer undergoing MCT Phase-I course at Indira Gandhi National Forest Academy, Dehradun, 24 September 2019.
- B.Sc. (Agriculture) final year students from JKK Munirajah College, Tamil Nadu, 26 September 2019.
- B.Sc. (Forestry) students from Doon Business School, Dehradun, 9 October 2019.
- UG & PG students from Dev Sanskriti University, Haridwar, 15 October 2019.
- TERI, School of Advance Studies, New Delhi, 16 October 2019.
- B.Sc. (Agribusiness Management) Coimbatore, Tamil Nadu, 21 October 2019.
- B.Sc. (Hons.) Biotech, GLA University, Mathura, Uttar Pradesh, 21 October 2019.
- M.Sc. (Botany) students from Central University, Himachal Pradesh, 22 October 2019.
- IFS officer undergoing course at Indira Gandhi National Forest Academy, Dehradun, 22 October 2019.
- Students from Nepal University of Forestry, 23 October 2019.
- B.Sc. (Forestry) students from FCRI, Hyderabad, Telangana, 29 October 2019.
- Zoology students from Chaudhary Bansilal University, Bhiwani, 4 November 2019.
- Students from Veterinary College, Palampur, Himachal Pradesh, 5 November 2019.
- Students from Tamil Nadu Agricultural University, Mettupalayam, 12 November 2019.
- Deputy Rangers from Forestry Training Institute, Pinjore, Haryana, 6 November 2019.
- Students from Agricultural Bidar, Maharashtra, 22 November 2019.
- Range Forest officers from Rampur Mandi, Uttarakhand, 27 November 2019.
- B.V.Sc. & A.H. students from Veterinary College, Bidar, Karnataka, 30 November 2019.
- Range Forest officers from Dulapally, Hyderabad, Telangana, 2 December 2019.
- B.V.Sc. & A.H. students from Veterinary College, Bidar, Karnataka, 2 December 2019.
- Central Academy for State Forest Service, Coimbatore, Tamil Nadu, 4 December 2019.
- B.Sc. (Agriculture) students from Coimbatore, Tamil Nadu, 13 December 2019.

- Indian Forest Service officers 2019 batch from Indira Gandhi National Forest Academy, Dehradun, 13 December 2019.
- Students of B.Sc. Forestry from College of Forestry, Sirsi, Karnataka, 16 December 2019.
- Students from St. Kabeer Academy, Dehradun, 17 December 2019.

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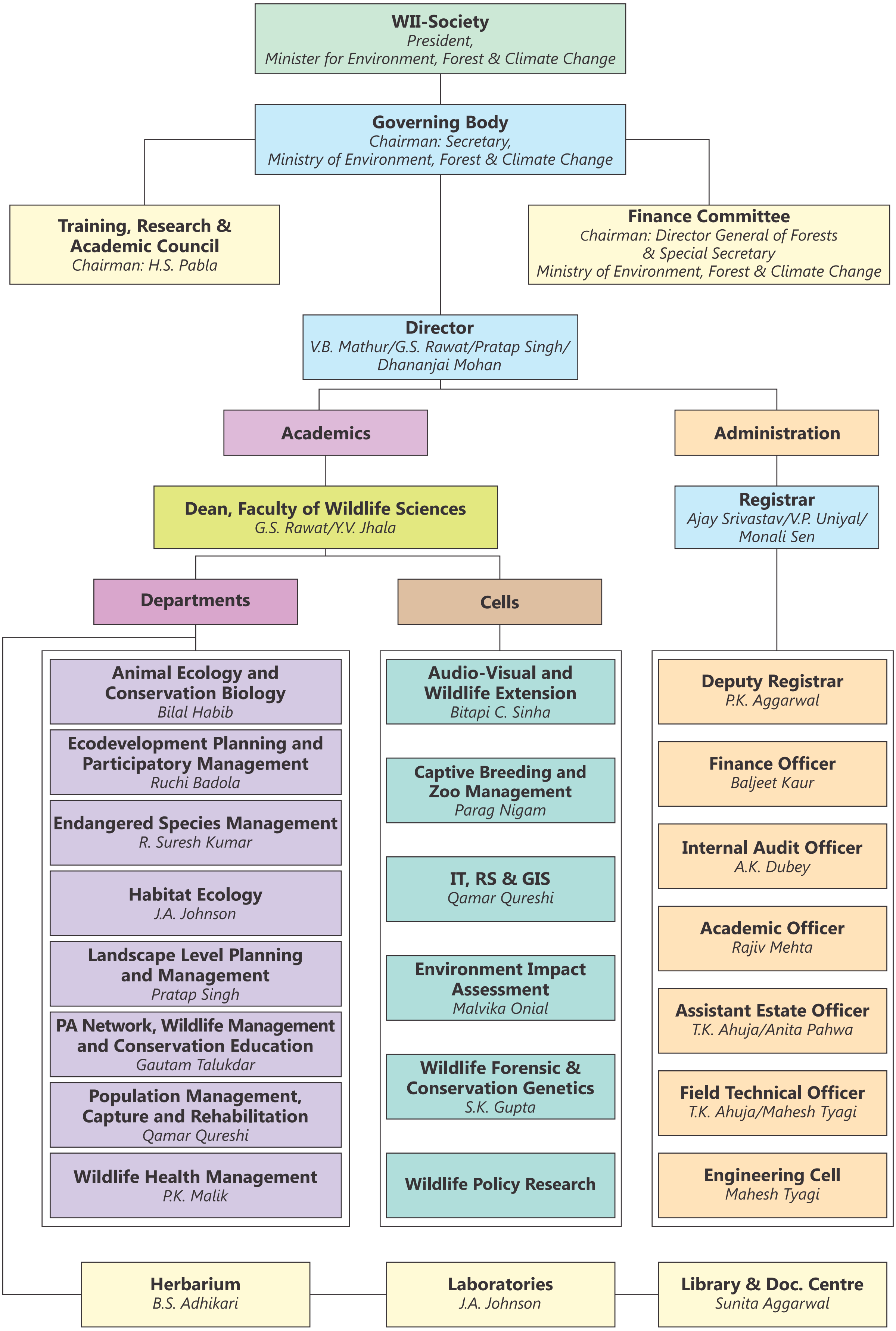
- Students from The Wisdom Global School, Haridwar, 20 December 2019.
- Faculty from Lala Lajpat Rai University of Veterinary & Animal Husbandry, Hisar, 24 December 2019.
- Forest Range Officers from Forest Training Academy, Haldwani, 24 December 2019.
- Students form Kendriya Vidyalaya, OFD, Dehradun, 30 December 2019.
- B.Sc. (Forestry) students from Central Agricultural College, Arunachal Pradesh, 2 January 2020.
- Students of M.Sc. Zoology from Bhavnagar University, Gujarat, 6 January 2020.
- B.Sc. students from University of Science & Technology, Meghalaya, 6 January 2019.
- B.Sc. (Forestry) students from University of Agricultural & Horticultural Science, Shivamoga, Kodagu, Karnataka, 17 January 2020.
- Students from University of Forestry, Ranchi, 17 January 2020.
- Frontline staff of Wildlife Division, Kullu, Himachal Pradesh, 20 January 2020.
- Frontline staff of Wildlife Division, Kullu, Himachal Pradesh, 27 January 2020.
- Range Forest Officers from Central Academy for State Forest Service, 29 January 2020.
- Frontline staff and EDC members from Manas Tiger Reserve, Assam, 7 February 2020.
- PG Diploma and M.Tech. students form Indian Institute of Remote Sensing, Dehradun, 7 February 2019.
- B.Tech. (Agriculture) final year students from Kumulur, Trichy, Tamil Nadu, 17 February 2020.
- Range Forest Officers from TS Forest Academy, Dulapally, Telangana, 26 February 2020.
- Students of Environmental Science from Shivaji University, Kolhapur, 28 February 2020.
- Students from Kerala Agricultural University, College of Forestry, Kerala, 6 March 2020.
- Range Forest Officers from Karnataka State Forest Academy, Karnataka 13 March 2020.

GOVERNANCE

Organisational Structure of WII



Wildlife Institute of India - Society

President

1. Shri Prakash Javadekar
Hon'ble Minister of Environment, Forest & Climate Change, Government of India,
Indira Paryavaran Bhavan, Jor Bagh Road,
New Delhi - 110 003

Vice-President

2. Dr Mahesh Sharma,
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6. Smt. Pramila Rani Brahma
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7. Ms. Clement Marak,
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8. Ms. Pema Khandu,
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Govt. of Arunachal Pradesh,
Gyangkhar village,
P.O Lemberdung,
PS Tawang, Dist. Tawang,
Arunachal Pradesh

Eastern, India

9. Shri Sushil Kumar Modi,
Hon'ble Dy. Chief Minister & Forest Minister,
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10. Shri Raghubar Das,
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11. Shri Rajendra Arlekar
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13. Shri Raghava Rao Sidda,
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Chandigarh

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Environment & Forest & Education,
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New Delhi - 110 002

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17. Shri Mahesh Gagda,
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Shankar Nagar, Raipur,
Chhattisgarh

Permanent Members

18. Dr. Harak Singh Rawat,
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Uttarakhand,
Shrikhot, Ganganali,
Srinagar, Garhwal

19. Shri Uday Sinh Wala,
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20. Shri Vijay Mehta,
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27. Professor Dileep K. Singh,
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28. Shri S.S. Bist,
Former Principal Chief Conservator,
of Forests & Head of Forest Force,
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29. Shri Deepak Apte,
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30. Shri Ravi Singh,
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31. Dr Prashant Singh,
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32. Director,
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Ahmedabad 380 054

33. Dr Anil Prakash Joshi,
Himalayan Environmental Studies &
Conservation Organization,
Village: Shuklapur,
P.O.: Ambiwala, Via: Prem Nagar,
Dehradun, Uttarakhand

Members (*Ex-Officio*)

34. Shri C.K. Mishra,
Secretary to the Govt. of India,
Ministry of Environment, Forest and
Climate Change,
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Jor Bagh Road, Ali Ganj,
New Delhi - 110 003

35. The Secretary,
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Ministry of Finance, North Block,
New Delhi - 110 001

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

37. The Secretary,
Government of India,
Department of Education,
Ministry of Human Resource Development,
Higher Education,
127-C Shastri Bhavan,
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New Delhi

38. Representative of the Advisor,
(Environment & Forest) of
Niti Aayog, Sansad Marg,
New Delhi

39. Representative of the Chairman,
University Grant Commission (UGC),
Bahadur Shah Zafar Marg,
New Delhi

40. The Chief Secretary,
Govt. of Uttarakhand,
"Sachivalaya",
Dehradun

41. Shri Siddhanta Das,
Director, General of Forest &
Special Secretary to the Government of
India,
Ministry of Environment, Forest and
Climate Change,
Indira Paryavaran Bhavan,
Jor Bagh Road, Ali Ganj
New Delhi - 110 003

42. Shri M.S. Negi,
Additional Director General of Forest (WL)
& Director, Wildlife Preservation,
Ministry of Environment,
Forest and Climate Change,
Government of India,
Indira Paryavaran Bhavan,
Jor Bagh Road, Ali Ganj
New Delhi - 110 003

43. Shri Praveen Garg,
Additional Secretary & Financial Advisor,
Ministry of Environment,
Forest and Climate Change,
Government of India,
Indira Paryavaran Bhavan,
Jor Bagh Road, Ali Ganj,
New Delhi - 110 003

44. Dr S.C. Gairola
Director-General,
Indian Council of Forestry
Research & Education,
P.O. New Forest,
Dehra Dun - 248 006

45. Dr Kailash Chandra,
Director, Zoological Survey of India,
Prani Vigyan Bhawan,
M-Block, New Alipore,
Kolkata - 700 053

46. Dr A.K. Pathak,
Director, Botanical Survey of India,
CGO Complex, 3 MSO Building,
Block F, 5th & 6th Floor, DF Block,
Sector-I, Salt Lake City,
Kolkata - 700 064, West Bengal

47. Dean,
Faculty of Wildlife Sciences,
Wildlife Institute of India,
Chandrabani,
Dehradun - 248001

48. Registrar,
Wildlife Institute of India,
Chandrabani,
Dehradun - 248001

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

Permanent Invitees

50. Shri Soumitra Dasgupta,
Inspector General of Forests (WL),
Ministry of Environment, Forest and
Climate Change,
Indira Paryavaran Bhavan,
Jor Bagh Road, Ali Ganj,
New Delhi - 110 003

51. Dr Anup Naik,
Member Secretary,
National Tiger Conservation Authority,
B-1 Wing, 7th Floor, Paryavaran Bhavan,
CGO Complex,
New Delhi - 110 003

52. Shri Noyal Thomas,
Director (Project Elephant),
Ministry of Environment, Forest and
Climate Change,
Indira Paryavaran Bhavan,
Jor Bagh Road, Ali Ganj,
New Delhi - 110 003

WII-Governing Body

Chairman

1. Shri C.K. Mishra,
Secretary,
Ministry of Environment, Forest and
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PUBLICATIONS

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Accounts

SAR (Separate Audio Report) on the Accounts of Wildlife Institute of India, Dehradun for the year 2019-20

1. We have audited the attached Balance Sheet of the Wildlife Institute of India, Dehradun (WII) as at 31 March 2020 and the Income and Expenditure Account and Receipt and Payment Account for the year ended on that date under section 20 (1) of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act 1971. These financial statements are the responsibility of the Management. Our responsibility is to express an opinion on these financial statements based on our audit.
2. This separate audit report contains the comments of the Comptroller and Auditor General of India (CAG) on the accounting treatment only with regard to classification, conformity with best accounting practices, accounting standards and disclosure norms, etc. Audit observations on financial transactions with regard to compliance with the Laws, Rules and regulations (Propriety and Regularity) and efficiency-cum-performance aspects, etc. if any, are reported through Inspection Reports/CAG's Audit Reports separately.
3. We have conducted our audit in accordance with auditing standards generally accepted in India. These standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatements. An audit includes examining, on a test basis, evidences supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of financial statements. We believe that our audit provides a reasonable basis for our opinion.
4. Based on our audit, we report that:

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

   ii). The Balance Sheet, Income and Expenditure Account and Receipt and Payment Account dealt with by this report are drawn up in the format as prescribed by the Ministry of Finance, Government of India.

   iii). In our opinion, proper books of accounts and other relevant records have been maintained by WII in so far as it appears from our examination of such books.

   iv). We further report that:

A. Balance Sheet

1. Assets

1.1 Fixed Assets (Schedule 8) 'Rs. 1831.53 lakh'

1.1.1 (i) WII included an amount of Rs107.74 lakh under Building in Schedule 8 'Fixed Assets' and charged depreciation of Rs 5.39 lakh at the rate of 5 per cent for half year, whereas the work was still under progress. This resulted in overstatement of Fixed Assets and Expenditure by Rs.102.35 lakh and Rs. 5.39 lakh respectively besides understatement of Capital Work in Progress by Rs. 107.74 lakh.

1.1.2 Investment from Earmarked Funds (Schedule 9): Rs. Nil

No amount has been shown in this schedule. However, an amount of Rs. 2.95 more was invested in FDs from Earmarked Funds as detailed below:

S.No.	Project Name	Amount Invested in FD (Amount in rupees)
1	Assessment of Impacts of the proposed Nagpur...	100,00,000
2	Jewar International Airport project...	100,00,000
3	AITEP 2017-19...	95,00,000

Thus, investment from Earmarked Funds were understated by Rs.2.95 crore. This has been pointed in the previous years also but no remedial action was taken.

1.2 Current Assets (Schedule 11): Rs. 17.47 crore

Part A (4) of this schedule did not include an amount of Rs. 66.23 crore being closing balance of sponsored projects. Hence, current assets were understated by Rs. 66.23 crore. The similar point has been pointed in the previous years too but no remedial action was taken.

2. Liabilities

2.1 Earmarked Funds (Schedule 3): Rs. 3.26 crore

This schedule did not include the balances and transactions related to the sponsored projects (Opening Balance Rs. 39.29 crore, Receipts Rs. 98.14 crore, Payments Rs. 71.20 crore and Closing Balance Rs. 66.23 crore). This resulted in understatement of Earmarked Funds by Rs. 66.23 crore. The similar observation was pointed out in previous year report too but no remedial action was taken.

B. Income and Expenditure Account

2. Income `Rs. 3425.03 Iakh'

2.1 Income from Investments (Schedule 15): Rs. Nil

The interest income of Rs. 1.31 crore earned by WII from FDs made from Earmarked Funds has not been depicted in the above schedule as detailed below.

S.No.	Project Name	Amount of interest received from FDs in Rupees
1	Assessment of Impacts of the proposed Nagpur....	786962.00
2	Jewar International Airport Project...	39988.00
3	AITEP 2017-19	1012931.00
4	Habitat Improvement....	10733227.00
5	WII management effectiveness	555458.00
	Total	**13128566.00**

The similar observation was pointed out in previous year's report also.

C. Grant-in-aid:

WII received Grants in Aid of Rs. 31.49 crore (Rs. 29.63 crore revenue and Rs. 1.86 crore capital) besides opening balance of Rs. 0.85 crore and other receipts of Rs. 2.33 crore. Out of total available amount of Rs. 34.67 crore, WII made payments of Rs. 33.49 crore and an amount of Rs. 1.18 crore was closing balance.

D. General

1. Non-Provisioning of Terminal Benefits

WII did not make any provision for 'Terminal Benefits' viz. Gratuity, Accumulated Earned Leaves' of its officers/ officials and a 'Nil' balance was reflected in both Schedule-7 'Current Liabilities and Provisions' and Schedule-20 'Establishment Expenditure' of the accounts.

2. Static balances:

The static balances under various schedules of the balance sheets as detailed below:

(Amount in Rs.)

S.No.	Schedule/Head	Balance as on 31.03.2020	Amount lying since year
1	Sch.11-Current Assets, Loans and Advances-Advance for D/WII A/c 54272	1239000.00	2017-18
2	Sch.11-Current Assets, Loans and Advances-Loan for World Environment Day (MoEFCC)	280984.00	2011-12
3	Sch.11-Current Assets, Loans and Advances-Loan for WCF workshop	30253.00	2012-13
4	Sch.11-Current Assets, Loans and Advances-TDS to be refunded by the ITO (Pension Fund)	4389787.00	2017-18
5	Sch.11-Current Assets, Loans and Advances-TDS to be refunded by the ITO (GPF)	2277757.00	2017-18
6	Sch.11-Current Assets, Loans and Advances-TDS to be refunded by the ITO (Corpus Fund)	2907227.00	2017-18
7	Sch.11-Current Assets, Loans and Advances-Training cost accrued but not received	838375.00	1996

These static balances were long standing in the accounts. As these amounts were required to be released/recovered (as the case may be), efforts may he made by the Authority to settle these balances that were kept pending without any justification.

E. Management Letter

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

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

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

a. In so far as it relates to the Balance Sheet of the state of affairs of the WII, as of 31 March 2020 and

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

For and on behalf of C&AG of India

Director General of Audit (SD)

Place: New Delhi
Date:

Annexure

1. Adequacy of internal audit system

Last internal audit of Wildlife Institute of India, Dehradun was conducted in August 2018 by MoEF&CC for the period 2013-14 to 2017-18. Thus, the internal audit of WII was not conducted for the period from 2018-20.

2. Adequacy of internal control system

a. Signatures of the cashier or ODD had not been made on any of the entry in the Cash book. Further, no surprise checks of the cash balance had been conducted and certificate recorded by WII.

b. 30 audit paras of 6 Inspection Reports for the period from 2010-11 to 2017-18 were outstanding.

c. Broadsheet of long term advances were not maintained.

d. Register of Inventory, Expenditure Control, Contracts and Works Control were not maintained.

e. Register of Valuable as per GAR 5, Accession Register as per GFR 18, Stock Register of Consumables and Investment Register were not maintained in prescribed format.

3. System of physical verification of fixed assets

The physical verification of fixed assets had not been conducted for the year 2019-20.

4. System of physical verification of inventory

a. Physical verification of consumable store has not been conducted for the year 2019-20.

b. The physical verification of Books had been conducted for the year 2017-18. 79 number of books worth Rs. 41,500 were missing. However, WII had not conducted the physical verification of Library for the period from 2018-19 to 2019-20.

5. Regularity in payment of statutory dues

Non deduction of TDS under GST Act/Rules in violation of statutory provisions

No Payment over six months in respect of statutory dues like Income Tax, Sales Tax, Service Tax, Custom Duty, Cess, Contributory Provident Fund (CPF) and employee's state insurance were outstanding as on 31.03.2020.

However, WII had made payment to M/s Industrial Security and Manpower Services (regd.) on account of hiring of outsourced staff. WIl while making payment to the contractor paid only basic amount (without GST) and after receiving GST challan WII paid Rs 50.24 lakh (18 % GST) during the year 2019-20 to the contractor. Whereas as per the TDS on GST 2% TDS under GST was to be deducted from the payment of the contractor and was required to be deposited to GST authority. Further, GST amounting to Rs 1.30 lakh has not been deducted from various vendors/suppliers etc. WII did not follow the procedure/provisions of the GST Law for deduction of TDS under GST on payments made towards procurement of goods and services, which is also applicable on societies/statutory bodies established by the central/state govt. or a local authority. This had resulted in non-deduction of statutory TDS under GST of Rs. 6.88 lakh (Rs. 1.30 lakh + Rs. 5.58 lakh) on payments made towards procurement of goods/services from agencies/vendors during the year.

Except above, the Authority is regular in payment of other statutory dues.

(DIRECTOR EA)

Annexure-A

A. Balance Sheet

1. Assets

1.1 Fixed Assets (Schedule 8)

An amount of Rs. 1.16 incurred towards the purchase of 'office equipment' be booked in Assets was wrongly booked as expenditure towards `Consumable a' or 'Expenses' which, after deduction of depreciation of Rs. 0.17 lakh for the year 2019-20, resulted in understatement of Fixed Assets besides Overstatement of Expenditure both by Rs. 0.99 lakh.

B. Income and Expenditure Account

1. Expenditure 'Rs. 3523.62 Iakh'

1.1 This included an expenditure of Rs. 32.50 lakh by the Institute on Other Administrative Expenses (travel, medical, legal and contingency etc.) pertaining to the prior period (Rs 0.11 lakh pertained to the period 2017-18 and Rs 32.39 lakh for the year 2018-19). This had resulted in Overstatement of Expenditure by Rs. 32.50 lakh besides understatement of Prior-period Expenses by the same amount.

1.2 WII did not made any provisions for outstanding Other Administrative Expenses during the year 2019-20 whereas payments of Rs 27.82 lakh were made in April/May/June & July 2020 towards Other Administrative Expenses (viz. Training, legal expenses, Vehicle Running/Maintenance, Misc. expenditure, Housekeeping expenses etc.). This had resulted in understatement of expenditure and current liabilities during 2019-20 both by Rs. 27.82 lakh.

(DIRECTOR EA)

RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2019-20

	RECEIPT			Previous Year	PAYMENT				Previous Year
Particulars	Plan	Non Plan	Total		Particulars	Plan	Non Plan	Total	
(A) GRANT-IN-AID					Expenses				
To Opening Balance					By Salaries & Allowances	23,77,76,818.00	-	23,77,76,818.00	21,53,97,769.00
Cash in Bank	83,75,247.25	-	83,75,247.25	7,84,63,541.04	By Medical	90,39,762.50	-	90,39,762.50	1,15,24,293.00
Cash In Hand	147,705.00	-	1,47,705.00	230.00	By LTC	18,35,620.00	-	18,35,620.00	26,09,461.00
					By OTA	-	-	-	-
To Grant in Aid (Revenue)	29,63,17,000.00	-	29,63,17,000.00	31,00,00,000.00	By Honorarium	1,44,420.00	-	1,44,420.00	2,83,050.00
To Grant in Aid (Capital)	1,86,00,000.00	-	1,86,00,000.00	2,00,00,000.00	By Fellowship & Wages (R/Proj)	2,13,699.00	-	2,13,699.00	38,82,523.00
To Grant (other Projects)	-	-	-	6,59,522.00	By Stipend of MSc Students	8,23,179.00	-	8,23,179.00	7,04,974.00
To MSc Course Fee	31,96,800.00	-	31,96,800.00	31,96,800.00	By Leave encashment & Gratuity	1,54,24,368.00	-	1,54,24,368.00	2,13,43,390.00
To Bus Charges	2,10,046.00	-	2,10,046.00	1,02,130.00	By Bonus	-	-	-	-
To Building Rent+HLF	9,42,306.00	-	9,42,306.00	4,10,534.00	By Fellowship Forenis Cell	-	-	-	-
To WII Products	5,474.00	-	5,474.00	-	By Base Camp Exp. (Res Project)	82,824.00	-	82,824.00	190,040.00
To Misc Receipts	1,995,535.29	-	19,95,535.29	9,62,629.00	By Vehicle insurance	-	-	-	351,435.25
To Elect & Water	9,37,085.00	-	9,37,085.00	4,65,129.00	By Annual Res Seminar-ARS	12,02,721.00	-	12,02,721.00	10,24,709.00
To Interest on Saving A/c	2,87,891.00	-	2,87,891.00	16,06,868.00	By Estate Security	9,46,292.00	-	9,46,292.00	69,74,313.00
To Loan & Advance	-	-	-	-	By POL, Hiring of Veh (R/Proj)	2,34,822.00	-	2,34,822.00	4,29,497.00
To EMD Security Deposit	1,20,000.00	-	1,20,000.00	9,11,500.00	By Contingencies (Res Proj)	6,79,238.00	-	6,79,238.00	24,75,565.00
To Hostel Caution Money	2,83,892.00	-	2,83,892.00	3,92,500.00	By Travel Expenses (Res. Proj)	7,69,558.00	-	7,69,558.00	6,63,740.00
To Intt on HBA	1,76,942.00	-	1,76,942.00	1,85,819.00	By Lab Expenses-Forc Lab	6,71,005.00	-	6,71,005.00	6,73,045.00
To Travel/FA Adv.-GIA	-	-	-	-	By M.Sc Expenditure	35,63,190.00	-	35,63,190.00	44,26,162.00
To Travel Adv.(R/Proj)	22,196.00	-	22,196.00	41,000.00	By Elect and Water Charges	52,51,780.00	-	52,51,780.00	90,07,317.00
To FA (Research Project)	5,63,345.00	-	5,63,345.00	2,762.00	By Hospitality/Entertainment	1,61,581.00	-	1,61,581.00	2,36,870.00
To LTC Adv	-	-	-	-	By POL of WII Vehicle	4,07,851.00	-	4,07,851.00	5,18,541.00
To Medical Adv	-	-	-	11,58,000.00	By Postage & Telegram	1,72,699.00	-	1,72,699.00	2,22,600.00
To M.Sc-FA & TA Advance	3,57,848.00	-	3,57,848.00	-	By Repair & Maint of Vehicle	7,35,464.75	-	7,35,464.75	7,45,331.00

RECEIPT				Previous Year	PAYMENT				Previous Year
Particulars	Plan	Non Plan	Total		Particulars	Plan	Non Plan	Total	
To Loan from othe project	-	-	-	-	By Sport	2,37,019.00	-	2,37,019.00	5,45,760.00
To Expenses for Capitales	6,09,331.00	-	6,09,331.00	2,19,50,373.00	By Stationery & Consumables	5,40,546.00	-	5,40,546.00	6,07,651.00
To Opening Stock-Library	6,308.00	-	6,308.00	6,749.00	By Telephone & Trunk Calls	3,22,921.00	-	3,22,921.00	6,38,507.00
To GPF Recd	24,99,780.00	-	24,99,780.00	-	By Legal Expenses	18,66,149.00	-	18,66,149.00	24,04,964.00
To Adv payment CPWD	85,80,651.00	-	85,80,651.00	58,98,549.00	By Operational expenses	25,20,174.00	-	25,20,174.00	13,76,236.00
To Adv Payment CCU	21,93,224.00	-	21,93,224.00	6,33,95,629.00	By Printing & Binding	16,51,568.00	-	16,51,568.00	31,600.00
To Advance for Veh. Ins.	82,062.75	-	82,062.75	-	By Maint of WII Campus	8,53,874.00	-	8,53,874.00	5,87,006.00
To Campus Development-CPWD	-	-	-	50,92,979.00	By Repair of equip/furniture	6,000.00	-	6,000.00	5,250.00
To Telephone-Income	5,348.00	-	5,348.00	-	By Computer AMC & Cons.	21,78,778.00	-	21,78,778.00	21,50,637.00
To Bouns Refund	-	-	-	-	By Lab. Exp-Research Lab	78,839.00	-	78,839.00	47,904.00
To GST	86,851.00	-	86,851.00	-	By Lab. Expenses-Gen.	58,622.00	-	58,622.00	1,68,675.00
To CGEGIS	1,13,130.00	-	1,13,130.00	-	By Maint. Of Civil Work	16,49,063.00	-	16,49,063.00	12,06,080.00
					By Transferred to Trg A/c	50,00,000.00	-	50,00,000.00	50,00,000.00
					By Travel Expenses	19,63,250.00	-	19,63,250.00	30,42,049.00
					By Lib expenses	44,396.00	-	44,396.00	216,353.00
					By Computer/ Periphirel	13,44,022.00	-	13,44,022.00	1,07,05,309.00
					By Furniture & Fixture	6,23,887.00	-	6,23,887.00	37,40,139.00
					By Journals & Periodicals	6,04,530.00	-	6,04,530.00	60,31,487.79
					By Lab Exp-Harberiam	10,473.00	-	10,473.00	-
					By Forest & Tour Adv-GIA	7,87,977.00	-	7,87,977.00	-
					By Medical Adv	39,000.00	-	39,000.00	-
					By Forest advance R/Proj	6,41,403.00	-	6,41,403.00	5,63,345.00
					By Tour Advance -R/Proj	1,07,196.00	-	1,07,196.00	22,196.00
					By M.Sc. TA Advance	40,000.00	-	40,000.00	29,530.00
					By M.Sc. FA Advance	4,38,694.00	-	4,38,694.00	3,28,318.00

	RECEIPT			Previous Year		PAYMENT			Previous Year
Particulars	Plan	Non Plan	Total		Particulars	Plan	Non Plan	Total	
					By Building Complex	30,720.00	-	30,720.00	6,36,49,306.00
					By Campus Development	1,07,73,875.00	-	1,07,73,875.00	-
					By Vehicle	-	-	-	28,12,898.00
					By Forensic Lab.	4,67,514.00	-	4,67,514.00	1,22,94,712.00
					By CGEGIS	-	-	-	-
					By DG Set	-	-	-	45,45,044.00
					By Lab Equipment (Res. Lab.)	-	-	-	77,031.00
					By Office equipment	3,57,255.00	-	3,57,255.00	7,30,964.00
					By Office Eqpt (Res. Proj)	6,779.00	-	6,779.00	10,37,434.00
					By Camp Eqpt (Res. Proj.)	1,19,760.00	-	1,19,760.00	12,03,129.00
					By Loan and adv-IIT Kanpur	-	-	-	2,47,800.00
					By Intt. Tfr to Corpus Fund	-	-	-	-
					By Prev. Year bal. Transf. to Corpus	21,26,241.00	-	21,26,241.00	3,32,61,512.00
					By Elect. Equipment	2,04,254.00	-	2,04,254.00	33,70,213.00
					By Advance for CPWD	1,25,32,180.00	-	1,25,32,180.00	2,32,50,383.00
					By Advance for CCU	29,82,500.00	-	29,82,500.00	48,75,661.00
					By Sundry Creditores	9,29,461.00	-	9,29,461.00	3,17,31,912.00
					By Complementry-Library	6,308.00	-	6,308.00	6,749.00
					By GPF-CDL	-	-	-	-
					By Security Deposit	523,409.00	-	5,23,409.00	46,276.00
					Adv for Vehical Ins. Premium	84,100.00	-	84,100.00	1,05,644.75
					By LTC Advance	45,000.00	-	45,000.00	-
					In Bank	1,17,81,369.04	-	1,17,81,369.04	83,75,247.25
					In Hand	-	-	-	1,47,705.00
A' Total	**346,715,998.29**	**-**	**346,715,998.29**	**514,903,243.04**	**A' Total**	**34,67,15,998.29**	**-**	**34,67,15,998.29**	**514903,243.04**

RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2019-20

General Provident Fund

	RECEIPT			Previous Year		PAYMENT			Previous Year
Particulars	**Plan**	**Non Plan**	**Total**		**Particulars**	**Plan**	**Non Plan**	**Total**	
To Opening Bal (Bank)	1,23,46,519.00	-	1,23,46,519.00	89,09,428.00	By Final Payment	2,55,63,727.00	-	2,55,63,727.00	1,40,67,717.00
To GP Fund Contribution	2,80,49,962.00	-	2,80,49,962.00	2,84,68,830.00	By Advance/withdrawl	1,02,07,500.00	-	1,02,07,500.00	1,18,92,368.00
To Encashment of FDR	96,28,390.00	-	96,28,390.00	80,00,000.00	By Loan to Deputationists	-	-	-	13,00,000.00
To Int. on saving a/c	3,66,834.00	-	366,834.00	5,49,913.00	By Investment of FDR	1,00,00,000.00	-	1,00,00,000.00	99,00,000.00
To Int. on FDR	2,63,605.00	-	2,63,605.00	22,78,433.00	By Auto Sweep Investment	35,00,000.00			
To Refunds of Loan	-	-	-	1300,000.00					
					By Closing Balance (Bank)	13,84,083.00		13,84,083.00	1,23,46,519.00
B' Total	**50,655,310.00**		**50,655,310.00**	**49,506,604.00**	**F' Total**	**5,06,55,310.00**		**4,71,55,310.00**	**4,95,06,604.00**

RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2019-20

Pension Fund

	RECEIPT			Previous Year		PAYMENT			Previous Year
Particulars	**Plan**	**Non Plan**	**Total**		**Particulars**	**Plan**	**Non Plan**	**Total**	
To Opening Balance									
To Cash in Bank	1119,755.00	-	11,19,755.00	56,36,534.00	By Investment in FDR		-	-	7,17,80,625.00
To Encashment of FDR	34016,996.00	-	3,40,16,996.00	2,97,00,000.00	By Commuted Value of Pension	15612,520.00	-	1,56,12,520.00	89,49,787.00
To Interest (Pension A/c)	425,639.00	-	4,25,639.00	3,26,542.00	By Pension/ Family Pension	25214,809.00	-	2,52,14,809.00	2,23,81,199.00
To WII Contribution	7624,289.00	-	76,24,289.00	81,28,981.00	By Loan		-	-	1,00,00,000.00
To Interest on FDRs	764,225.00	-	7,64,225.00	84,58,684.00					
To Refund of Loan	-	-	-	6,19,80,625.00					
					Cash in Bank	31,23,575.00	-	31,23,575.00	11,19,755.00
C' Total	**4,39,50,904.00**	**-**	**4,39,50,904.00**	**11,42,31,366.00**	**D' Total**	**4,39,50,904.00**	**-**	**4,39,50,904.00**	**11,42,31,366.00**

RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2019-20

Corpus Fund

	RECEIPT			Previous Year		PAYMENT			Previous Year
Particulars	**Plan**	**Non Plan**	**Total**		**Particulars**	**Plan**	**Non Plan**	**Total**	
To Opening Balance	3,71,84,421.00	-	3,71,84,421.00	3,20,02,120.00	By Investment in FDRs	7,40,00,000.00	-	7,40,00,000.00	11,40,00,000.00
To Misc Receipts	5,15,81,971.00	-	5,15,81,971.00	11,84,43,569.00	By Investment in FDRs	4,45,312.00		4,45,312.00	
To Interests on Saving A/c	917,357.00	-	9,17,357.00	7,38,732.00	By Autosweep Investment	1,45,00,000.00			
To Interests on FDR	3,537.00		3,537.00						
To Encashment of FDR	441,775.00		4,41,775.00						
					Closing Balance	11,83,749.67		11,83,749.67	371,84,421.00
D' Total	**90,129,061.00**	**-**	**90,129,061.00**	**151,184,421.00**	**F' Total**	**9,01,29,061.67**		**7,56,29,061.67**	**1511,84,421.00**

RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2019-20

Training Account

	RECEIPT			Previous Year		PAYMENT			Previous Year
Particulars	**Plan**	**Non Plan**	**Total**		**Particulars**	**Plan**	**Non Plan**	**Total**	
To Opening in Bank	51,62,501.32	-	51,62,501.32	1,51,27,946.82	By Office Equipment	83,113.00	-	83,113.00	8,74,092.00
To Grant Received	50,00,000.00	-	50,00,000.00	50,00,000.00	By Cont/Misc	9,27,707.47	-	9,27,707.47	17,52,567.74
To Interest Received	3,01,729.00	-	3,01,729.00	4,72,519.00	By Camping Gear	2,548,116.00	-	25,48,116.00	2,31,218.00
To Other Receipts	2,82,44,265.00	-	2,82,44,265.00	1,52,38,942.00	By Travelling Expenses	8,942,264.00	-	89,42,264.00	36,10,553.00
To Adv. for Expenses	12,00,000.00	-	12,00,000.00	1,55,000.00	By TA/DA & Honorarium	6,13,086.00	-	6,13,086.00	3,90,439.00
To Misc Receipts	12,70,000.00	-	12,70,000.00	2,58,558.00	By POL & Maint of Vehicle	8,01,883.00	-	8,01,883.00	5,70,285.00
To Loan D/WII-54272	10,00,000.00	-	10,00,000.00	1,899.00	By Boarding & Lodging	5,803,503.00	-	58,03,503.00	72,09,546.76
To Prepaid Vehicle Insurance	23,582.00	-	23,582.00	-	By Books	-	-	-	53,970.00
					By Salary & Wages	462,356.00	-	4,62,356.00	7,77,832.00
					By Other Advance	6,92,800.00	-	6,92,800.00	-
					By Corpus Funds	4,650,000.00	-	46,50,000.00	133,80,000.00

	RECEIPT			Previous Year		PAYMENT			Previous Year
Particulars	Plan	Non Plan	Total		Particulars	Plan	Non Plan	Total	
					By Maint of Vehicle	60,159.00	-	60,159.00	-
					By Sports Item	47,976.00	-	47,976.00	41,860.00
					By Advances for expenses	8,41,000.00	-	8,41,000.00	12,00,000.00
					By Furniture & Fixture	83,481.00	-	83,481.00	-
					By TDS	1,899.00	-	1,899.00	-
					By Loan D/WII A/c No. 54272	-	-	-	10,00,000.00
					By Closing in Bank	156,42,733.85	-	156,42,733.85	51,62,501.32
E' Total	**42,202,077.32**	**-**	**42,202,077.32**	**36,254,864.82**	**C' Total**	**422,02,077.32**	**-**	**422,02,077.32**	**362,54,864.82**

(Baljeet Kaur)
Finance Officer

(Dr. Dhananjai Mohan)
Director

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
BALANCE SHEET AS ON 31 MARCH 2020

(Amt. Rs.)

CORPUS /CAPITAL FUND AND LIABILITIES	Schedule	Current Year	Previous Year
Corpus /Capital Fund	1	74,72,04,640.96	66,36,53,625.39
Reserve and Surplus	2	-	-
Endowment/Earmarked Fund	3	3,25,82,870.41	2,56,77,042.92
Secured Loan and Borrowings	4	-	-
Unsecured Loan and Borrowings	5	5,56,968.00	5,56,968.00
Deferred Credit Liabilities	6	38,70,437.00	35,82,546.00
Current Liabilities And Provision	7	28,64,24,384.00	27,12,35,411.00
Total (A)		**107,06,39,300.37**	**96,47,05,593.31**
ASSETS			
Fixed Assets	8	18,31,52,664.40	19,47,07,792.40
Investments- From Earmarked / Endowment Funds	9	-	-
Investments- Others	10	71,27,81,914.00	62,13,68,542.00
Curent Assets, Loans, Advances Etc.	11	17,47,04,721.97	14,86,29,258.91
Miscellaneous Expenditure (to the extent not written off or adjusted)			
Total (B)		**107,06,39,300.37**	**96,47,05,593.31**

(Baljeet Kaur)
Finance Officer

(Dr. Dhananjai Mohan)
Director

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2020

(Amt. Rs.)

SCHEDULE 1 : CORPUS/CAPITAL FUND		Current Year	Previous Year
Balance as at the beginning of the year		25,35,22,451.72	28,54,72,701.97
Add: Contribution towards Corpus/Capital Fund		1,46,99,190.00	804,23,706.79
Add/(Deduct): Balance of net income (expenditure) transferred from		-98,59,141.43	-11,23,73,957.04
TOTAL	**A**	**25,83,62,500.29**	**25,35,22,451.72**
Corpus Fund			
Opening Balance		41,01,31,173.67	28,32,53,453.67
Received during the year		5,15,81,971.00	11,84,43,569.00
Add Accrued Interest		2,62,08,102.00	1,86,17,473.00
Add Interest Earned		9,17,357.00	7,38,732.00
Interest on FDR		3,537.00	-
Add/Less: wrongly credited accrued Intt. 2016-17 and 2017-18		-	-1,09,22,054.00
TOTAL	**B**	**48,88,42,140.00**	**41,01,31,173.67**
TOTAL A+B		**74,72,04,640.96**	**66,36,53,625.39**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2020

(Amt. Rs.)

SCHEDULE 2: RESERVE AND SURPLUS	Current Year	Previous Year
1. Capital Reserve :		
As per last Account	-	-
Addition during the year	-	-
Less : Deductions during the year	-	-
2. Revaluation Reserve :		
As per last Account	-	-
Addition during the year	-	-
Less : Deductions during the year	-	-
3. Special Reserves :		
As per last Account	-	-
Addition during the year	-	-
Less : Deductions during the year	-	-
4. General Reserve :		
As per last Account	-	-
Addition during the year	-	-
Less : Deductions during the year-	-	
TOTAL	**-**	**-**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2020

SCHEDULE3 : EARMARKED FUNDS			Current Year	Previous Year
a)		Opening Balance of the Funds	25,677,042.92	6,45,92,130.00
b)		Addition to the Funds		
	i	Grants Received	24,078,306.00	6,52,02,765.18
	ii	Interest Received	9,23,454.00	9,37,130.00
	iii	Other for Expenses	12,16,464.00	-
	iv	Loan-54272	15,00,000.00	-
Total			2,77,18,224.00	6,61,39,895.18
TOTAL (A+B)			5,33,95,266.92	13,07,32,025.18
Utilisation/Expendition towards objectives of funds				
c)	i	Capital Expenditures (Fixed Assets)		
		Camp/Field Equipment	-	-
		Office Equipment	4,63,189.00	10,58,100.00
	ii	Revenue Expenditure		
		Contingencies/Misc.	40,94,087.80	18,80,881.26
		Fellowship & Wages	6,63,794.00	10,57,174.00
		Travel Expenses	22,88,018.00	43,14,688.00
		POL & Maint. Of Vehicle	1,39,925.00	78,563.00
		Advance for Expenses (FA)	15,20,000.00	-
		Boarding & Lodging	42,77,687.00	55,77,915.00
		Misc receipt - Payment (Previous Year)	-	8,18,07,939.00
		Report Writing	10,736.00	-
		Corpus fund	32,58,937.00	50,61,403.00
		TA/DA & Honorarium	1,46,708.00	3,28,570.00
		Stationery items	2,52,495.00	1,80,243.00

SCHEDULE3 : EARMARKED FUNDS	Current Year	Previous Year
Training Course Materials	1,06,530.00	2,000.00
Training Course Fee	28,90,289.71	9,84,658.00
Sport Expenses	-	6,384.00
Loan to Director WII Other Project	7,00,000.00	15,00,000.00
Loan to Director WII A/c No 10	-	88,064.00
Advance for other Firm	-	11,28,400.00
TOTAL-C	2,08,12,396.51	10,50,54,982.26
NET BALANCE AS AT THE YEAR-END (A+B-C)	**3,25,82,870.41**	**2,56,77,042.92**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2020

		(Amt. Rs.)
SCHEDULE 4 : SECURED LOANS AND BORROWINGS	**Current Year**	**Previous Year**
(1) Central Govt.	-	-
(2) State Govt.(Specify)	-	-
(3) Financial Institutions		
(a) Term Loans	-	-
(b) Interest accured and due	-	-
(4) Banks		
(i) Term Loans		
- Interest accured and due	-	-
(ii) Others Loans (specify)		
- Interest accured and due	-	-
(5) Other Institutions and Agencies	-	-
(6) Debentures and Bonds	-	-
(7) Others (specify)	-	-
TOTAL	**-**	**-**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2020

		(Amt. Rs.)
SCHEDULE 5 : UNSECURED LOANS AND BORROWINGS	**Current Year**	**Previous Year**
(1) Central Govt.	-	-
(2) State Govt.(Specify)	-	-
(3) Financial Institutions	-	-
(4) Banks		
(i) Term Loans	-	-
(ii) Others (specify)	-	-
(5) Other Institutions and Agencies	-	-
(6) Debentures and Bonds	-	-
(7) Fixed Deposits	-	-
(8) Others (Specify)		
Security Deposit	5,56,968.00	5,56,968.00
Internal Loan	-	-
Pension Fund	-	-
TOTAL	**5,56,968.00**	**5,56,968.00**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2020

		(Amt. Rs.)
SCHEDULE 6 : DEFERRED CREDIT LIABILITIES:	**Current Year**	**Previous Year**
(A) Acceptances secured by hypothecation of capital equipment and other assets		
(B) Others	3,870,437.00	35,82,546.00
TOTAL	**3,870,437.00**	**35,82,546.00**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2020

		(Amt. Rs.)
SCHEDULE 7 : CURRENT LIABILITIES AND PROVISION	**Current Year**	**Previous Year**
(A) CURRENT LIABILITIES		
(1) Acceptances		
(2) Sundry Creditors		
(1) For Goods		
(2) For Others		
Other Payments outstanding (Grant in Aid) (17-18)	-	2,73,945.00
Other Payments outstanding (Grant in Aid) (18-19)	121,355.00	7,76,871.00
(3) Advances Received		
Hostel Caution Money	1,643,795.00	13,59,903.00
(4) Interest accrued but not due on		
(1) Secured Loans/Borrowings	-	-
(2) Unsecured Loans/Borrowings -	-	
(5) Statuary Liabilities		
(1) Overdue		
(2) Others (Specify)		
Pension Fund	132,845,827.00	1,21,726,806.00
GP Fund	147,180,488.00	1,45,282,829.00
(6) Others (Specify)		
EMD Received	1,933,158.00	18,13,158.00
Welfare Fund -	-	
TOTAL (A)	**283,724,623.00**	**27,12,33,512.00**
B) PROVISIONS		
(1) For Taxation		
TDS- Training Account	-	1,899.00
GST-Grant in Aid	86,851.00	-
(2) Gratuity		
(3) Superannuation/ Pension	-	-
(4) Accumulated Leave Encashment	-	-
(5) Trade Warranties/ Claims	-	-
(6) Others (Specify)		
TDS refund paid to GPF, Pension & Corpus -	-	
CGEGIS	113,130.00	-
GPF-CDL	2,499,780.00	-
Payment to Income Tax	-	-
Payment made to Sh Rajkishore Mohanto (Res. Projecdt)	-	-
Fellowship (Arrear)	-	-
TOTAL (B)	**2,699,761.00**	**1,899.00**
TOTAL (A+ B)	**286,424,384.00**	**2,712,35,411.00**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 2019-20
SCHEDULE 8 : FIXED ASSETS

Partuculars	Gross Block											Net Block	
		Addition during the year											
	Cost as at the beginning of the year			Deduction during the year	Adjustment change of dep rates	Cost as at the end of the year	As at the beginning of the year		For the year	Deduction during the year	At the end of the year	As at the current year-end	As at the Previous year-end
		Upto 30 Sep.	After 30 Sep										
LAND													
BLOCK: 0%													
TOTAL	6,607,214.58	-	-	-	-	66,07,214.58	-		-	-	-	66,07,214.58	66,07,214.58
BUILDINGS													
BLOCK: 10%													
TOTAL	115,707,041.91	30,720.00	10,773,875.00	-	-	12,65,11,636.91	1,03,96,478.00	-	1,21,12,469.00	-	1,21,12,469.00	11,43,99,167.91	11,57,07,041.91
BLOCK: 5%													
Staff Quarters	5,095,112.71	-	-	-	-	50,95,112.71	2,97,134.00	0.05	2,54,756.00	-	2,54,756.00	48,40,356.71	50,95,112.71
TOTAL	5,095,112.71	-	-	-	-	50,95,112.71	2,97,134.00	-	2,54,756.00	-	2,54,756.00	48,40,356.71	50,95,112.71
PLANT MACHINERY & EQPT													
BLOCK: 15%													
TOTAL	47,371,684.10	666,701.00	571,974.00	-	-	4,86,10,359.12	56,06,257.00		72,48,658.00	-	72,48,658.00	4,13,61,701.12	4,73,71,684.10
AC Plant : BLOCK : 10%													
TOTAL	449,905.46	-	-	-	-	4,49,905.46	92,573.00	-	44,991.00	-	44,991.00	4,04,914.46	4,49,905.46
FURNITURE, FIXTURES : BLOCK : 10%													
TOTAL	6,464,669.32	556,146.00	151,222.00	-	-	71,72,037.32	3,83,662.00		7,09,642.00	-	7,09,642.00	64,62,395.32	64,64,669.32
COMPUTER/PERIPHERALS : BLOCK : 40%													
TOTAL	7,350,776.86	1,297,412.00	46,610.00	-	-	86,94,798.86	7,15,680.00		34,68,597.00	-	34,68,597.00	52,26,201.86	73,50,776.86
LIBRARY BOOKS/BOOKS : BLOCK : 40%													
TOTAL	5,661,387.45	148,717.00	455,813.00	-	-	62,65,917.45	33,35,337.00	0.80	24,15,205.00	-	24,15,205.00	38,50,712.45	56,61,387.45
GRAND TOTAL	**194,707,792.40**	**2,699,696.00**	**11,999,494.00**	**-**	**-**	**20,94,06,982.40**	**2,08,27,121.00**		**-2,62,54,318.00**	**-**	**2,62,54,318.00**	**18,31,52,664.40**	**19,47,07,792.39**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2020

(Amt. Rs.)

SCHEDULE :9 INVESTMENTs FROM EARMARKED/ENDOWMENT FUNDS		Current Year	Previous Year
1.	In the Govt. Securities	-	-
2.	Other approved Securities	-	-
3.	Shares	-	-
4.	Debentures and Bonds	-	-
5.	Subsidaries and Joint Ventures	-	-
6-	Others (Specify)	-	-
TOTAL		**-**	**-**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2020

(Amt. Rs.)

SCHEDULE :10 INVESTMENT - OTHERS		Current Year	Previous Year
1.	In the Govt. Securities		
2.	Other approved Securities		
3.	Shares		
4.	Debentures and Bonds		
	Investment in RBI Bond (GPF)	-	-
	Investment in RBI Bond (Pension)	-	-
	Investment in RBI Bond (Corpus Fund)	4,20,00,000.00	4,20,00,000.00
5.	Subsidaries and Joint Ventures		
6.	Others (Specify)		
	Investment in GIA	-	-
	Investment in FDR (GPF)	13,03,69,426.00	12,22,28,753.00
	Autosweep FDR-GPF	35,00,000.00	1,10,00,000.00
	Investment in FDR (Pension Fund)	12,03,69,426.00	10,12,17,737.00
	FDR Corpus Fund	40,20,43,062.00	30,94,22,052.00
	Autosweep FDR Corpus fund	1,45,00,000.00	3,55,00,000.00
	Autosweep FDR-Pension Fund	-	-
TOTAL		**71,27,81,914.00**	**62,13,68,542.00**

(Baljeet Kaur)
Finance Officer

(Dr. Dhananjai Mohan)
Director

(Amt. Rs.)

SCHEDULE :11 CURRENT ASSETS, LOANS, ADVANCES ETC.	Current Year	Previous Year
(A) CURRENT ASSETS		
(1) Inventories		
Closing Stock of Steel & Cement	-	-
Advance paid for Journals (Grant in Aid)	-	-
Closing Balance of WII Publication	3,00,563.00	3,06,871.00
(2) Sundry Debtors		
(1) Debts Outstanding for a period exceeding six months	-	-
(2) Others (Specify)	-	-
(3) Cash balances in hand (including cheques/drafts and imprest)		
Grant-in-Aid A/c	-	1,47,705.00
Training A/c	-	-
Pension Fund A/c	-	-
GPF A/c	-	-
Corpus Fund	-	-
(4) Bank Balances		
(1) With Scheduled Banks		
Grant-in-Aid A/c	1,17,81,369.04	83,75,247.25
Training A/c	1,56,42,733.85	51,62,501.32
Pension Fund A/c	31,23,575.00	11,19,755.00
GPF A/c	13,84,083.00	13,46,519.00
Corpus fund No 4032	11,83,749.67	16,84,421.67
Endowment Funds	3,25,82,870.41	2,56,77,042.92
TOTAL (A)	**6,59,98,943.97**	**4,38,20,063.16**
(B) LOANS, ADVANCES AND OTHER ASSETS		
(1) Loans		
(1) Staff FA(MSc) TA(MSc) FA TA LTC Med. Adv.		
Advance for expenses (Staff) 438694+40000+496953+291024+45000+39000	13,50,671.00	3,57,848.00
Advance for expenses (Research Projects) (FA-641403+TA-107196)	7,48,599.00	5,85,541.00
Land Acquisition Charges (Deposited in Hon'ble High Court)	1,80,00,000.00	1,80,00,000.00
Advance for expenses (Training Account)	8,41,000.00	12,00,000.00
Advance for IIT kanpur	12,39,000.00	12,39,000.00
Advance for D/WII A/c 54272	-	10,00,000.00
Advance for Vehicle Insurance	84,100.00	1,05,644.75
(2) Other entities engaged in activities /objectives similar to		
(3) Others (Specify)		
Adv for civil work to CPWD	1,78,30,008.00	1,38,78,479.00
Loan for World Environment Day (MoEF)	2,80,984.00	2,80,984.00
Loan for WCF workshop	30,253.00	30,253.00
Advance payment to CCU	1,52,71,531.00	1,44,82,255.00
Advance Payment-Training Account	6,92,800.00	-
(2) Advances and other amounts recoverable in cash or in kind or		
(1) On Capital Accounts		
(2) Prepayment		

(3) Others (Specify)		
Security Deposit for Electricity Connection	9,81,968.00	4,58,559.00
TDS to be refunded by the ITO (Pension Fund)	43,89,787.00	43,89,787.00
TDS to be refunded by the ITO (GPF)	22,77,757.00	22,77,757.00
TDS to be refunded by the ITO (Corpus fund)	29,07,227.00	29,07,227.00
(3) Income Accrued		
(1) On Investments from Earmarked / Endowment Funds		
(2) On Invesments -Others		
Interest Accrued on FDR (GIA)	-	-
Interest Accrued on FDR (GPF)	96,49,222.00	84,29,800.00
Interest Accrued on FDR (Pension Fund)	49,63,039.00	1,49,99,527.00
Interest Accrued on FDR (Corpus Fund)	2,62,08,102.00	1,86,17,473.00
(3) On Loans and Advances		
(4) Others (Specify)		
Training Cost Accrued But not Received	8,38,375.00	8,38,375.00
(4) Expenses payable towards capital/fixed Assets		
(1) Grant in Aid (2015-16)	-	-
(2) Grant in Aid (2016-17)	-	-
(3) Research Project (2017-18)	-	-
(4) Grant in Aid (2017-18)	1,21,355.00	2,73,945.00
(5) Grant in Aid (2018-19)	-	4,56,741.00
TOTAL (B)	**10,87,05,778.00**	**10,48,09,195.75**
TOTAL (A+B)	**17,47,04,721.97**	**14,86,29,258.91**

(Baljeet Kaur)
Finance Officer

(Dr. Dhananjai Mohan)
Director

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

			(Amt. Rs.)
INCOME	**Schedule**	**Current Year**	**Previous Year**
Income from Sales/Services	12	-	-
Grants/Subsidies	13	300,217,810.00	249,576,293.21
Fees/Subscriptions	14	37,711,065.00	24,095,264.00
Income from Investments (from earmarked/endowment Funds Transferred to funds)	15	-	-
Income from Royalty, Publication etc	16	4,095,794.29	1,940,422.00
Interest Earned	17	478,671.00	4,144,910.00
Other Income	18	-	-
Increase/decrease) in stock of Finished goods and works-in-progress	19	-	-
TOTAL (A)		**342,503,340.29**	**279,756,889.21**
EXPENDITURE			
Establishment Expenses (Plan & Non Plan)	20	265,803,046.50	256,713,332.00
Other Administrative Expenses (Plan & Non Plan)	21	86,559,435.22	135,035,539.75
Expenditure on Grants, Subsidies etc.	22	-	-
Expenditure on Grants, Subsidies etc.	23	-	-
Significant account Polices (notes on Accounts)	24	-	-
CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS (Illustrative)	25	-	-
TOTAL (B)		**352,362,481.72**	**391,748,871.75**
Balance being excess of Income over Expenditure (A-B)		-9,859,141.43	-111,991,982.54
Prior period items -			-381,974.00
BALANCE BEING SURPLUS (DEFICIT) CARRIED TO CORPUS/CAPITAL FUND		**-9,859,141.43**	**-112,373,956.54**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
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INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

		(Amt. Rs.)
SCHEDULE :12 INCOME FROM SALES/SERVICES	**Current Year**	**Previous Year**
1. Income from Sales		
(a) Sale of Finished Goods	-	-
(b) Sale of Raw Material	-	-
(c) Sale of Scraps	-	-
2. Income from Services		
(a) Labour and Processing Charges	-	-
(b) Professional/Consultancy Services	-	-
(c) Agency Commission and Brokerage	-	-
(d) Maintenance Services (Equipment/Property)	-	-
(e) Other (Specify)	-	-
TOTAL	**-**	**-**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

(Amt. Rs.)

SCHEDULE :13 GRANTS/SUBSIDIES		Current Year	Previous Year
1.	Central Government		
	Grant -in- Aid from MoEF	31,49,17,000.00	33,00,00,000.00
	Amount Capitalized	(-)1,46,99,190.00	8,04,23,706.79
	Total	30,02,17,810.00	24,95,76,293.21
2.	State Governments (s)	-	-
3.	Government Agencies	-	-
4.	Institutions/Welfare Bodies	-	-
5.	International Organisations	-	-
6.	Others (Specify)		
	WII Contribution (Pension A/c)	-	-
TOTAL		**30,02,17,810.00**	**24,95,76,293.21**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

(Amt. Rs.)

SCHEDULE :14 FEES/ SUBSCRIPTIONS		Current Year	Previous Year
1.	Entrance Fees		
	M.Sc.Course Fee	31,96,800.00	31,96,800.00
2.	Annual Fees/ Subscriptions	-	-
3.	Seminar/ Program Fees		
	Seminar/ Workshop Fees	-	-
4.	Consultancy Fees		
	Consultancy refund	-	-
5.	Others (Specify)		
	Other Receipt (Training)	2,82,44,265.00	1,52,38,942.00
	Receipt for Training Courses	5,000,000.00	5,000,000.00
	Other Project Grant	12,70,000.00	6,59,522.00
	Pre-receipted bill issued but not received	-	-
	Receipt for Training Cost	-	-
TOTAL		**3,77,11,065.00**	**2,40,95,264.00**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

(Amt. Rs.)

SCHEDULE :15 INCOME FROM INVESTMENTS	Investment from Earmarked fund		Investment-Other	
(income on Investment from Earmarked/Endowment funds transferred to Funds)	Current Year	Previous Year	Current Year	Previous Year
1. Interest				
(a) On Govt Securities	-	-	-	-
(b) Other Bonds/Debentures	-	-	-	-
2. Dividends:				
(a) On Shares	-	-	-	-
(b) On Mutual Fund Securities	-	-	-	-
3. Rents	-	-	-	-
4. Others (Specify)	-	-	-	-
TOTAL	**-**	**-**	**-**	**-**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

(Amt. Rs.)

SCHEDULE :16 INCOME FROM ROYALTY, PUBLICATION ETC.	Current Year	Previous Year
1. Income from Royalty	-	-
2. Income from Publications	-	-
3. Others (Specify)		
Genetic lab	-	-
Misc. Receipts	19,95,535.29	9,62,629.00
UBI Building Rent	70,572.00	50,100.00
Misc Income from Lib	-	-
WII Products	5,474.00	-
House Licence Fee	8,71,734.00	3,60,434.00
Bus Charges	2,10,046.00	1,02,130.00
Electricity & Water Charges	9,37,085.00	4,65,129.00
Telephone	5,348.00	-
TOTAL	**40,95,794.29**	**19,40,422.00**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

				(Amt. Rs.)
SCHEDULE :17 INTEREST EARNED			**Current Year**	**Previous Year**
1.	On Term Deposits			
	1)	With Scheduled Banks		
		Int. on Bank Deposit	-	-
		Interest on FDR	-	-
		Interest on Investment	-	-
	2)	With Non-Scheduled Banks	-	-
	3)	With Institutions	-	-
	4)	Others (Specify)	-	-
		Int. on Investment (Training)	-	-
		Interest (Training)	3,01,729.00	-
		Interest on HBA	1,76,942.00	1,85,819.00
2.	On Savings Account			
	1)	With Scheduled Banks		
		Int. on Savings Account	-	-
		Accrued Interest on FDR A/c (GIA)	-	34,86,572.00
		Interest on Saving A/c (Training A/c)	-	4,72,519.00
	2)	With Non-Scheduled Banks	-	-
	3)	Post Office Savings Account	-	-
	4)	Others (Specify)	-	-
3.	On Loans			
	1) Interest on Loan & Advance		-	-
	2) Others		-	-
4.	Interest on Debtors and Other Receivables			
TOTAL			**4,78,671.00**	**41,44,910.00**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

				(Amt. Rs.)
SCHEDULE :18 OTHER INCOME			**Current Year**	**Previous Year**
1.	Profit on Sale/Disposal of Assets			
	1) Owned Assets		-	-
	2) Assets acquired out of grants, or received free of cost		-	-
2.	Export Incentives realized		-	-
3.	Fees for Misc. Services		-	-
4.	Others (Specify)			
		Misc. Receipts	-	-
		EMD Forfeited	-	-
		Receipt for Project	-	-
TOTAL			**-**	**-**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

(Amt. Rs.)

SCHEDULE :19 INCREASE/DECREASE IN STOCK OF FINISHED GOODS	Current Year	Previous Year
1. Closing Stock		
1) Finished Goods		
Closing Stock of WII Publication	-	-
2) Work-in-progress	-	-
2. Less : Opening Stock		
1) Finished Goods	-	-
2) Work-in-progress	-	-
TOTAL	**-**	**-**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

(Amt. Rs.)

SCHEDULE :20 ESTABLISHMENT EXPENSES	Current Year		Previous Year	
	Plan	Non Plan	Plan	Non Plan
1. Salaries and Wages				
Salary & Wages (Training A/c)	4,62,356.00	-	7,77,832.00	-
Honorarium	1,44,420.00	-	2,83,050.00	-
Medical	90,39,762.50	-	1,15,24,293.00	-
Fellowship - Forensic Cell	-	-	-	-
Salaries & Allowances	23,77,76,818.00	-	20,92,54,754.00	-
Stipend	8,23,179.00	-	7,04,974.00	-
Fellowship & Wages (Research Project)	2,13,699.00	-	3,882,523.00	-
HRA	-	-	3,761,412.00	-
2. Allowances and Bonus				
Bonus	-	-	-	-
OTA	-	-	-	-
LTC	1835,620.00	-	2609,461.00	-
Corps Fund (Training)	-	-	-	-
Transferred to Corpus Fund	-	-	-	-
Honorarium (Training A/c)	-	-	-	-
3. Others (Specify)				
4. Contribution to Other Fund (Specify)				
Leave Salary and Pension Contr.	23,47,688.00	-	23,81,603.00	-
5. Staff Welfare Expenses				
Uniforms	-	-	-	-
6. Expenses on Employees Retirement and Terminal Benefits				
Final Payment				
Leave Encashment & Gratuity	1,30,76,680.00	-	2,13,43,390.00	-
7. Others (Specify)				
Camp Expenses (Research Project)	82,824.00	-	1,90,040.00	-
TOTAL	**26,58,03,046.50**	**-**	**25,67,13,332.00**	**-**

(Baljeet Kaur)
Finance Officer

(Dr. Dhananjai Mohan)
Director

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

(Amt. Rs.)

SCHEDULE :21 OTHER ADMINISTRATIVE EXPENSES	R&P	Committed	Current Year		Previous Year	
			Plan	Non Plan	Plan	Non Plan
AMC of Computers	1,866,834.00	-	1,866,834.00	-	2,150,637.00	-
Annual Research Seminar	1,202,721.00	-	1,202,721.00	-	1,024,709.00	-
Contingencies/Misc. (Research Project)	679,238.00	-	679,238.00	-	2,475,565.00	-
Cont./Misc. (Training Account)	4,088,909.47	-	4,088,909.47	-	2,037,755.74	-
Expenses for Library	44,396.00	-	44,396.00	-	216,353.00	-
Electricity and Water Charges	5,251,780.00	-	5,251,780.00	-	9,007,317.00	-
Maint. Of WII Campus	853,874.00	-	853,874.00	-	587,006.00	-
Estate Security	946,292.00	-	946,292.00	-	6,974,313.00	-
Lab Expenses (Research lab)	78,839.00	-	78,839.00	-	47,904.00	-
Lab Expenses (Forensic Lab)	671,005.00	-	671,005.00	-	673,045.00	-
Lab Expenses (Harbarium)	10,473.00	-	10,473.00	-	-	-
Lab Expenses (Genetic Lab)	58,622.00	-	58,622.00	-	168,675.00	-
Legal Expenses	1,866,149.00	-	1,866,149.00	-	2,550,104.00	-
M.Sc. Course Expenditure	3,563,190.00	-	3,563,190.00	-	4,426,162.00	-
Operational Expenses	2,520,174.00	-	2,520,174.00	-	1,376,236.00	-
Corpur Fund Transfer (Training Account)	4,650,000.00		4,650,000.00	-	13,380,000.00	-
POL & Maintenance of Vehicle (Research Project)	234,822.00	-	234,822.00	-	429,497.00	-
POL & Maintenance of Vehicle (Training A/c)	862,042.00	-	862,042.00	-	570,285.00	-
POL for Vehicles	407,851.00	-	407,851.00	-	518,541.00	-
Postage & Telegrams	172,699.00	-	172,699.00	-	222,600.00	-
Printing & Binding	1,651,568.00	-	1,651,568.00	-	31,600.00	-
Borading & Lodging (Training Account)	5,803,503.00	-	5,803,503.00	-	7,209,546.76	-
Repair & Maintenance of Vehicles	549,762.75	-	549,762.75	-	745,331.00	-
Vehicle insurance	185,702.00	-	185,702.00	-	416,794.25	-
Repair & Maintenance furniture & Fixture	6,000.00	-	6,000.00	-	5,250.00	-
Sports	237,019.00	-	237,019.00	-	545,760.00	-
Hospitality/entertainment	161,581.00	-	161,581.00	-	236,870.00	-
Sport Goods (Training Account)	47,976.00	-	47,976.00	-	41,860.00	-
Stationery	540,546.00	-	540,546.00	-	738,096.00	-
Telephone & TC	322,921.00	-	322,921.00	-	683,052.00	-
Training Cost Expenditure	5,000,000.00	-	5,000,000.00	-	5,000,000.00	-
Travel Exp. (Grant in Aid)	1,963,250.00	-	1,963,250.00	-	3,042,049.00	-
Travel Exp. (Research Project)	769,558.00	-	769,558.00	-	663,740.00	-
Travelling Expenses (Training A/c)	8,942,264.00	-	8,942,264.00	-	4,000,992.00	-
Maintinancae of civil work	1,649,063.00	-	1,649,063.00	-	4,782,702.00	-
Computer Expenses (Consuamble)	311,944.00	-	311,944.00	-	-	-
Complementary-Lib.	6,308.00	-	6,308.00	-	6,749.00	-
Funds Transfer of Misc. Recipt to Corpus A/c	2,126,241.00	-	2,126,241.00	-	33,261,512.00	-
Depriciation during the year 25667171+587147	26,254,318.00	-	26,254,318.00	-	24,786,931.00	-
TOTAL	**86,559,435.22**	**-**	**86,559,435.22**	**-**	**135,035,539.75**	**-**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

(Amt. Rs.)

SCHEDULE: 22 EXPENDITURE ON GRANTS, SUBSIDIES ETC...	Current Year		Previous Year	
	Plan	Non Plan	Plan	Non Plan
(a) Grants given to Institutions/Organisation	-	-	-	-
(b) Subsidies given to Institution?Organisations	-	-	-	-
TOTAL	**-**	**-**	**-**	**-**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

(Amt. Rs.)

SCHEDULE :23 - INTEREST	Current Year		Previous Year	
	Plan	Non Plan	Plan	Non Plan
(a) On Fixed Loans	-	-	-	-
(b) On other Loans (including Bank Chargs)	-	-	-	-
(c) Other (Specify)	-	-	-	-
TOTAL -	**-**	**-**	**-**	**-**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

(Amt. Rs.)

SCHEDULE – 24 SIGNIFICANT ACCOUNTING POLICES (Notes on Accounts)

1 ACCOUNTING CONVENTION

The financial statement are prepared on the basis of historical cost convention, unless otherwise stated and on the accrual method of accounting.

2 INVENTORY VALUATION

2.1 Stores and spares (including machinery spares) are valued at cost.

2.2 Nil

3 INVESTMENTS

3.1 Investments classified as Long term investments are carried at cost. Provision for decline, other than temporary, is made on carrying cost of such investments.

3.2 Investments classified as current are carried at lower of coast and fair value. Provision for shortfall In the value of such investments is made for each investment considered individually and not on a global basis.

3.3 Cost includes acquisition expenses like brokerage, transfer stamps.

4 EXCISE DUTY

Nil

5 FIXED ASSETS

5.1 Fixed assets are stated at cost of acquisition inclusive of inward freight, duties and taxes and incidental and direct expenses related to acquisition. In respect of projects involving construction, related pre-operational expenses (including interest on loan for specific project prior to its completion), form part of the value of the assets.capitalized

5.2 Fixed assets received by way of non-monetary grants, (other than towards the Corpus Fund), are capitalized at values stated by corresponding credit to capital Reserve.

SCHEDULE – 24 SIGNIFICANT ACCOUNTING POLICES (Notes on Accounts)

6	**DEPRECIATION**
6.1	Depreciation is provided on "Written Down Value method" as per specified in the Income-tax, 1961 except depreciation on cost adjustments arising on account of conversion of foreign currency, liabilities for acquisition of fixed assets, which is amortized over the residual life of the respective assets.
6.2	In respect of additions to/deductions from fixed assets during the year, depreciation is considered on pro-rata basis.
6.3	Nil
7	**MISCELLANEOUS EXPENDITURE**
	Nil
8	**ACCOUNTING FOR SALES**
	Nil
9	**GOVERNMENT GRANT/SUBSIDIES**
9.1	Government grants of the natures of contribution towards capital cost of setting up projects are treated as Capital Reserve
9.2	Government grants in respect of specific assets acquired are shown as a deduction from the cost of the releated assets.
9.3	Government grants /subsidy are accounted on realization basis.
10	**FOREIGN CURRENCY TRANSACTION**
10.1	Transaction denominated in foreign currency are accounted at the exchange rate prevailing at the date of the transaction.
10.2	Current assets, foreign currency loans and current liabilities are converted at the exchange rate prevailing as at the year end and the resultant gain/loss is adjustment to cost of fixed assets, if the foreign currency liability related to fixed assets, and in other cases is considered to revenue
11	**LEASE**
	Lease rentals are expensed with reference to lease terms.
12	**RETIREMENT BENEFITS**
	The pension scheme followed in the institute is based on CCS Pention Rules, for the employees appointed prior to 01 Jan 2004. The New Pension Scheme(NPS) is in operation for the employees recruited on or after 01 Jan 2004
13	**PRIOR PERIOD ITEMS**
13.1	Prior period items, Extra ordinary items and changes in Accounting Polices are accounted in accordance with Accounting Standard-5.

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

(Amt. Rs.)

	SCHEDULE :25 - CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS :	Plan	Non Plan	Plan	Non Plan
1	**CONTINGENT LIABILITIES**				
1.1	Claims against the Entity not acknowledged as debts	-	-	-	-
1.2	In respect of :				
	Bank guarantees given by/on behalf of the entity	-	-	-	-
	Letters of Credit opened by Bank on behalf of the Entity	-	-	-	-
	Bills discounted with banks	-	-	-	-
1.3	Disputed demands in respect of :				
	Income Tax	-	-	-	-
	Sales-Tax	-	-	-	-
	Municipal Taxes	-	-	-	-
1.4	In respect of claims from parties for non-execution of orders, but contested by the Entity	-	-	-	-

2	**CAPITAL COMMITMENTS**				
	Estimated value of contracts remaining to be executed on capital account and not provided for (net of advance)	-	-	-	-
3	**LEASE OBLIGATIONS**				
	Future obligations for rentals under finance lease arrangements for Plant and Machinery amount to	-	-	-	-
4	**CURRRENT ASSESTS, LOANS AND ADVANCES**				
	In the opinion of the Management, the current assets, loans and advances have a value on realization in the ordinary course of business, equal at least to the aggrerate amount shown in the Balance Sheet.	-	-	-	-
5	**TAXATION**				
	In view of there being no taxable income under Income-tax Act 1961 no provison for income tax has been considered necessary	-	-	-	-
6	**FOREIGN CURRENCY TRANSACTIONS**				
6.1	Value of Imports calculated on C.I.F. Basis :				
	Purchase of finished Goods	-	-	-	-
	Raw Materials & Components (including in transit)	-	-	-	-
	Capital Goods-	-	-	-	-
	Stores, Spares and Consumables	-	-	-	-
6.2	Expenditure in foreign currency:				
	a) Travel	-	-	-	-
	b) Remittances and Interest payment to Financial Institutions/Banks in Foreign Currency	-	-	-	-
	c) Other expenditure:				
	Commission on Sales	-	-	-	-
	Legal and Professional Expenses	-	-	-	-
	Miscellaneous Expenses	-	-	-	-
6.3	Earnings:				
	Value of Exports on FOB basis	-	-	-	-
6.4	Remuneration to auditors (As auditors)				
	Taxation Matters	-	-	-	-
	For Management Services	-	-	-	-
	For certification	-	-	-	-
	other	-	-	-	-
7	**Corresponding figures for the previous year have been regrouped/ rearranged, wherever necessary**	-	-	-	-
8	**Schedules 1 to 25 are annexed to and form an integral part of the Balance Sheets as at 31 Mar 2020 and the Income and Expenditure Account for the year ended on that date**	-	-	-	-
TOTAL	**-**	**-**	**-**	**-**	**-**

GENERAL PROVIDENT FUND ACCOUNT NO. 518502010001297
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

Income		Expenditure	
Particulars	**Amount**	**Particulars**	**Amount**
Opening Balance	1,23,46,519.00	Final payment of GPF	2,55,63,727.00
Interest Received on Saving Account	3,66,834.00	Investment	1,00,00,000.00
GPF Contribution	2,80,49,962.00	Advance/Withdrawal paid	1,02,07,500.00
Encashment of FDR	96,28,390.00	By Auto Sweep Investment	35,00,000.00
Interest on FDR	2,63,605.00	Bank Balance	13,84,083.00
Total	**5,06,55,310.00**	**Total**	**5,06,55,310.00**

PENSION FUND ACCOUNT NO. 518502010000018
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2019-20

Income		Expenditure	
Particulars	**Amount**	**Particulars**	**Amount**
Opening Balance	11,19,755.00	Investment in FDR	0.00
Interest Received on Saving Account	425,639.00	Commuted Value of Pension	1,56,12,520.00
Interest Earned on FDR	764,225.00	Family Pension/ Pension	2,52,14,809.00
WII Contribution	76,24,289.00	Bank Balance	31,23,575.00
Encashment of FDR	3,40,16,996.00		
Total	**4,39,50,904.00**	**Total**	**4,39,50,904.00**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
Wildlife Institute of India, Dehradun
Fixed Assets Purchased from Funds reflected in Schedule-3
ACCOUNT FOR THE YEAR ENDED 2019-20

Particulars	Gross Block					Description				Net Block	
		Addition during the year									
	Cost as at the beginning			Deduction during the Year	Cost as at the end of the year	As at the beginning of the year	For the year	Deduction during the year	At the end of the year	As ast the current year-end	As at the previous year-enf
		Upto 30-Sep.	After 30-Sep.								
PLANT MACHINERY & EQPT											
BLOCK: 15%											
Office Equipment	63,33,717.90	1,46,743.00	3,16,446.00	-	67,96,906.90	-	9,95,802.59	-	9,95,802.59	58,01,104.32	63,33,717.90
Camp Equipment	27,03,595.15	0.00	0.00	-	27,03,595.15	-	4,05,539.27	-	4,05,539.27	22,98,055.88	27,03,595.15
TOTAL	90,37,313.05	1,46,743.00	3,16,446.00	-	95,00,502.05	-	14,01,341.86	-	14,01,341.86	80,99,160.19	90,37,313.05
FURNITURE, FIXTURES											
BLOCK : 10%											
Furiniture & Fixtures	1,78,611.53	-	-	-	1,78,611.53	-	17,861.15	-	17,861.15	1,60,750.38	1,78,611.53
TOTAL	**1,78,611.53**	**-**	**-**	**-**	**1,78,611.53**	**-**	**17,861.15**	**-**	**17,861.15**	**1,60,750.38**	**1,78,611.53**
BOOKS : BLOCK : 40%											
Books	4,450.37	-	-	-	4,450.37	-	1,780.15	-	1,780.15	2,670.22	4,450.37
TOTAL	4,450.37	-	-	-	4,450.37	-	1,780.15	-	1,780.15	2,670.22	4,450.37
GRAND TOTAL	**92,20,374.95**	**1,46,743.00**	**3,16,446.00**	**-**	**96,83,563.95**	**-**	**14,20,983.16**	**-**	**14,20,983.16**	**82,62,580.79**	**92,20,374.95**

(Baljeet Kaur)
Finance Officer

(Dr. Dhananjai Mohan)
Director

ASSESSING THE IMPACTS OF POWER - LINES ON AVIAN SPECIES IN THE ARID PLAINS OF WESTERN GUJARAT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	370,261.30	Manpower	707,130.50
Grant Received	2,430,384.00	Equipment	27,609.00
Interest Received	12,087.00	Travel	747,276.00
Advances for Expenses	25,000.00	Accommodation	136,945.00
Laon from A/c No.-55510	500,000.00	Contingency	49,738.00
		Miscellaneous	103,482.00
		Publications	2,333.00
		Institutional Charges	1,051,500.00
		Total Expenditure	2,826,013.50
		Outstanding :	
		Forest Advance	210,000.00
		Tour Advance	135,000.00
		Balance as on 31.03.2020 A/C No. 56170	166,718.80
Grand Total	**3,337,732.30**	**Grand Total**	**3,337,732.30**

DST FUNDED - WOMEN SCIENTIST (WoS) PROJECT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,49,119.00	Manpower	5,50,000.00
Grant Received	10,00,000.00	Consumables	20,006.00
Interest Received	4,493.00	Contingency	32,865.50
		Travel	1,32,515.50
		Institutional Charges	90,000.00
		Loan Refund to A/c No. 62	3,00,000.00
		Total Expenditure	11,25,387.00
		Outstanding :	
		Tour Advance	10,000.00
		Balance as on 31.03.2020 A/C No. 55926	18,225.00
Grand Total	**11,53,612.00**	**Grand Total**	**11,53,612.00**

POPULATION GENETIC STRUCTURE IN TRACKING POACHING CASES OF INDIAN PANGOLIN (MANIS CRASSICUDATA)
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	85,646.00	Manpower	55,000.00
Interest Received	3,109.00	Total Expenditure	55,000.00
Advances for Expenses	40,000.00	**Outstanding :**	
		Forest Advances	35,000.00
		Tour Advance	5,000.00
		Balance as on 31.03.2020 A/C No. 56111	33,755.00
Grand Total	**1,28,755.00**	**Grand Total**	**1,28,755.00**

FORENSIC CELL REVOLVING FUND
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	91,28,570.51	Contingency	1,25,845.00
Forensic Income	18,95,335.00	Travel	2,75,608.00
Interest Received	3,58,953.00	Total Expenditure	4,01,453.00
Advances for Expenses	84,000.00	**Outstanding :**	
		Forest Advances	15,000.00
		Tour Advances	4,000.00
		Balance as on 31.03.2020 A/C No. 53911	1,10,46,405.51
Grand Total	**1,14,66,858.51**	**Grand Total**	**1,14,66,858.51**

CAUSES OF AVIAN DIVERSITY GRADIENTS ALONG THE HIMALAYAS
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	26,538.91	Manpower	-
Interest Received	1,323.00	Total Expenditure	-
		Balance as on 31.03.2020 A/C No. 53582	27,861.91
Grand Total	**27,861.91**	**Grand Total**	**27,861.91**

ECOLOGICAL RECONNAISSANCE AND CONSERVATION ASSESSMENT OF AVIFAUNA IN SAHYADRI TIGER RESERVE
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	16,014.00	Loan Refund to A/c No. 55742	100,000.00
Grant Received	99,200.00	Total Expenditure	100,000.00
Interest Received	426.00	**Outstanding :**	
		Forest Advance	10,000.00
		Balance as on 31.03.2020 A/C No. 55467	5,640.00
Grand Total	**115,640.00**	**Grand Total**	**115,640.00**

AUGMENTATION AND RECOVERY OF TIGER POPULATION IN SATKOSIA TIGER RESERVE, ANGUL
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	42,49,825.00	Manpower	11,97,783.50
Advances for Expenses	60,000.00	Equipment	48,927.00
Interest Received	1,48,868.00	Vehicle Hiring and Fuel	5,50,955.00
		Travel	2,11,239.00
		Accommodation	6,608.00
		Contingency	71,236.00
		Base Camp Exp.	89,596.00
		Total Expenditure	21,76,344.50
		Outstanding :	
		Forest Advance	60,000.00
		Tour Advance	7,000.00
		Balance as on 31.03.2020 A/C No. 56377	22,15,348.50
Grand Total	**44,58,693.00**	**Grand Total**	**44,58,693.00**

POPULATION MANAGEMENT OF SPECIES INVOLVED IN HUMAN - WILDLIFE CONFLICT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	2,21,25,711.00	Engagement of Proj. Scientist & Res. Scholars	75,99,359.00
Grant Received	2,33,59,831.00	Lab Facility and Animal Housing, Lab Set up & Lab Running Cost	37,98,764.16
Advances for Expenses	416,965.00	Field Equipment	30,86,204.00
Interest Received	1,581,433.00	Field Implementation	15,92,215.00
Due Tax (CGST / SGST)	3,202.00	Lab Building	11,43,133.00
Other Advance	3,28,00,000.00	Total Expenditure	1,72,19,675.16
		Outstanding :	
		Forest Advance	8,13,000.00
		Tour Advance	5,15,000.00
		Loan to A/c No.-56409 (Kandi Road)	2,8,60,000.00
		Balance as on 31.03.2020 A/C No. 56389	5,88,79,466.84
Grand Total	**8,02,87,142.00**	**Grand Total**	**8,02,87,142.00**

ASSESSMENT OF IMPACTS OF THE PROPOSED NAGPUR - MUMBAI SUPER COMMUNICATION EXPRESSWAY, MAHARASHTRA, SAMRIDDHI CORRIDOR ON WILDLIFE VALUES & MEASURES RECOMMENDED TO MITIGATE NEGATIVE IMPACTS
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,61,48,292.00	Technical Manpower Charges	64,10,772.00
Grant Received	1,51,72,000.00	Field Logistics	28,09,369.21
Advances for Expenses	1,30,000.00	Study Equipments & Data/Imagery/ Base Camp, Infrastructure etc.	93,69,922.00
Interest Received	1,12,245.00	Miscellaneous	5,47,312.00
Interest on FDR	7,86,962.00	Institutional Charges	
Taxes Due (CGST / SGST)	472.00	Total Expenditure	1,91,37,375.21
		Outstanding :	
		Forest Advance	1,00,000.00
		Tour Advance	47,000.00
		Loan to A/c No.-55338	10,00,000.00
		Loan to A/c No.-5549	500,000.00
		FDR	1,00,00,000.00
		Balance as on 31.03.2020 A/C No. 56459	15,65,595.79
Grand Total	**3,23,49,971.00**	**Grand Total**	**3,23,49,971.00**

DEVELOPMENT OF LANDSCAPE MANAGEMENT PLAN AND MONITORING WITH REFERENCE TO KEN - BETWA RIVER LINK PROJECT IN PANNA TIGER RESERVE, MADHYA PRADESH
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	3,08,98,768.00	Manpower	67,76,144.00
Advances for Expenses	13,16,000.00	Equipment	884,281.00
Grant Received	2,00,00,000.00	Travel & Lodging	5,250,106.00
Interest Received	8,57,662.00	Contingency	20,08,374.00
Due Taxes (CGST / SGST)	1,586.00	Miscellaneous	3,28,714.00
		Institutional Charges	2,00,00,000.00
		Total Expenditure	3,52,47,619.00
		Outstanding :	
		Forest Advance	4,53,000.00
		Tour Advance	1,59,000.00
		Loan to Satyamanglam A/c No.-56410	10,00,000.00
		Balance as on 31.03.2020 A/C No. 56403	1,62,14,397.00
Grand Total	**5,30,74,016.00**	**Grand Total**	**5,30,74,016.00**

RESEARCH AND MONITORING OF AMUR FALCONS AT TAMENGLONG DISTRICT OF MANIPUR UNDER THE APO ON CSS
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,215,524.00	Purchase of four Satellite Transmitters	799,890.00
Grant Received	800,000.00	Travel Expenses	19,326.00
Interest Received	30,969.00	Contingency	142,853.00
		Total Expenditure	962,069.00
		Outstanding :	
		Forest Advance	55,000.00
		Balance as on 31.03.2020 A/C No. 56401	1,029,424.00
Grand Total	**2,046,493.00**	**Grand Total**	**2,046,493.00**

ASSESSMENT OF BIODIVERSITY FOR EFFECTIVE MANAGEMENT & EVALUATION OF ECOTOURISM POTENTIAL OF FOUR PROTECTED AREAS IN HIMANCHAL PRADESH, INDIA
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	5,58,977.00	Researcher Engagement	2,80,000.00
Interest Received	13,532.00	Travel	77,516.00
		Total Expenditure	3,57,516.00
		Outstanding :	
		Tour Advance	6,000.00
		Balance as on 31.03.2020 A/C No. 56435	2,08,993.00
Grand Total	**5,72,509.00**	**Grand Total**	**5,72,509.00**

ELEPHANT PROJECT, UTTARAKHAND
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	72,53,384.00	Hardware	1,04,400.00
Interest Received	2,71,191.00	Miscellaneous	9,07,245.00
		Travel	51,840.00
		Total Expenditure	10,63,485.00
		Outstanding :	
		Balance as on 31.03.2020 A/C No. 56402	64,61,090.00
Grand Total	**75,24,575.00**	**Grand Total**	**75,24,575.00**

WILD TIGERS OF SIMILIPAL : A STUDY ON SPATIAL DISTRIBUTION, ABUNDANCE & POPULATION GENETICS" IN SIMILIPAL TIGER RESERRVE - REG
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	24,11,187.00	Recurring Component	
Interest Received	77,878.00	Research Personnel Salary	3,54,873.50
Advances for Expenses	1,50,000.00	Field Assistant	87,582.00
		Travel	77,360.00
		Consumables	7,802.00
		Total Expenditure	5,27,617.50
		Outstanding :	
		Forest Advance	1,50,000.00
		Tour Advance	25,000.00
		Balance as on 31.03.2020 A/C No. 56412	19,36,447.50
Grand Total	**26,39,065.00**	**Grand Total**	**26,39,065.00**

CURRENT DISTRIBUTION POPULATION STATUS & THREATS TO INDIAN PANGOLIN (MANIS CRASSICAUDATA) IN TERAI ARC LANDSCAPE, UTTARAKHAND
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	3,53,331.00	Project Biologist	3,65,029.00
Grant Received	2,16,750.00	Travel, Lodging and Boarding	50,783.00
Interest Received	7,213.00	Equipment	43,280.00
Advances for Expenses	35,000.00	Contingency	16,507.51
		Miscellaneous	67,300.00
		Total Expenditure	5,42,899.51
		Outstanding :	
		Forest Advance	50,000.00
		Balance as on 31.03.2020 A/C No. 56713	19,394.49
Grand Total	**6,12,294.00**	**Grand Total**	**6,12,294.00**

PREPARATION OF UTTAR PRADESH STATE BIODIVERSITY STRATEGY AND ACTION PLAN
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	12,02,080.00	Personnel	6,77,015.00
Interest Received	27,955.00	Travel	46,206.00
		Total Expenditure	7,23,221.00
		Balance as on 31.03.2020 A/C No. 57014	5,06,814.00
Grand Total	**1,230,035.00**	**Grand Total**	**1,230,035.00**

TIGER TRANSLOCATION AND MONITORING IN RAJAJI TIGER RESERVE - REG
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	935,941.00	Manpower	47,957.00
Interest Received	18,793.00	Travel	33,000.00
		Hiring of Vehicle	176,000.00
		Contingency	10,598.00
		Base Camp	193,865.00
		Permanent Equipment	27,160.00
		Pol & Maintenance of Vehicle	28,500.00
		Total Expenditure	517,080.00
		Outstanding :	
		Forest Advance	120,000.00
		Balance as on 31.03.2020 A/C No. 56977	317,654.00
Grand Total	**954,734.00**	**Grand Total**	**954,734.00**

JEWAR INTERNATIONAL AIRPORT PROJECT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	-	Manpower	1,042,208.00
Grant Received	15,036,000.00	Field Logistics	506,554.00
Interest Received	39,988.00	Field Equipments	506,000.00
Taxes Due	4,978.00	Consultation Workshop	84,960.00
		Miscellaneous	652,250.00
		Institutional Charges	2,000,000.00
		Total Expenditure	4,791,972.00
		Outstanding :	
		Forest Advance	80,000.00
		FDR	10,000,000.00
		Balance as on 31.03.2020 A/C No. 57559	208,994.00
Grand Total	**15,080,966.00**	**Grand Total**	**15,080,966.00**

PLANNIG, DESIGNING AND DEVELOMENT OF A GREENFIELD AIRPORT AT CHANDRAPUR: WILDLIFE STUDY (MADC)
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	-	Manpowr / Equipment	
Grant Received	17,85,600.00	Field Assistant	19,200.00
Interest Received	16,525.00	Equipment	7,10,043.00
Taxes Due (CGST / SGST)	10,920.00	Field Logistics	
		Hiring of field Vehicle	56,000.00
		Field Camping Charges	19,051.00
		Travel & Accommodation	1,92,600.00
		Total Expenditure	9,96,894.00
		Balance as on 31.03.2020 A/C No. 57554	8,16,151.00
Grand Total	**18,13,045.00**	**Grand Total**	**18,13,045.00**

PROMOTING COMMUNITY PARTICIPATION IN CONSERVATION AND CONFLICT RESOLUTION IN THE FRINGE VILLAGES OF KAZIRANGA TIGER RESERVE,ASSAM THROUGH ECODEVELOPMENT (COMP-01)
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	17,00,000.00	Manpower	2,54,096.00
Interest Received	47,550.00	Consumables	70,815.00
		Operational	12,000.00
		Total Expenditure	3,36,911.00
		Outstanding :	
		Forest Advance	90,000.00
		Tour Advance	25,000.00
		Loan to A/c No.- 56411	4,00,000.00
		Balance as on 31.03.2020 A/c No. 56990	8,95,639.00
Grand Total	**17,47,550.00**	**Grand Total**	**17,47,550.00**

MANAGEMENT OF INVASIVE SPEICES IN KAZIRANGA TIGER RESERVE, ASSAM (COMP-02)
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	6,27,666.00	Manpower	6,52,572.00
Grant Received	18,30,000.00	Equipment	77,583.00
Advances for Expenses	1,05,000.00	Consumables	1,93,064.00
Interest Received	12,796.00	Travel & Field Visit	94,649.00
Loan from A/c No.-56411	4,00,000.00	Operational	1,40,718.00
		Total Expenditure	11,58,586.00
		Outstanding :	
		Forest Advance	25,000.00
		Tour Advance	20,000.00
		Balance as on 31.03.2020 A/C No. 56411	17,71,876.00
Grand Total	**29,75,462.00**	**Grand Total**	**29,75,462.00**

DEVELOPING A COLLABORATIVE MANAGEMENT STRATEGY FOR CONSERVATION OF TIGERS IN NORTH EAST INDIA, CONNECTING THE DOTS: FINDING DISPERSAL CORRIDORS FOR TIGERS IN NORTH EAST INDIA (COMP- 03)
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	18,00,000.00	Manpower	2,11,044.00
Interest Received	54,252.00	Operational	12,000.00
		Consumables	17,065.00
		Travel	24,675.00
		Total Expenditure	2,64,784.00
		Outstanding :	
		Forest Advance	1,90,000.00
		Tour Advance	25,000.00
		Balance as on 31.03.2020 A/c No. 56992	13,74,468.00
Grand Total	**18,54,252.00**	**Grand Total**	**18,54,252.00**

MONITORING OF RE-INTRODUCED GAUR IN BANDHAVGARH TIGER RESERVE
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	67,409.50	Manpower	3,83,275.00
Grant Received	23,62,395.00	Travel	26,716.00
Advances for Expenses	5,000.00	Insurance Liability to researcher and field assistant	6,873.50
Interest Received	6,569.00	Vehicle & POL Maintenance	69,345.00
Loan from A/c No.-55760	5,00,000.00	Contingency	5,882.00
		Total Expenditure	4,92,091.50
		Balance as on 31.03.2020 A/C No. 50629	24,49,282.00
Grand Total	**29,41,373.50**	**Grand Total**	**29,41,373.50**

MONITORING OF RE-INTRODUCED TIGERS IN SARISKA TIGER RESERVE
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	4,76,753.55	Vehicle & POL Maintenance	23,736.00
Interest Received	15,150.00	Contingency	1,12,000.00
		Total Expenditure	1,35,736.00
		Balance as on 31.03.2020 A/C No. 50545	3,56,167.55
Grand Total	**4,91,903.55**	**Grand Total**	**4,91,903.55**

RADIO COLLARING OF TIGERS IN SUNDERBANS TIGER RESERVE
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	2,39,746.20	Manpower	2,42,073.50
Interest Received	4,490.00	Total expenditure	2,42,073.50
		Balance as on 31.03.2020 A/C No. 50546	2,162.70
Grand Total	**2,44,236.20**	**Grand Total**	**2,44,236.20**

RADIO TELEMETRY MONITORING SOURCE POPULATION OF TIGERS IN KANHA TIGER RESERVE
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,677,784.80	Manpower	1,317,340.50
Loan to D/WII A/c No. 50968	1,000,000.00	Vehicle & POL	5,012.00
Interest Received	58,531.00	Contingency & Publication	2,500.00
		Total Expenditure	1,324,852.50
		Outstanding:	
		Forest Advance	2,500.00
		Balance as on 31.03.2020 A/C No. 50685	1,408,963.30
Grand Total	**2,736,315.80**	**Grand Total**	**2,736,315.80**

ECOLOGICAL MONITORING OF TIGER POPULATION IN PANNA LANDSCAPE (MP)
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	9,76,324.48	Manpower	10,73,599.00
Advances for Expenses	1,60,000.00	Vehicle Hiring & Fuel	6,75,451.00
D/WII A/c No. 54159	10,00,000.00	Contingency/Misc.	38,887.00
Grant Received	10,04,000.00	Travel	50,142.00
Interest Received	17,953.00	Base Camp	28,000.00
		Equipment	41,848.00
		Total expenditure	19,07,927.00
		Outstanding:	
		Forest Advance	2,500.00
		Tour Advance	3,776.00
		Loan to Sanjay Tiger Reserve A/c No. 54149	5,00,000.00
		Balance as on 31.03.2020 A/C No. 50908	744,074.48
Grand Total	**31,58,277.48**	**Grand Total**	**31,58,277.48**

ECOLOGY OF CLOUDED LEOPARD (NEOFELIS NEBULOSA) IN AN EAST HIMALAYAN BIODIVERSITY HOTSPOT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,79,049.00	Manpower	2,58,788.50
Grant Received	5,46,000.00	Equipment	3,57,000.00
Advances for Expenses	35,000.00	Travel	73,306.00
Interest Received	5,319.00	Contingencies	30,680.00
Loan from A/c No.-08	200,000.00	Total expenditure	719,774.50
		Outstanding:	
		Forest Advance	2,00,000.00
		Balance as on 31.03.2020 A/C No. 55559	45,593.50
Grand Total	**9,65,368.00**	**Grand Total**	**9,65,368.00**

RECONCILING DEVELOPMENT WITH CONSERVATION : DELINEATING HABITAT PATCHES AND CORRIDORS FOR GIR LIONS
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	13,870.19	Total Expenditure	-
Grant Received	5,50,000.00	**Outstanding:**	
Interest Received	1,562.00	Other Advance	4,50,000.00
		Balance as on 31.03.2020 A/C No. 55692	115,432.19
Grand Total	**5,65,432.19**	**Grand Total**	**5,65,432.19**

AN INVESTIGATION OF SPECIES OCCUPANCY PATTERNS AND NICHE DIFFERENTIATION AMONG SYMPATRIC CARNIVORES ACROSS VARYING AND USE AND DISTURBANCE REGIMES IN AND AROUND MEHAO WILDLIFE SANCTUARY, ARUNACHAL PRADESH
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,76,037.00	Total Expenditure	-
Interest Received	6,063.00	Balance as on 31.03.2020 A/C No. 55358	1,82,100.00
Grand Total	**1,82,100.00**	**Grand Total**	**1,82,100.00**

RESEARCH ON FLAGSHIP SPECIES IN DACHIGAM NATIONAL PARK
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	88,842.00	Manpower	16,350.00
Grant Received	14,70,000.00	Travel & Accommodation	67,562.00
Interest Received	16,250.00	Total Expenditure	83,912.00
		Balance as on 31.03.2020 A/C No. 55384	14,91,180.00
Grand Total	**15,75,092.00**	**Grand Total**	**15,75,092.00**

STUDY ON DIVERSITY AND ECOLOGY OF HERPETOFAUNA OF PANNA TIGER RESERVE
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	3,405.00	Total Expenditure	-
Interest Received	401.00	Balance as on 31.03.2020 A/C No. 55735	3,806.00
Grand Total	**3,806.00**	**Grand Total**	**3,806.00**

WL WORKSHOP ON CENSUS TECHNIC
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,70,184.00	Field Survey	1,62,500.00
Interest Received	5,929.00	Total Expenditure	1,62,500.00
Misc. Income	774.00	Balance as on 31.03.2020 A/C No. 55756	14,387.00
Grand Total	**1,76,887.00**	**Grand Total**	**1,76,887.00**

AUGMENTATION AND LONG TERM MONITORING OF TIGER IN BUXA TIGER RESERVE (W.B.)
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,953,108.80	Manpower	1,669,178.00
Grant Received	8,728,000.00	Equipment	255,449.00
Advances for Expenses	140,000.00	Travel	62,775.00
Interest Received	40,202.00	Vehicle Hiring & Fuel	392,455.00
		Contingency	73,992.00
		Miscellaneous	904.00
		Total Expenditure	2,454,753.00
		Outstanding:	
		Forest Advance	150,000.00
		Tour Advance	75,509.00
		Balance as on 31.03.2020 A/C No. 56209	8,181,048.80
Grand Total	**10,861,310.80**	**Grand Total**	**10,861,310.80**

DEVELOPING SPATIAL DATABASE ON THE STATUS, DISTRIBUTION AND ABUNDANCE OF UNGULATES IN AND AROUND THE FOREST DIVISION OF KULLU WL DIVISION
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,95,287.00	Manpower	7,500.00
Interest Received	5,478.00	Equipment	1,69,500.00
		Miscellaneous	720.00
		Total Expenditure	177,720.00
		Balance as on 31.03.2020 A/C No. 56366	23,045.00
Grand Total	**2,00,765.00**	**Grand Total**	**2,00,765.00**

PREPARATION OF STATE LEVEL STRATEGY FOR MITIGATION OF HUMAN - WILDLIFE CONFLICT IN KERALA
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	3,78,373.00	Cost of Travel	3,45,199.00
Interest Received	11,165.00	GIS support and designing of APP for conflict monitoring	8,650.00
Loan from A/c No.-57553	1,50,000.00	Miscellaneous	58,115.00
		Total Expenditure	411,964.00
		Balance as on 31.03.2020 A/C No. 56801	1,27,574.00
Grand Total	**5,39,538.00**	**Grand Total**	**5,39,538.00**

TRAINING OF BIODIVERSITY MANAGEMENT COMMITTEES AND PREPARATION OF PEOPLES BIODIVERSITY REGISTER OF HARYANA STATE
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	-	Personnel	3,07,196.00
Grant Received	16,37,326.00	Travel, Boarding and Lodging	95,624.00
Interest Received	2,061.00	Stakeholder Consultation	1,13,873.00
		PBR and BMC Report Printing Cost	59,297.00
		Field Logistics for Research Personnel	398.00
		Miscellaneous	4,542.00
		Institutional Charges	85,500.00
		Total Expenditure	6,66,430.00
		Outstanding:	
		Tour Advance	4,000.00
		Balance as on 31.03.2020 A/C No. 57635	9,68,957.00
Grand Total	**16,39,387.00**	**Grand Total**	**16,39,387.00**

DEVELOPMENT OF INTERACTIVE AND DYNAMIC WEB PORTAL WII-UNDP SECURE HIMALAYA PROJECT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	6,724,443.00	Personnel Services	6,865,323.00
Grant Received - 056	10,614,127.00	Travel & Accommodation	2,034,771.00
Interest Received	135,695.00	Stakeholder Workshop/ Workshop	1,077,726.00
Advances for Expenses	70,000.00	Miscellaneous	298,636.00
		Communication	440,560.00
		Hosting Charges	71,737.00
		Institutional Charges	1,007,493.00
		Local Meeting	194,520.00
		Procurement GIS Layers	260,058.00
		Printing	41,260.00
		Outstanding Advances	652,216.00
		Total Expenditure (B)	12,944,300.00
		Balance as on 31.03.2020 A/C No. 56876	4,599,965.00
Grand Total	**17,544,265.00**	**Grand Total**	**17,544,265.00**

DST- INSPIRED FACULTY FELLOW & DST FUNDED: METAPOPULATION DYNAMIC OF TIGER IN TERAI ARC LANDSCAPE PROJECT & POPULATION GENETICS OF SWAMP DEER RECEIPT & PAYMENT FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	11,10,376.78	Manpower	47,10,111.00
Advances for Expenses	36,000.00	Contingency	112,920.00
Grant Received - Inspired	46,76,864.00	Consumables	19,746.00
Interest Received	50,410.00	Total Expenditure	48,42,777.00
Loan from A/c No.-54992	1,91,364.00	**Outstanding:**	
Loan from A/c No.-08	5,00,000.00	Forest Advance	1,98,534.00
		Tour Advance	1,16,000.00
		Other Advance	12,00,000.00
		Balance as on 31.03.2020 A/C No. 54269	2,07,703.78
Grand Total	**65,65,014.78**	**Grand Total**	**65,65,014.78**

WCT PANTHERA FUNDED: METAPOPULATION DYNAMIC OF TIGER IN TERAI ARC LANDSCAPE PROJECT RECEIPT & PAYMENT FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	3268,588.55	Manpower	267,200.00
Advances for Expenses	200,924.00	Field, Vehicle hiring, maintenance and logistics	58,936.00
Interest Received	110,453.00	Contingency	268,939.00
		Equipment	20,532.00
		Lab Reagents	409,288.00
		Lab Plastic Wares	70,653.00
		Total Expenditure	1095,548.00
		Outstanding:	
		Forest Advance	75,000.00
		Loan to DST Metapopulation	191,364.00
		Balance as on 31.03.2020 A/C No. 54992	2218,053.55
Grand Total	**3579,965.55**	**Grand Total**	**3579,965.55**

IMPLEMENTING RHINO DNA INDEXING SYSTEM TO COUNTER RHINO POACHING THREAT AND AID POPULATION MANAGEMENT IN INDIA
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	4,55,794.00	Manpower	4,06,474.00
Advances for Expenses	54,919.00	Contingency	62,798.00
Grant Received	12,42,483.00	Laboratory Reagents	2,46,278.00
Interest Received	27,216.00	Laboratory Plastic Wares	55,654.00
		Institutional Charges	268,464.00
		Total Expenditure	10,39,668.00
		Outstanding:	
		Tour Advance	42,000.00
		Balance as on 31.03.2020 A/C No. 55585	6,98,744.00
Grand Total	**17,80,412.00**	**Grand Total**	**17,80,412.00**

NATIONAL MISSION ON HIMALAYAN STUDIES (NMHS) - HUMAN WILDLIFE CONFLICT PROJECT (PROJECT- 1)
NATIONAL MISSION ON HIMALAYAN STUDIES (NMHS) - FELLOWSHIP PROJECT (PROJECT- 2)
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,18,91398.05	Expenses: Human Wildlife conflict	
Advances for Expenses		Manpower	41,50,711.00
Advances (Human Wildlife conflict) :		Consumables	6,48,002.00
Forest Advance	9,58,829.28	Contingency	9,80,475.00
Tour Advance	2,54,580.00	Travel	5,87,554.42
Advances (Fellowship) :		Equipment	2,51,325.00
Forest Advance	10,24,055.00	Activities & Other project cost	1,95,623.00
Tour Advance	1,73,679.00	Forest Advance	14,74,436.28
		Tour Advance	3,12,012.00
Grant Received HWC Project	96,24,630.00	Total Expenditure (A)	86,00,138.70
Interest Received	2,27,227.00	**Expenses: Fellowship**	
		Manpower	10,33,167.00
		Contingency including travelling	19,72,503.13
		Forest Advance	2,35,275.00
		Tour Advance	44,558.00
		Other Advances	56,981.00
		Other Expenditures	9,70,788.00
		Total Expenditure (B)	43,13,272.13
		Total Expenditure (A+B)	1,29,13,410.83
		Outstanding :	
		Advance to Science & Conservation	2,06,336.58
		Loan to D/WII A/c No.-54272	30,00,000.00
		Loan to D/WII A/c No.-57509	6,79,795.00
		Loan to Other Project	5,82,800.00
		Balance as on 31.03.2020 A/C No. 55352	67,72,055.92
Grand Total	**2,41,54,398.33**	**Grand Total**	**2,41,54,398.33**

DST-NMSHE PROGRAMME PROJECT - MICRO FLORA AND FAUNA & WILDLIFE ANIMAL POPULATION
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	84,09,592.37	Manpower	65,28,008.50
Advance for Expenses	2,07,25,089.00	Equipment	6,30,955.00
Grant Received from DST	24,05,214.00	Travel & field work	8,11,362.00
Grant Received from Inspire	27,76,864.00	Consumables	45,177.00
Interest Received	52,195.00	Contingency	4,68,203.88
Loan from A/c No.-55352	30,00,000.00	Surplus as per Last Backup	25,000.00
		Total Expenditure	85,08,706.38
		Outstanding:	
		Forest Advance	9,69,355.12
		Tour Advance	3,27,639.00
		Other Advances	2,74,23,830.00
		Balance as on 31.03.2020 A/C No. 54272	1,39,423.87
Grand Total	**3,73,68,954.37**	**Grand Total**	**3,73,68,954.37**

DST-NMSHE TEK PROJECT (JNU)
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	2,24,934.00	Manpower	6,29,557.50
Advance for Expenses	1,10,070.00	Travel & field work	28,113.00
Grant Received	9,36,940.00	Equipment	31,950.00
Interest Received	17,516.00	Contingency	63,700.00
		Total Expenditure	7,53,320.50
		Outstanding:	
		Forest Advance	22.00
		Tour Advance	1,125.00
		Balance as on 31.03.2020 A/C No. 55746	5,34,992.50
Grand Total	**12,89,460.00**	**Grand Total**	**12,89,460.00**

ASSESSMENT OF CLIMATE CHANGE IMPACTS ON SOIL HEALTH THROUGH MICROBIAL AND PLANT COMMUNITIES IN ALPINE ECOSYSTEM OF THE INDIAN HIMALAYAN REGION [GOI - GEF - UNDP]
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	9,90,788.23	Manpower	5,84,263.00
Advance for Expenses	19,09,447.77	Equipment	43,998.00
Grant Received	29,33,342.50	Travel	98,000.00
Interest Received	38,890.00	Recurring Expenses	81,907.00
		DNA Squencing Charges	3,18,120.00
		Total Expenditure	11,26,288.00
		Outstanding:	
		Forest Advance	4,594.00
		Advance to M/s LICOR Inco.	18,09,447.77
		Loan to NATCOM	10,58,112.00
		Balance as on 31.03.2020 A/C No. 56589	18,74,026.73
Grand Total	**58,72,468.50**	**Grand Total**	**58,72,468.50**

ECOLOGICAL RESPONSES OF FLORA AND FAUNA TO CLIMATE CHANGE IN THE TRANS- HIMALAYAN LANDSCAPES
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	9,66,203.00	Manpower	9,57,000.00
Grant Received	10,36,945.00	Travel	2,09,766.00
Advance for Expenses	11,41,112.00	Recurring Expenses	1,57,819.00
Interest Received	21,665.00	Equipment	2,75,539.00
		Total Expenditure	16,00,124.00
		Outstanding:	
		Forest Advance	70,000.00
		Tour Advance	9,000.00
		Balance as on 31.03.2020 A/C No. 57062	14,86,801.00
Grand Total	**31,65,925.00**	**Grand Total**	**31,65,925.00**

STUDY ON BLACKBUCK MOVEMENT IN AND AROUND KAIMUR WILDLIFE SANCTUARY INCLUDING RESERVED FORESTS OF MIRZAPUR AND SONBHADRA DISTRICTS OF U.P.
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	11,324.00	Technical Manpower Charges	3,26,028.00
Grant Received	12,16,260.00	Field Logistics	6,66,802.00
Advance for Expenses	7,46,353.00	Miscellaneous	3,68,325.00
Interest Received	10,559.00	Satellite Data	1,52,676.00
		Transfer to A/c No.-56459 (MSRDC)	4,70,665.00
		Total Expenditure	19,84,496.00
		Balance as on 31.03.2020 A/C No. 56466	0.00
Grand Total	**19,84,496.00**	**Grand Total**	**19,84,496.00**

INVENTORIZATION OF FLORA & FAUNA OF CONSERVATION SIGNIFICANCE SHAILA PATTAN RANJIT SAGAR WETLANDS AND LALWAN COMMUNITY RESERVE, PUNJAB
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	10,81,857.00	Manpower	4,52,313.50
Advance for Expenses	74,640.00	Field Assistant	3,750.00
Interest Received	31,234.00	Consumables / Contingency	78,777.00
		Hiring of Boat / Vehicle	69,684.00
		Total Expenditure	6,04,524.50
		Outstanding:	
		Forest Advance	10,000.00
		Tour Advance	7,221.00
		Balance as on 31.03.2020 A/C No. 56712	5,65,985.50
Grand Total	**11,87,731.00**	**Grand Total**	**11,87,731.00**

RADIOTELEMETRY STUDIES ON ELEPHANTS IN ROURKELA & SUNDERGARH FOREST DIVISION ODISHA
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	-	Equipment	14,75,040.00
Grant Received	20,00,000.00	Total Expenditure	14,75,040.00
Interest Received	33,950.00	Balance as on 31.03.2020 A/C No. 57114	5,58,910.00
Grand Total	**20,33,950.00**	**Grand Total**	**20,33,950.00**

BIOGEOGRAPHY OF EASTERN BORDERLAND IN INDIA : EVIDENCE FROM ECOTHERMS
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	-	Equipment	10,98,512.00
Grant Received	18,72,000.00	Recurring -I	
Interest Received	39,976.00	Manpower	2,19,062.00
		Recurring -II	
		Contingency	54,882.00
		Travel	59,374.00
		Total Expenditure	14,31,830.00
		Outstanding:	
		Forest Advance	58,336.00
		Tour Advance	0.00
		Balance as on 31.03.2020 A/C No. 57130	4,21,810.00
Grand Total	**19,11,976.00**	**Grand Total**	**19,11,976.00**

ANALYSIS OF SCATS (SNOW LEOPARD & WOLF) AND WHOLE GENOME SEQUENCING OF SNOW LEOPARD DNA
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	-	Equipment	15,00,000.00
Grant Received	60,00,000.00	Total Expenditure	15,00,000.00
Interest Received	1,10,040.00	Balance as on 31.03.2020 A/C No. 57115	46,10,040.00
Grand Total	**61,10,040.00**	**Grand Total**	**61,10,040.00**

MANAGEMENT PLAN PREPARATION AND POPULATION MONITORING OF TURTLES IN SURINSAR MANSAR WETLANDS, JAMMU & KASHMIR BY WILDLIFE INSTITUTE OF INDIA
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	-	Fellowship	2,53,817.00
Grant Received	18,63,000.00	Travel	5,495.00
Interest Received	18,243.00	Equipment	2,42,408.00
		Consumables	46,677.00
		Total Expenditure	5,48,397.00
		Outstanding:	
		Forest Advance	1,40,000.00
		Tour Advance	20,000.00
		Balance as on 31.03.2020 A/C No. 57552	11,72,846.00
Grand Total	**18,81,243.00**	**Grand Total**	**18,81,243.00**

NATIONAL MISSION ON HIMALAYAN STUDIES (NMHS)-TREELINE PROJECT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Transfer Balance Amount	13,34,739.00	Manpower	3,09,408.00
Advance for Expenses	60,781.00	Contingency	25,811.00
Interest Received	6,473.00	Equipment	2,47,921.00
		Other Cost	3,11,948.00
		Travel	69,607.00
		Total Expenditure	9,64,695.00
		Outstanding:	
		Forest Advance	43,781.00
		Tour Advance	28,243.00
		Balance as on 31.03.2020 A/C No. 57509	3,65,274.00
Grand Total	**14,01,993.00**	**Grand Total**	**14,01,993.00**

PROPOSAL FOR RAPID ASSESSMENT AND STATUS OF WILDLIFE BETWEEN KOTA BARRAGE AND JAWAHAR SAGAR DAM
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	-	Travel	5,145.00
Grant Received	10,25,570.00	Total Expenditure	5,145.00
		Outstanding:	
		Forest Advance	20,000.00
		Balance as on 31.03.2020 A/C No. 57793	10,00,425.00
Grand Total	**10,25,570.00**	**Grand Total**	**10,25,570.00**

ASSESSING THE FUNCTIONING AND EFFICACY OF TIGER CONSERVATION FOUNDATIONS
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	-	Travel	54,635.00
Grant Received	5,70,000.00	Total Expenditure	54,635.00
Interest Received	964.00	**Outstanding:**	
		Loan to A/c No.-56801	1,50,000.00
		Balance as on 31.03.2020 A/C No. 57752	3,66,329.00
Grand Total	**5,70,964.00**	**Grand Total**	**5,70,964.00**

FOUNDATION OF ECOLOGICAL SECURITY (FES)
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	-	Manpower	0.00
Grant Received	6,00,000.00	Total Expenditure	0.00
Interest Received	427.00	**Outstanding:**	
		Balance as on 31.03.2020 A/C No. 57768	6,00,427.00
Grand Total	**6,00,427.00**	**Grand Total**	**6,00,427.00**

AITEP 2017-19/MSTRIPS/GENETIC CONNECTIVITY PROJECT
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	99,97,670.73	Fellowship	20,208,577.00
Grant AITEP	2,70,32,305.00	POL & eh Hiring	428,228.00
Grant MSTrIP	75,00,000.00	Travel Exp	53,14,852.05
Misc income	76,608.00	Contingencies	33,58,434.21
Interest	10,12,931.00	field equipment	13,90,240.00
Advances for Expenses	26,62,018.00	Grant to University of petrolium	2,10,000.00
Loan to D/WII A/c No. 55367	13,20,844.00	Investment	95,00,000.00
		Genetic analysis	21,44,710.00
		workshop	32,927.00
		Printing/Publication	4,10,850.96
		Loan: Director WII A/c No. 55367	28,20,844.00
		Total Expenditure	4,58,19,663.22
		Forest/Tour Advance	24,95,398.00
		Bank UBI-50968	12,87,315.51
Grand Total	**4,96,02,376.73**	**Grand Total**	**4,96,02,376.73**

WII - TIGER CELL & PALAMAU TIGER PROJECT
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	4,58,753.25	Manpower	41,35,037.00
Grant Received	80,04,716.00	POL & eh Hiring	55,644.00
Interest	19,813.00	Travel Exp	68,171.00
Advances for Expenses	1,55,401.00	Contingencies	52,017.00
Loan to 50968	15,00,000.00	Total expenses	43,10,869.00
		Tour Advance	0.00
		Grand Total	43,10,869.00
		Bank UBI-55367	58,27,814.25
Grand Total	**1,01,38,683.25**	**Grand Total**	**1,01,38,683.25**

WII - LONG TERM MONITORING OF TIGER IN TADOBA ANDHARI TIGER RESERVE
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	19,68,925.25	Fellowship	27,14,008.00
Grant Received	19,48,558.00	Travel Exp	15,47,915.00
Interest	4,68,542.00	Contingencies	19,05,320.53
Advances for Expenses	10,746.00	Institutional Charges	0.00
Grant from CAMPA	1,16,77,000.00	Field equipment	50,84,564.63
Grant from CCF, AN	21,50,000.00	Total expenses	1,12,51,808.16
Grant from Melghat TR	13,18,556.00	Advance for Expenses	3,92,545.00
Grant from Tadoba	27,68,969.00	Grand Total	1,16,44,353.16
		Bank UBI-53431	1,06,66,943.09
Grand Total	**2,23,11,296.25**	**Grand Total**	**2,23,11,296.25**

WII - GLOBAL TIGER FORUM SNOW LEOPARD PROJECT
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	2,80,261.25	Travel	0.00
Interest	8,582.00	Printing/Binding	80,996.00
		Grand Total	80,996.00
		Bank UBI-55366	2,07,847.25
Grand Total	**2,88,843.25**	**Grand Total**	**2,88,843.25**

WII - ECOLOGICAL IMPACT ASSESSMENT AND ROAD INFRASTRUCTURE
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	12,53,735.00	Fellowship	11,56,374.00
Refund of loan	0.00	POL & Veh hiring	1,05,300.00
Interest	27,398.00	Travel Exp	5,60,016.00
Advances for Expenses	55,791.00	Equipment	1,02,885.00
Loan from A/c No 56459	10,00,000.00	Contingencies	1,68,161.00
		Repair of vehicle	0.00
		Total expenses	20,92,736.00
		Tour Advance	35,791.00
		Grand Total	21,28,527.00
		Bank UBI-55338	2,08,397.00
Grand Total	**23,36,924.00**	**Grand Total**	**23,36,924.00**

WII - RE-INTRODUCTION OF CHEETAH PROJECT
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opeining Balance	20,323.19		
Intrest Received	700.00	Bank UBI-52366	21,023.19
Grand Total	**21,023.19**	**Grand Total**	**21,023.19**

WII - M.Sc DESERTATION
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opeining Balance	1,79,280.00	Desertation	2,25,496.00
Intrest Received	1,805.00	Total Expenses	2,25,496.00
Grant from NTCA	50,000.00	Bank UBI-57095	5,589.00
Grand Total	**2,31,085.00**	**Grand Total**	**2,31,085.00**

WII - GIB JAISALMER : RAJASTHAN GOVT
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Grant Recd from Rajasthan	10,00,000.00	Travel	42,758.00
		Total Expenses	42,758.00
		Bank UBI-57520	9,57,242.00
Grand Total	**10,00,000.00**	**Grand Total**	**10,00,000.00**

HABITAT IMPROVEMENT & CONSERVATION BREEDING OF THE INDIAN BUSTARD
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	26,30,695.19	Staff engagement	80,61,423.00
Grant from CAMPA	4,29,59,200.00	Conservation Breeding	115,69,073.00
Advance for Expenses	20,241,196.00	Applied Research	1,53,59,606.00
Interest Received	1,99,084.00	Capacity Building and Awareness	36,90,962.00
FDR Interest	1,07,33,227.00	Pilot Habita Management	1,34,898.00
Encashment of FDR	3,50,00,000.00	Total Expenditure	3,88,15,962.00
		Outstanding :	
		Forest Advance	30,17,709.00
		Tour Advance	4,02,048.00
		Adv to Addl PCCF	10,00,000.00
		Advance to CPWD Jaisalmer	92,32,090.00
		Advance to Nucleome Informatics	40,00,000.00
		Balance as on 31.03.2020 A/C No. 55292	5,52,95,593.19
Grand Total	**11,17,63,402.19**	**Grand Total**	**11,17,63,402.19**

DEVELOPMENT OF CONSERVATION PLAN FOR RIVER DOLPHIN
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	32,268,210.64	Manpower engagement	13,445,637.00
Advance for Expenses	9,072,263.00	Capacity Building & Awareness	7,001,682.00
Interest Received	1,107,121.00	Research	10,398,221.00
		Misc/Contingency	613,548.00
		Total Expenditure	31,459,088.00
		Outstanding:	
		Forest Advance	2,798,715.00
		Tour Advance	849,481.00
		Adv to Hesco Project (A/c 55700)	700,000.00
		Adv to Dugong Project (A/c 55294)	1,500,000.00
		Balance as on 31.03.2020 A/C No. 55293	5,140,310.64
Total	**42,447,594.64**	**Total**	**42,447,594.64**

PROJECT MANAGEMENT UNIT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	8,69,441.00	Manpower	27,97,589.00
Loan From Other Project	12,00,000.00	Contingency	76,005.00
Advance for Expenses	44,693.00	Travel	36,212.00
Advances Received	23,00,000.00	Equipment	2,64,600.00
Interest Received	34,316.00	Total Expenditure	31,74,406.00
		Outstanding:	
		Forest Advance	20,000.00
		Tour Advance	5,532.00
		Other advance (A/c No 55494)	3,00,000.00
		Balance as on 31.03.2019 A/C No. 55357	9,48,512.00
Total	**44,48,450.00**	**Total**	**44,48,450.00**

WII MANAGEMENT EFFECTIVENESS EVALUATION (MEE) OF PROTECTED AREAS
RECEIPT & PAYMENTS
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,12,85,140.57	Travel Expenses	38,40,572.00
Interest received 2019-20	3,74,846.00	Sitting Fee	9,72,000.00
Interest received from FDs	555458.00	Per diem to evaluation team	30,38,097.00
Grant received for MEE of TR Project	11,04,000.00	Report Writing Cost	1,95,000.00
Grant received for CZA New Delhi for MEE of ZOOs	5,00,000.00	Project Initiation Cost	5,19,992.00
Refund of Loan	13,00,000.00	Project Management Cost	23,74,175.50
FD Matured No - 2	1,00,00,000.00	Miscellaneous & unforeseen Expenses/Overheads	25,03,497.00
		Loan to other project	14,20,000.00
		Refund of Interest	5,45,048.00
		Total of MEE Expenditure	1,54,08,381.50
		Expenditure MEE Tiger Reserve	13,31,349.00
		Expenditure MEE of ZOOs	25,368.00
		Bank Balance A/C No - 62	83,54,346.07
Grand Total	**2,51,19,444.57**	**Grand total**	**2,51,19,444.57**

PROJECT TIGER CO-PREDATOR, PREY & HABITAT PHASE IV
RECEIPT & PAYMENTS
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,11,763.00	Fellowships	0.00
Interest received 2019-20	3,851.00	Consumable Printing of report	0.00
		Contingencies	0.00
		Equipment	0.00
		Bank Balance A/C No - 50673	1,15,614.00
Grand Total	**1,15,614.00**	**Grand total**	**1,15,614.00**

PREPARING AND UPDATING STUD BOOKS OF 34 ENDANGERED SPECIES (14 OLD AND 20 NEW)
RECEIPT & PAYMENTS
FOR THE PERIOD OF 01.04.2019 TO 31.03.2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	94.48	Salaries	0.00
Interest received 2019-20	981.00	Travel (Data colletion from Zoos)	0.00
		Stationery	0.00
		Miscellaneous & contingencies	0.00
		Unspent balance refunded to CZA	0.00
		Bank Balance A/C No - 53274	1,075.48
Grand Total	**1,075.48**	**Grand total**	**1,075.48**

PATTERN OF BIOMASS PRODUCTION BY WETLANDS AND ITS USE BY WILD UNGULATES IN KAZIRANGA LANDSCAPE
RECEIPT & PAYMENTS
FOR THE PERIOD OF 01.04.2019 TO 31.03.2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	2,14,582.00	Manpower	0.00
Interest received 2019-20	7,391.00	Consumable	0.00
		Travel	0.00
		Contingency	0.00
		Equipments	0.00
		Overhead charges	0.00
		Bank Balance A/C No - 53439	2,21,973.00
Grand Total	**2,21,973.00**	**Grand total**	**2,21,973.00**

BLACK KITE PROJECT
Receipt & Payments
For the period of 01.04.2019 to 31.03.2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,06,059.00	Manpower Wages to Fd Asst	22,54,797.00
Interest received 2019-20	32,070.00	Equipment	17,000.00
Grant received for Project from RRCF, Mumbai	46,29,666.00	Travel	1,62,975.00
Advance for Expenses	50,000.00	Base Camp Rent	2,23,000.00
		Consumable	76,858.00
		Miscellaneous	92,183.00
		Advances paid as a loan	53,000.00
		Bank Balance A/C No - 55500	19,37,982.00
Grand Total	**48,17,795.00**	**Grand Total**	**48,17,795.00**

WII - GIZ - HWC PROJECT
RECEIPT & PAYMENTS
FOR THE PERIOD OF 01.04.2019 TO 31.03.2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	19,47,863.25	Salary of Staff	24,43,054.00
Grant received from GIZ, New Delhi	56,26,335.00	External Expert	0.00
Interest received 2019-20	54,716.00	Transport/Travel Cost	7,12,014.00
		Training Cost	31,90,735.99
		Procurement of goods, Equipment, Consumeables	79,483.24
		Supporting/Adm Cost	4,20,438.00
		Advances paid	40,000.00
		Bank Balance A/C No - 54145	7,43,189.02
Grand Total	**76,28,914.25**	**Grand Total**	**76,28,914.25**

ASSESSMENT AND CONSERVATION PRACTICES OF POLLINATORS
RECEIPT & PAYMENTS
FOR THE PERIOD OF 01.04.2019 TO 31.03.2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	6,72,818.00	Manpower Wages to Fd Asst	12,01,327.00
Interest received 2019-20	35,075.00	Travel	3,99,474.00
Grant received from GB Pant National Institute	26,83,722.00	Consumeables	65,377.00
Advance for Expenses	71,000.00	Contingencies	1,20,811.00
		Activities and other project cost	7,64,494.00
		Equipment	65,752.16
		Advances Paid	55,000.00
		Bank Balance A/C No - 56376	7,90,379.84
Grand Total	**34,62,615.00**	**Grand Total**	**34,62,615.00**

TAXONOMIC AND ECOLOGICAL STUDIES ON ARACHINDS OF TRANS AND WESTERN HIMALAYAS, INDIA
RECEIPT & PAYMENTS
FOR THE PERIOD OF 16.01.2020 TO 31.03.2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Grant received from MOEFCC (CS-1) Division, New Delhi	7,90,400.00	Salary and Wages	58,000.00
Interest received 2019-20	0.00	Field Assistants	0.00
		Travel	0.00
		Contingencies	0.00
		Dissemination of works	0.00
		Advances Paid	0.00
		Bank Balance A/C No - 57780	7,32,400.00
Grand Total	**7,90,400.00**	**Grand Total**	**7,90,400.00**

WII MANAGEMENT EFFECTIVENESS EVALUATION (MEE) OF 210 PROTECTED AREAS
RECEIPT & PAYMENTS
FOR THE PERIOD OF 31.03.2020 TO 31.03.2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Grant received from MOEFCC (WL) Division,			
New Delhi	2,00,00,000.00	Salary and Wages	0.00
Interest received 2019-20	0.00	Field Assistants	0.00
		Travel	0.00
		Contingencies	0.00
		Dissemination of works	0.00
		Advances Paid	0.00
		Bank Balance A/C No - 57943	2,00,00,000.00
Grand Total	**2,00,00,000.00**	**Grand Total**	**2,00,00,000.00**

WII-ENVIS PROJECT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,907,832.75	Fellowship and Wages	1,743,471.00
Intt. Received	57,088.00	Travelling Expenditure	18,057.00
Grant Received	2,830,743.00	Contigency	145,095.00
Misc. Income	18,000.00	Advance for Expenses	484,570.00
Salary Payable	130,967.00	Payable Salary	108,974.00
Advance for Expenses	10,000.00	CZA Training & Workshop	832,987.00
		Certificare Course in Bird Identification and Basic	313,231.00
		Certificate Course in Wildlife Management	
		Using Geospatial Tech.	48,037.00
		Expenditure Total	3,694,422.00
		Bank Balance A/c No. 32	1,260,208.75
Grand Total	**4,954,630.75**	**Grand Total**	**4,954,630.75**

WII-UNESCO PROJECT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	2,533,482.41	Expenditure Total	0.00
Intt.Received	88,487.00	Bank Balance A/c No. 44	2,677,993.41
Refund of TA	56,024.00		
Grand Total	**2,677,993.41**	**Grand Total**	**2,677,993.41**

WII-DGH SEATURTLE TELEMETRY PROJECT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	873,663.52	Expenditure Total	0.00
Intt. Received	30,174.00	Bank Balance A/c No. 59	903,837.52
Grand Total	**903,837.52**	**Grand Total**	**903,837.52**

WII-GRATUITY OF CONTRIBUTION
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	422,370.27	Final Payment	89,593.00
Gratuity of Fund	1,965,459.00	Expenditure Total	89,593.00
Interest Received	51,125.00	Bank Balance A/c No. 55326	2,349,361.27
Grand Total	**2,438,954.27**	**Grand Total**	**2,438,954.27**

TIGER RESPONSE TO PRAY HUMAN DISTURBANCE
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,668,604.30	Expenditure Total	0.00
Interest Received	57,480.00	Bank Balance A/c No. 60	1,726,084.30
Grand Total	**1,726,084.30**	**Grand Total**	**1,726,084.30**

ISRO-GBP PROJECT ON LULC DYNAMICS & BIOFIN PROJECT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	7,58,508.37	Misc. & Contingencies	3,78,772.16
Interest Received	20,928.00	Expenditure Total	3,78,772.16
		Bank Balance A/c No. 51241	4,00,664.21
Grand Total	**7,79,436.37**	**Grand Total**	**7,79,436.37**

INTERRATED DEVELOPMENT OF WILDLIFE HABITATS
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	59,054.00	Expenditure Total	0.00
Intt. Received	2,034.00	Bank Balance A/c No. 51240	61,088.00
Grand Total	**61,088.00**	**Grand Total**	**61,088.00**

STRUCTURAL AND FUNCTIONAL ATTRUBUTES OF PLANT COMMUNITIES IN COLD ARID REGION OF NANDA DEVI BISOPHERES RESERVE, UTTARAKHAND
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	11,373.00	Funds Transferred Corpus Funds A/c NO. 4032	11,529.00
Intt. Received	156.00	Expenditure Total	11,529.00
		Bank Balance A/c No. 51240	0.00
Grand Total	**11,529.00**	**Grand Total**	**11,529.00**

I U C N CELL
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	7,72,808.39	Travel Expenditure	1,35,643.00
Intt. Received	26,992.00	Misc. and Meeting and Confrenace	2,750.00
Member Ship Fees	2,04,000.00	Advance for Expenses	110.00
		Expenditure Total	1,38,503.00
		Bank Balance A/c No. 41	8,65,297.39
Grand Total	**10,03,800.39**	**Grand Total**	**10,03,800.39**

WESTERN TRAGOPAN PROJECT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	15,74,602.00	Advance for Expenses	20000.00
Intt. Received	54,241.00	Expenditure Total	20,000.00
Advance for Expenses	20,000.00	Bank Balance A/c No. 52465	16,28,843.00
Grans Total	**16,48,843.00**	**Grand Total**	**16,48,843.00**

ASSESSMENT OF ECOLOGICAL SETTING AND BIODIVERSITY VALUES OF PAPIKONDA NATIONAL PARK AND INDIRA SAGAR (POLAVARAM) MULT. PROJECT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	6,55,442.00	Expenditure Total	0.00
Intt. Received	22,579.00	Bank Balance A/c No. 53223	6,78,021.00
Grand Total	**6,78,021.00**	**Grand Total**	**6,78,021.00**

ECOLOGY AND CONSERVATION OF SEA TURTLE OFF COAST OF THE SINDHUDURY USING SATELLITE TRACKING TECHNIQUES & DEVELOPMENT OF INTERGRATED MANAGEMENT PLAN OF THE THANE CREEK FLAMINGO SANCTURY
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	8,65,609.00	Expenditure Total	0.00
Intt. Received	29,818.00	Bank Balance A/c No. 54273	8,95,427.00
Grand Total	**8,95,427.00**	**Grand Total**	**8,95,427.00**

WII-UNESCO C 2 C PROJECT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,65,37,500.00	Salaries	68,64,870.50
Grant Received	2,10,00,000.00	Travel Expenditure	5,62,527.00
Intt. Received	7,20,679.00	Contingencies /Misc. Expenses	13,26,009.00
Misc. Receipt	39,13,283.00	Office Equipment	86,675.00
Advance for Expenses	1,86,174.00	Database Development & Maintenance	4,39,565.00
MSc. Course Fees	12,00,000.00	Report Writing	1,24,694.00
Stragtic Marketing	1,75,000.00	Training & Workshop Expenses	21,86,733.00
Director WII-2162	852.00	Boarding & Lodging	49,628.00
		Madhya Pradesh Tourism Board	2,53,695.00
		MSc. HCM Course Expenditure	12,00,000.00
		Advance for Expenses	8,44,761.00
		Expenditure Total	1,39,39,157.50
		Bank Balance A/c No. 54034	2,97,94,330.50
Grand Total	**4,37,33,488.00**	**Grand Total**	**4,37,33,488.00**

WII-THE UNIVERSITY OF BRITISH COLUMBIA
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,33,790.38	Boarding & Lodging	80,887.00
Grant	5,323.00	Travel Expenses	48,895.00
Advance for Expenses	1,72,089.00	Wages of Field Assistant	62,000.00
		Contingencies	50,256.00
		Expenditure Total	2,42,038.00
		Bank Balance A/c No. 55061	69,164.38
Grand Total	**3,11,202.38**	**Grand Total**	**3,11,202.38**

WILD LIFE INSTITUTE OF INDIA FOREIGN CONTRIBUTION ACCOUNT
RECEIPT & PAYMENT ACCOUNT
for the period of 01-04-2019 to 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Balance as on April,1 2018		Fellowship & Wages	3976838.50
UBI A/c No 518502010000010	22977405.14	Travel Expenditure	412979.00
Interest Received	806497.00	POL & Maint. Of Vehicle	69204.00
Fund Received		Contigencies	1879147.04
ZSL-UKFD on Tiger Conservation Project	1668259.50	Office Equipemt	460449.00
Indo US Science of Tech Forum (IUSSTA)	68333.00	Boarding & Lodging	940607.00
APN-Secretariat	310914.00	Workshop/ Awareness Camp	1397200.00
Asian Development Bank	148519.00	Corpus Funds	1111530.00
Student from Hiroshima University Japan	275873.42	Report Writing	198791.00
Misc. Income	49000.00	Advance for Payment	126038.00
Misc. Receipt	3500826.62	Total Expenditure	10572783.54
Loan:- Director WII	156000.00	Balance as on 31.03.2019	
Advance for Expenses	449302.00	UBI A/c No 518502010000010	19838146.14
Grand Total	**30410929.68**	**Grand Total**	**30410929.68**

NATIONAL GEOGRAPHIC SOCIETY
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	-	Salary & Wages	13,21,122.00
Grant	48,89,417.00	Boarding & Lodging	2,71,144.00
Intt. Received	29,375.00	Contingencies	3,71,697.00
		Hiring of Vehicle	92,428.00
		Insurance Premium	9,18,382.00
		Institutional Charges	3,74,526.00
		Purch. Of Chemicals	64,267.00
		TA/DA and Honorarium (Resource Persons)	1,72,400.00
		Travel Expenses	1,28,958.00
		Workshop Material	6050.00
		Lab Equipment	16,825.00
		Advance for Expenses	2,75,611.00
		Expenditure Total	40,13,410.00
		Bank Balance A/c No. 57149	9,05,382.00
Grand Total	**49,18,792.00**	**Grand Total**	**49,18,792.00**

UNDP-DEVELOPMENT AND CONSERVATION OF FOREST CORRIDORS IN SIKKIM PROJECT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	8,22,449.60	Fellowship & Wages	4,23,747.00
Grant Received	29,90,000.00	Base Camp Expenses	37,450.00
Interest Received	39,347.00	Camp Equipment	6,799.00
Advance for Expenses	2,60,000.00	Office Equipment	7,999.00
		Field Equipment	7,63,849.00
		Contingencies	45,730.00
		Travel Expenditure	3,09,982.00
		POL & Maint. of Vehicle	94,770.00
		High & Manpower	9,48,720.00
		Advance for Expenses	1,45,635.00
		Expenditure Total	27,84,681.00
		Bank Balance A/c No. 52465	13,27,115.60
Grand Total	**41,11,796.60**	**Grand Total**	**41,11,796.60**

WII- C2C EXTERNALLY FUNDED PROJECT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	-	Contigencies	94.40
Grant	10,00,000.00	Expenditure Total	94.40
		Bank Balance A/c No. 57750	9,99,905.60
Grand Total	**10,00,000.00**	**Grand Total**	**10,00,000.00**

WII- UNESCO C2C MSC. COURSE
RECEIPT & PAYMENT
FOR THE PERIOD OF 01-04-2019 TO 31-03-2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	-	Contigencies	94.40
MSc. Course Fees	9,32,400.00	Expenditure Total	94.40
		Bank Balance A/c No. 57750	9,32,305.60
Grand Total	**9,32,400.00**	**Grand Total**	**9,32,400.00**

ECOLOGY TAXONOMY AND CONSERVATION OF FISH DIVERSITY IN SUBANSIRI RIVER BASIN OF ARUNANCHAL PRADESH
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,62,919.00	Total Expenditure	0.00
Interest Received	5,612.00	Balance as on 31.03.2020 A/C No. 53803	1,68,531.00
Grand Total	**1,68,531.00**	**Grand Total**	**1,68,531.00**

KAILASH SACRED LANDSCAPE CONSERVATION AND DEVELOPMENT INITIATIVE (KSLCDI)
RECEIPT & PAYMENT
FROM 01.04.2019 TO 31.03.2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	18,38,453.13	Manpower	5,48,000.00
Advance for Expenses	15,000.00	Miscellaneous Expenses	53,563.00
Interest received	49,624.00	Travel	2,240.00
		Equipment	1,36,214.00
		Total Expenditure	7,40,017.00
		Outstanding :	
		Forest Advance	15,000.00
		Loan to D/WII A/c No. 56472	1,50,000.00
		Balance as on 31.03.2020, A/c No. 53475	9,98,060.13
Grand Total	**19,03,077.13**	**Grand Total**	**19,03,077.13**

POPULATION GENETIC STRUCTURE AND GENE FLOW IN BROWN BEAR POPULATION IN INDIA AND ASSESS EXTENT OF GENE FLOW BETWEEN POPULATION OF INDIA & PAKISTAN
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	14,164.00	Non Recurring :	
Advance for Expenses	6,930.00	Equipment	1,900.00
Interest Received	864.00	Total Expenditure	1,900.00
Loan from D/WII A/c No. 55352	5,00,000.00	**Outstanding :**	
Loan from D/WII A/c No. 55157	72,561.00	Forest Advances	6,930.00
Loan from D/WII A/c No. 55352	82,800.00	Loan from D/WII A/c No. 55352	5,00,000.00
		Loan from D/WII A/c No. 55157	72,561.00
		Loan from D/WII A/c No. 55352	82,800.00
		Balance as on 31.03.2020 A/C No. 55018	13,128.00
Grand Total	**6,77,319.00**	**Grand Total**	**6,77,319.00**

GENETIC ASSESSMENT OF SAMBER RUSA UNICOLOR POPULATION IN NORTH-EAST INDIA
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	51,191.00	Non Recurring :	
Advance for Expenses	362.00	Equipment	5,049.00
Interest Received	1,669.00	Total Expenditure	5,049.00
		Outstanding :	
		Tour Advances	362.00
		Balance as on 31.03.2020 A/C No. 54947	47,811.00
Grand Total	**53,222.00**	**Grand Total**	**53,222.00**

MARINE TURTLE PROJECT ALONG THE COAST OF PUDUCHERRY & KARAIKAL REGION
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	2,66,499.00	Total Expenditure	0.00
Advance for Expenses	1,00,000.00	**Outstanding :**	
Interest Received	9,180.00	Loan to A/c No.-55701	1,00,000.00
		Balance as on 31.03.2020 A/C No. 54919	2,75,679.00
Grand Total	**3,75,679.00**	**Grand Total**	**3,75,679.00**

MAPPING LANDUSE/ LANDCOVER PATTERNS IN ARAVALLIS, HARYANA WITH SPECIAL REFERENCE TO STATUS OF KEY WILDLIFE SPECIES LONG TERM MONITORING OF LEOPARDS AND ITS PREY IN KALESAR NATIONAL PARK HARYANA RECEIPT & PAYMENT FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	493,600.83	Total Expenditure	0.00
Interest Received	17,019.00	Balance as on 31.03.2020 A/C No. 54196	510,619.83
Grand Total	**510,619.83**	**Grand Total**	**510,619.83**

POPULATION GENETIC STRUCTURE OF NILGIRI TAHR IN WESTERN GHATS, INDIA CONSERVATION & FORENSIC IMPLICATIONS & DBT- STIPEND FOR DBT-RA RECEIPT & PAYMENT FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	65,155.77	Consumables	47,558.00
Advance for Expenses	18,494.00	DBT- Stipend for DBT-RA	
Interest Received	1,711.00	Contingencies	19,249.00
Loan from D/WII A/c No. 55018	72,561.00	Total Expenditure	66,807.00
		Outstanding :	
		Forest Advances	494.00
		Loan from D/WII A/c No. 55018	72,561.00
		Balance as on 31.03.2020 A/C No. 55157	18,059.77
Grand Total	**1,57,921.77**	**Grand Total**	**1,57,921.77**

CONSERVATION OF MANIPUR BROW ANTLERED DEER OF SANGHAI AN INTEGRATED APPROACH RECEIPT & PAYMENT FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	32,52,786.47	Manpower	53,72,122.00
Advance for Expenses	36,52,181.00	Infrastructure and Equipment	10,73,708.00
Interest Received	1,08,907.00	Research & Monitoring	51,08,354.00
FDR Interest	8,30,661.00	Capacity Development	2,12,794.00
FDR Withdrawal	1,00,00,000.00	Conservation Education & Awareness	2,19,166.00
		Habitat Recovery Plan at KLNP	3,96,914.00
		Vetrinary Action Plan	6,24,247.00
		Total Expenditure	1,30,07,305.00
		Outstanding :	
		Forest advance	6,15,751.00
		Tour Advance	2,99,107.00
		Advance to M/s Ashish Chandola	13,11,750.00
		Balance as on 31.03.2019 A/C No. 55295	26,10,622.47
Grand Total	**17844,535.47**	**Grand Total**	**1,78,44,535.47**

CONSERVATION OF MANIPUR BROW ANTLERED DEER OF SANGHAI AN INTEGRATED APPROACH
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	14,94,791.32	Manpower Engagement	78,07,586.00
Grant Received	2,40,54,000.00	Capacity Building & Awarness	42,55,602.00
Advance for Expenses	76,48,715.00	Research Monitoring Species and Habitat	1,35,53,620.00
Bank Interest	65,526.00	Participatory Management	10,42,000.00
Interest on FDR	35,06,535.00	Marine Mammal Rescue and Rehab	1,50,167.00
FDR Withdrawal	1,25,00,000.00	Total Expenditure	2,68,08,975.00
Loan from D/WII A/c No. 55701	2,50,000.00	**Outstanding :**	
		Forest Advance	11,42,938.00
		Tour Advance	3,65,758.00
		Loan from D/WII A/c No. 55701	2,50,000.00
		Balance as on 31.03.2020 A/C No. 55294	2,09,51,896.32
Grand Total	**4,95,19,567.32**	**Grand Total**	**4,95,19,567.32**

NTCA- E-BIRD TECHNOLOGY FOR TIGER CONSERVATION DEVELOPMENT AND INTEGRATION OF UN-MANNED AERIAL VEHICLES AS A SURVEILLANCE AND MONITORING TOOL FOR PROTECTION OF TIGERS AND CAPACITY BUILDING OF FRONTLINE STAFF
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	99.00	Manpower	15,99,173.00
Advance for Expenses	1,46,398.00	Travel	1,49,909.00
Grant received	37,47,000.00	Administrative Cost @15%	3,42,000.00
Interest Received	24,709.00	Miscellaneous	26,121.00
		Contingencies	53,260.00
		Refund of Interest to MoEF&CC	1,57,582.00
		Total Expenditure	23,28,045.00
		Outstanding :	
		Forest Advances	2,47,521.00
		Tour Advances	37,354.00
		Balance as on 31.03.2020 A/C No. 55580	13,05,286.00
Grand Total	**39,18,206.00**	**Grand Total**	**39,18,206.00**

PRIORITIZATION AND PREPARATION OF BRIEF DOCUMENT FOR NOTIFICATION UNDER WETLANDS RULES, 2010 IN CHHATTISGARH
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	3,35,773.00	Travel Costs	27,571.00
Interest Received	9,988.00	Total Expenditure	27,571.00
		Outstanding :	
		Tour Advances	20,000.00
		Loan to A/c No.- 56991	2,00,000.00
		Balance as on 31.03.2020	98,190.00
Grand Total	**3,45,761.00**	**Grand Total**	**3,45,761.00**

10 DAYS ORIENTATION TRAINING ON WILDLIFE MANAGEMENT WITH SPECIAL REF. TO HEALTH MANAGEMENT FOR FIELD VETERINARIAN OF UTTARAKHAND
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	44,30,932.00	Learning Materials	5,52,396.00
Interest Received	1,38,167.00	Lodging & Boarding	8,27,777.00
		Travel	4,57,584.00
		Veterinary Supplies	3,79,905.00
		Total Expenditure	22,17,662.00
		Balance as on 31.03.2020 A/C No. 55709	23,51,437.00
Grand Total	**45,69,099.00**	**Grand Total**	**45,69,099.00**

BIODIVERSITY ASSESSMENT OF GAUTAM BUDHA WILDLIFE SANCTUARY IN HAZARIBAGH AND GAYA DISTRICT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	13,54,162.00	Manpower	5,36,662.00
Advance for Expenses	1,29,110.00	Equipment	77,583.00
Interest Received	88,448.00	Field Camp Base Camp Rent	24,505.00
Grant received	26,65,125.00	Miscellaneous + Report Printing	40,832.00
		POL	1,20,050.00
		Travel	80,830.00
		Vehicle Hiring	1,33,700.00
		Total Expenditure	10,14,162.00
		Outstanding :	
		Tour Advances	20,000.00
		Balance as on 31.03.2020 A/C No. 55784	32,02,683.00
Grand Total	**42,36,845.00**	**Grand Total**	**42,36,845.00**

SPATIO-TEMPORAL AND THERMAL ECOLOGY ON INDIAN PYTHON IN MOYAR RIVER
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	56,360.75	Manpower	7,06,449.00
Grant received	8,80,000.00	Equipment	6,500.00
Advance for Expenses	55,498.00	Travel	6,26,363.00
Interest Received	7,945.00	Consumables	29,630.00
Loan from A/c No.- 62	8,00,000.00	Contingencies	53,468.00
		Other Costs	78,912.00
		Total Expenditure	15,01,322.00
		Outstanding :	
		Forest Advances	45,868.00
		Tour Advances	21,731.00
		Advance Caution Money to S. Karthy	25,000.00
		Balance as on 31.03.2020 A/C No. 55725	2,05,882.75
Grand Total	**17,99,803.75**	**Grand Total**	**17,99,803.75**

STUDY OF ECOLOGY AND SOCI-ECONOMIC IMPACT OF INVASIVE SPECIES TAMIL NADU
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	24,568.25		
Interest Received	881.00	Total Expenditure	0.00
Loan from A/c No. 54919	1,00,000.00	Loan from A/c No. 54919	1,00,000.00
Loan from A/c No. 62	1,00,000.00	Loan from A/c No. 62	1,00,000.00
Loan from A/c No. 55294	2,50,000.00	Loan from A/c No. 55294	2,50,000.00
		Balance as on 31.03.2020 A/C No. 55701	25,449.25
Grand Total	**4,75,449.25**	**Grand Total**	**4,75,449.25**

ASSESSMENT OF HABITAT USE BY BLACK NECKED CRANE (GRUS NIGRICOLLIS) AND EFLOWS OF NYAMJANG CHU HYDRO ELECTRIC PROJECT IN TAWANG DISTRICT, ARUNACHAL PRADESH.
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	75,912.00	Contingencies	1,19,680.00
Advance for Expenses	1,09,440.00	Equipment	3,855.00
Interest Received	2,586.00	Total Expenditure	1,23,535.00
		Outstanding :	
		Tour Advances	9,440.00
		Balance as on 31.03.2020 A/c No. 55742	54,963.00
Grand Total	**1,87,938.00**	**Grand Total**	**1,87,938.00**

MOVEMENT ECOLOGY OF TIGER FOR CONFLICT PREDICTION & LANDSCAPE MANAGEMENT IN SATHYAMANGALAM NILGIRI BIOSPHERE COMPLEX, SOUTHERN INDIA
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	16,05,315.80	Manpower	6,60,915.00
Advance for Expenses	37,095.00	Equipments	674.00
Interest Received	39,305.00	Travel & Lodging	7,51,019.00
Loan from A/c No.-56403	10,00,000.00	Contingency	84,213.00
		Miscellaneous	18,399.00
		Total Expenditure	15,15,220.00
		Outstanding :	
		Forest Advance	52,500.00
		Tour Advances	13,300.00
		Caution Money	25,000.00
		Balance as on 31.03.2020 A/C No. 56410	10,75,695.80
Grand Total	**26,81,715.80**	**Grand Total**	**26,81,715.80**

ASSESSMENT OF THE KOTDWAR - RAMNAGAR KANDI ROAD AND REVIEW OF THE FEASIBLE OPTION TO PROMOTE GREEN INFRASTRUCTURE TO ADDRESS THE IMPACTS ON WILDLIFE VALUES
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	2,43,205.00	Technical Manpower Charges	39,72,570.00
Advance for Expenses	11,39,275.00	Field Logistics	4,51,742.00
Interest Received	6,689.00	Study Equipments	4,45,311.00
Loan from A/c No.- 56211	3,67,216.00	Miscellaneous	49,832.00
Loan from A/c No.- 56389	28,60,000.00	Total Expenditure	49,19,455.00
Loan from A/c No.- 62	15,82,000.00	**Outstanding :**	
		Forest Advance	1,94,720.00
		Tour Advances	23,000.00
		Other Advances	9,62,000.00
		Balance as on 31.03.2020 A/C No. 56409	99,210.00
Grand Total	**61,98,385.00**	**Grand Total**	**61,98,385.00**

MINSTREAMING LANDSCAPE APPROACH FOR BIODIVERSITY CONSERVATION, IMPROVED LIVELIHOOD & ECOSYSTEM HEALTH IN KAILASH SACRED LANDSCAPE PART IN INDIA - NMHS
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	4,64,084.00	Activities	1,54,184.00
		Manpower	3,19,041.00
Advance for Expenses	240.00	Travel	35,395.00
Interest Received	9,336.00	Equipment	31,900.00
Loan from A/c No.-53475	1,50,000.00	Others	14,731.00
		Total Expenditure	5,55,251.00
		Outstanding :	
		Forest Advance	253.00
		Tour Advance	10,110.00
		Balance as on 31.03.2020 A/C No. 56472	58,046.00
Grand Total	6,23,660.00	Grand Total	6,23,660.00

DEVELOPMENT OF MANAGEMENT ACTION PLAN TO MITIGATE HUMAN CROCODILE CONFLICTS IN ANDAMAN & NICOBAR ISLANDS - NITI AYOG
RECEIPT & PAYMENT
FROM 01.04.2019 TO 31.03.2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	522823.00	Total Expenditure	0.00
Interest Received	18006.00	Balance as on 31.03.2020 A/c No. 56756	540829.00
Grand Total	**540829.00**	**Grand Total**	**540829.00**

KAILASH SACRED LANDSCAPE CONSERVATION AND DEVELOPMENT INITIATIVE PHASE II ICIMOD
RECEIPT & PAYMENT
FROM 01.04.2019 TO 31.03.2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	3,87,839.00	Manpower	6,98,968.00
Misc Grant	5,00,000.00	Contingency	47,246.00
Interest Received	12,503.00	Miscellaneous	6,318.00
		Travel	18,342.00
		Total Expenditure	7,70,874.00
		Outstanding :	
		Forest Advance	51,746.00
		Tour Advance	31,408.00
		Balance as on 31.03.2020 A/c No. 56932	46,314.00
Grand Total	**9,00,342.00**	**Grand Total**	**9,00,342.00**

LANDSCAPE SUSTAINABILITY CHALLENGES IN PROPOSED SIMLIPAL – SATKOSIA CORRIDOR REGION DUE TO COLLECTIVE MINING REGIME: MINING – WILDLIFE HABITAT LINKAGE AND IMPACT"
RECEIPT & PAYMENT
FROM 29.07.2019 TO 31.03.2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	0.00	Manpower	10,05,054.00
Grant Received	66,11,500.00	Consumables	1,84,618.00
Interest Received	95,026.00	Miscellaneous	27,179.00
		Travel	1,24,929.00
		Institutional Charges	9,91,725.00
		Operational	1,19,065.00
		Total Expenditure	24,52,570.00
		Outstanding :	
		Forest Advance	2,32,500.00
		Tour Advance	96,744.00
		Balance as on 31.03.2020 A/c No. 57182	39,24,712.00
Grand Total	**67,06,526.00**	**Grand Total**	**67,06,526.00**

POPULATION ESTIMATION AND HOME SITE SELECTION BY WOLVES IN HUMAN DOMINATED LANDSCAPE
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	3,42,427.00		
Interest Received	11,795.00	Total Expenditure	0.00
		Outstanding :	
		Tour Advance	10,000.00
		Loan to A/c No.-55281	3,00,000.00
		Balance as on 31.03.2020 A/C No. 55281	44,222.00
Grand Total	**3,54,222.00**	**Grand Total**	**3,54,222.00**

GENETIC ASSESSMENT OF WILD CAUGHT LEOPARD IN THE STATE OF MAHARASHTRA RECEIPT AND PAYMENT FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	525,956.00	Fellowship	30,000.00
Interest Received	10,026.00	Disease Investigation/Genetic and Forensic	300,000.00
		Total Expenditure	330,000.00
		Balance as on 31.03.2020 A/C No. 55280	205,982.00
Grand Total	**535,982.00**	**Grand Total**	**535,982.00**

STUDY IN SHIVALIK AND ARAVALI AREAS RECEIPT AND PAYMENT FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	68,083.00		
Interest Received	2,223.00	Total Expenditure	0.00
		Outstanding :	
		Forest Advances	40,000.00
		Balance as on 31.03.2020 A/C No. 55257	30,306.00
Grand Total	**70,306.00**	**Grand Total**	**70,306.00**

CONSERVING GREAT INDIAN BUSTARD LANDSCAPES RECEIPT AND PAYMENT FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	872,340.00	Field Logistic	158,828.00
Interest Received	24,015.00	Contingencies	38,712.00
Advance for Expenses	92,147.00	Total Expenditure	197,540.00
		Outstanding :	
		Forest Advances	200,000.00
		Balance as on 31.03.2020 A/C No. 55339	590,962.00
Grand Total	**988,502.00**	**Grand Total**	**988,502.00**

ECOLOGY OF WOLVES WITH EMPHASES ON DISPERSAL IN A HUMAN DOMINATED LANDSCAPES
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	5,96,104.00	Manpower	4,58,093.50
Interest Received	11,457.00	Consumable	52,664.00
Advance for Expenses	1,43,639.00	Travel	2,74,659.00
Loan from A/c No.-55281	3,00,000.00	Equipment	6,752.00
		Contingencies	35,578.00
		Total Expenditure	8,27,746.50
		Outstanding :	
		Balance as on 31.03.2020 A/c No. 55480	2,23,453.50
Grand Total	**10,51,200.00**	**Grand Total**	**10,51,200.00**

GEF-UNDP-GOI MUNNAR LANDSCAPE PROJECT
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	3,97,122.00		
Interest Received	13,680.00	Total Expenditure	0.00
		Outstanding :	
		Balance as on 31.03.2020 A/c No. 55075	4,10,802.00
Grand Total	**4,10,802.00**	**Grand Total**	**4,10,802.00**

SWAMP DEER - FUNDED BY UTTARAKHAND FOREST DEPARTMENT
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	48,08,627.00	Swamp Deer Project	
Grant Received	47,66,600.00	Manpower	3,48,559.00
Interest Received	1,40,202.00	Field Assistant	2,46,430.00
Advance for Expenses	1,07,635.00	Travel	8,35,798.00
Loan from River Ganga	4,00,000.00	Contingencies	74,371.00
		Laboratory Reagents and Chemicals	2,42,111.00
		Institutional Charges	6,21,150.00
		Design & Report	1,59,855.00
		Boarding & Lodging	7,465.00
		Honorarium	4,500.00
		Vehicle & POL	47,219.00
		Transf. to Global Tiger Forum	16,63,000.00
		Total (A)	42,50,458.00
		Outstanding :	
		Forest Advances	2,40,050.00
		Tour Advances	80,000.00
		Balance as on 31.03.2020 A/c No. 55350	56,52,556.00
Grand Total	**1,02,23,064.00**	**Grand Total**	**1,02,23,064.00**

EVALUATION OF WALLS AND OTHER BARRIERS USED FOR STOPPING CROP DEPREDATION BY ELEPHANTS & WILD PIGS
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	6,02,609.00		
Interest Received	20,759.00		
Advances for Expenses	85,000.00	Total Expenditure	0.00
		Outstanding :	
		Advances for Expenses	85,000.00
		Balance as on 31.03.2020 A/c No. 55351	6,23,368.00
Grand Total	**7,08,368.00**	**Grand Total**	**7,08,368.00**

ASSESSMENT OF IMPACTS ON WILDLIFE OF KEDARNATH VALLEY DUE TO HELICOPTER SERVICES
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	4,20,593.00		
Interest Received	14,486.00		
Advance for Expenses	1,10,000.00	Total Expenditure	0.00
		Outstanding :	
		Forest Advances	1,10,000.00
		Balance as on 31.03.2020 A/c No. 55282	4,35,079.00
Grand Total	**5,45,079.00**	**Grand Total**	**5,45,079.00**

CONCEPT ON TECHNOLOGY INTERVENTION FOR MOUNTAIN ECOSYSTEM (TIME) FOR COORDINATION (HESCO)
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	93,952.00	Manpower	4,36,856.00
Grant Received	7,00,000.00	Travel	1,05,439.00
Interest Received	5,941.00	Contingencies	3,03,689.00
Misc. Income (Bhatkosh)	7,510.00	Project Planning Workshop	99,930.00
Loan from A/c No.-55293	7,00,000.00	Overhead Charges	1,00,000.00
		Total Expenditure	10,45,914.00
		Outstanding :	
		Advance for Expenses	2,00,000.00
		Balance as on 31.03.2020 A/c No. 55700	2,61,489.00
Grand Total	**15,07,403.00**	**Grand Total**	**15,07,403.00**

ETALIAN HYDRO PROJECT
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Grant Received	6,97,090.00	Manpower	27,000.00
Grant Received	15,32,700.00	Equipment	9,000.00
Interest Received	9,164.00	Report Printing	3,06,115.00
Advance for Expenses	7,500.00	Institutional Charges	2,000.00
		Total Expenditure	3,44,115.00
		Outstanding :	
		Loan to A/c No.-56409	3,67,216.00
		Loan to A/c No.-56991	15,00,000.00
		Balance as on 31.03.2020 A/c No. 56211	35,123.00
Grand Total	**22,46,454.00**	**Grand Total**	**22,46,454.00**

DEVELOPING GENETIC DATABASE TO UNDERSTAND METAPOPULATION DYNAMICS & CONNECTIVITY OF TIGERS
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	10,78,374.50	Manpower	4,59,200.00
Interest Received	19,101.00	Field Assistant	1,25,358.00
Advance for Expenses	1,00,000.00	Laboratory reagents & Consumables	6,21,033.00
Loan from A/c No.-56459	5,00,000.00	Travel	1,93,226.00
		Insurance & Medical	6,873.50
		Contingency	84,331.00
		Total Expenditure	14,90,021.50
		Outstanding :	
		Forest Advances	50,000.00
		Tour Advance	10,000.00
		Balance as on 31.03.2020 A/c No. 55479	1,47,454.00
Grand Total	**16,97,475.50**	**Grand Total**	**16,97,475.50**

STUDYING THE DISPERSAL OF TIGERS ACROSS THE EASTERN
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	18,11,301.89	Manpower	9,41,197.00
Interest Received	19,551.00	Field Wages	74,970.00
Advance for Expenses	1,25,000.00	Vehicle Cost Pol	3,69,752.00
		Miscellaneous	48,824.00
		Grant Transfer	5,00,000.00
		Total Expenditure	19,34,743.00
		Balance as on 31.03.2020 A/C No. 55244	21,109.89
Grand Total	**19,55,852.89**	**Grand Total**	**19,55,852.89**

UNDERSTANDING POPULATION DYNAMICS SPACE USE, MOVEMENT AND DIET OF LEOPARDS IN JUNNAR TALUKA, MAHARASHTRA FOR HUMAN LEOPARD CONFLICT MITIGATION
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	86,92,255.00	Fellowship & Wages	8,39,029.00
Grant Received	13,45,000.00	Vehicle Pol & Travel	1,03,419.00
Interest Received	1,52,088.00	Field Equipment	74,02,981.00
		Miscellaneous	1,59,916.00
		Total Expenditure	85,05,345.00
		Outstanding:	
		Forest Advance	80,000.00
		Tour Advance	40,000.00
		Balance as on 31.03.2020 A/c No. 56960	15,63,998.00
Grand Total	**1,01,89,343.00**	**Grand Total**	**1,01,89,343.00**

DEVELOPING A COLLABORATIVE MANAGEMENT STRATEGY FOR CONSERVATION OF TIGERS IN NORTH EAST INDIA, COMPONENT 1 : STATUS AND CONSERVATION OF TIGERS AND THEIR HABITATS IN HILL RANGERS OF NORTH EAST INDIA WITH SPECIAL REFERENCE TO MISHMI HILLS, MANIPUR AND NAGALAND
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	17,43,022.00	Manpower	13,87,575.00
Interest Received	48,119.00	Consumables	1,97,324.00
Loan from A/c No.-55688	2,00,000.00	Equipment & Capital	1,58,990.00
Loan from Etalian	15,00,000.00	Operational	16,740.00
		Travel	2,98,876.00
		Institutional Charges	2,000.00
		Total Expenditure	20,61,505.00
		Outstanding:	
		Forest Advance	5,55,000.00
		Tour Advance	1,65,000.00
		Balance as on 31.03.2020 A/c No. 56991	7,09,636.00
Grand Total	**34,91,141.00**	**Grand Total**	**34,91,141.00**

AN INTEGRATED APPROACH FOR CONSERVATION OF TAKIN (BUDORCAS TAXICOLOR) IN NORTH EAST INDIA : LINKING SPECIES ECOLOGY AND TRADITIONAL ECOLOGICAL KNOWLEDGE
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	0.00	Manpower	1,55,533.00
Grant Received	26,92,760.00	Equipment	25,000.00
Interest Received	13,180.00	Consumables	35,013.40
		Total Expenditure	2,15,546.40
		Outstanding :	
		Forest Advances	32,500.00
		Tour Advance	15,000.00
		Balance as on 31.03.2020 A/c No. 56896	24,42,893.60
Grand Total	**27,05,940.00**	**Grand Total**	**27,05,940.00**

ASSESSMENT OF DISEASE PREVALENCE IN UNGULATES IN PROTECTED AREAS IN MIZORAM
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	0.00	Contingency	94.40
Grant Received	30,34,994.00		
Interest Received	5,343.00	Total Expenditure	94.40
		Outstanding :	
		Forest Advances	1,00,000.00
		Tour Advance	90,000.00
		Balance as on 31.03.2020 A/c No. 56903	28,50,242.60
Grand Total	**30,40,337.00**	**Grand Total**	**30,40,337.00**

ASSESSING FINE SCALE DISTRIBUTION PATTERN POPULATION AND HABITAT STATUS OF NORTHERN SWAMP DEER (RUCERVUS DUVAUCELI) ACROSS UPPER GANGETIC PLAINS OF NORTH INDIA (MOEFCC)
RECEIPT AND PAYMENT
FOR THE PERIOD OF 01 APRIL, 2019 TO 31 MARCH, 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	0.00	Field Assistant	40,000.00
Grant Received	25,46,520.00	Contingency	94.40
Interest Received	12,524.00	Total Expenditure	40,094.40
		Balance as on 31.03.2020 A/c No. 56892	25,18,949.60
Grand Total	**25,59,044.00**	**Grand Total**	**25,59,044.00**

RECEIPT & PAYMENT FOR THE YEAR 2019-20
REVOLVING FUND FOR GUEST HOUSE MAINTENANCE A/C NO. 54189

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	78,31,489.00	Operational Expenses	61,67,076.00
Rent Charges received	61,82,763.00	Office Equipment	11,32,827.00
Hostel Accomodation Charges	4,35,760.00		
Food Bill Charges	11,64,471.00		
Interest credited by UBI	3,19,595.00	Forest Advance	2,86,793.00
Forest Advance	100.00	Total Expenditure	75,86,696.00
		Bank Balance at UBI	83,47,482.00
Total	**15934178.00**	**Total**	**1,59,34,178.00**

ECOLOGY OF SLOTH BEAR IN AND AROUND RATANMAHAL JAMBUGHODA SANCTUARIES & UNPROTECTED AND FRAGMENTED
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	4,32,841.00		
Bank Interest for F.Y. 2019-20	14,910.00	Total Expenditure	-
		Balance as on 31.03.2020 A/C No. 53632	4,47,751.00
Grand Total	**4,47,751.00**	**Grand Total**	**4,47,751.00**

EVALUATION OF PREY AVAILABILITY AND HABITAT SUITABILITY FOR TIGER AND ITS RANGING PATTERNS IN SANJAY TIGER RESERVE, MADHYA PRADESH
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	7,39,031.00	Manpower	50,000.00
Bank Interest for F.Y. 2019-20	19,075.00	Travels	22,238.00
		Total Expenditure	72,238.00
		Outstanding:	
		Outstanding Advance D/WII A/c No. 50908	5,00,000.00
		Balance as on 31.03.2020 A/C No. 54159	1,85,868.00
Grand Total	**7,58,106.00**	**Grand Total**	**7,58,106.00**

ECOLOGY OF ENDANGERED ASIATIC LIONS USING SATELLITE & GPS TELEMETRY RECEIPT & PAYMENT FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	3,91,641.00		
Bank Interest for F.Y. 2019-20	13,846.00	Total Expenditure	-
		Balance as on 31.03.2020 A/C No. 53583	4,05,487.00
Grand Total	**4,05,487.00**	**Grand Total**	**4,05,487.00**

NMCG- BIODIVERSITY CONSERVATION AND GANGA REJUVENATION PART - 1 (COMPONENT 1, 3 & 4) RECEIPT & PAYMENT FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	2,95,47,384.84	**Component 1**	
Grant Received	-	Manpower	91,33,594.00
Advance for Expenses	9,56,170.00	Equipment	4,43,345.00
Bank Interest for F.Y. 2019-20	7,20,683.00	Operational Expenses	1,14,68,371.00
		Travels	12,33,415.00
		Other Expenses	6,10,487.00
		Institutional charges	20,30,146.00
		Advance for Expenses	1,45,000.00
		Total Expenditure (A)	2,50,64,358.00
		Balance as on 31.03.2020 A/C No. 55526	61,59,879.84
Grand Total	**3,12,24,237.84**	**Grand Total**	**61,59,879.84**

CSIR- AN ASSESSMENT OF BREEDING ,FORAGING AND HABITAT USE PATTERNS OF A THREATENED PISCIVORUS COLONIAL NESTING WATERBIRD, ORIENTAL DARTER AT BHITARKANIKA MANGROVES RECEIPT & PAYMENT FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	31,318.00		
Bank Interest for F.Y. 2019-20	1,079.00	Total Expenditure	-
		Outstanding:	
		Forest Advance	7,000.00
		Tour Advance	15,000.00
		Balance as on 31.03.2020 A/C No. 55104	10,397.00
Grand Total	**32,397.00**	**Grand Total**	**32,397.00**

NMCG- BIODIVERSITY CONSERVATION AND GANGA REJUVENATION PART - 2 (COMPONENT 2, 5 & 6) RECEIPT & PAYMENT FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	3,73,20,255.69	**Component 2**	
Grant Received	2,00,08,944.00	Manpower	78,92,516.00
Advance for Expenses (C2)	8,74,365.07	Equipment	24,17,696.00
Advance for Expenses (C5)	13,50,766.00	Operational Expenses	73,07,582.87
Advance for Expenses (C6)	1,18,000.00	Travels	10,52,030.00
Loan to Kumbh Mela Programme Project A/c No: 56944	41,55,000.00	Other Expenses	36,00,670.00
Loan to CAMPA Dolphin Project A/c No. 55357	3,00,000.00	Institutional charges	23,20,056.00
Loan to DST- HESCO Project A/c No. 55700	2,00,000.00	Advance	2,63,207.07
Bank Interest for F.Y. 2019-20	9,98,574.00	Total Expenditure (A)	2,48,53,757.94
		Component 5	
		Manpower	65,16,567.00
		Equipment	1,86,905.00
		Operational Expenses	73,17,550.00
		Travels	10,41,433.00
		Other Expenses	238,193.00
		Institutional charges	11,28,057.00
		Advance	3,87,927.00
		Total Expenditure (B)	1,68,16,632.00
		Component 6	
		Manpower	23,55,388.00
		Equipment	2,02,834.00
		Operational Expenses	95,81,185.00
		Travels	3,37,916.00
		Other Expenses	2,63,956.00
		Institutional charges	9,63,801.00
		Advance	-
		Total Expenditure (C)	1,37,05,080.00
		Total Expenditure (A+B+C)	5,53,75,469.94
		Balance as on 31.03.2020 A/C No. 55526	99,50,434.82
Grand Total	**6,53,25,904.76**	**Grand Total**	**6,53,25,904.76**

TIGER RECOVERY STRATEGY AND LONG TERM MONITORING IN SAHAYADRI TIGER RESERVE, MAHARASHTRA RECEIPT & PAYMENT FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	10,63,936.00	Manpower	9,36,984.00
Grant Received	30,00,000.00	Contingency	53,993.00
Bank Interest for F.Y. 2019-20	38,260.00	Travel	63,513.00
Advance for Expenses	1,40,000.00	Vehicle Hiring & Fuel	52,164.00
		Total Expenditure	11,06,654.00
		Outstanding:	
		Forest Advance	3,55,000.00
		Tour Advance	5,000.00
		Balance as on 31.03.2020 A/C No. 55541	27,75,542.00
Grand Total	**42,42,196.00**	**Grand Total**	**42,42,196.00**

STATUS OF FISH DIVERSITY IN SAHYADRI TIGER RESERVE, MAHARASHTRA & KOSI RIVER MAHSEER PROJECT RECEIPT & PAYMENT FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	30,929.00	Fish Diversity in Sahyadri Tiger Reserve:	
Advance for Expenses	38,000.00	Manpower	8,000.00
Bank Interest for F.Y. 2019-20	965.00	Total Expenditure (A)	8,000.00
		Kosi River :	
		Field Assistant	13,725.00
		Contingency	4,049.00
		Travel	43,185.00
		Total Expenditure (B)	60,959.00
		Balance Transfer to Corpus Fund A/c No-4032 (C)	935.00
		Total Expenditure (A+B+C)	69,894.00
		Balance as on 31.03.2020 A/C No. 55691	-
Grand Total	**69,894.00**	**Grand Total**	**69,894.00**

A RAPID STATUS SURVEY FOR THE GLOBALLY THREATENED YELLOW WEAVER PLOCEUS MEGARHYNCHOS IN UTTARAKHAND RECEIPT & PAYMENT FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	28,020.00		
Bank Interest for F.Y. 2019-20	965.00	Total Expenditure	-
		Balance as on 31.03.2020 A/C No. 55693	28,985.00
Grand Total	**28,985.00**	**Grand Total**	**28,985.00**

CONSERVATION MANAGEMENT OF ELEPHANTS IN CHHATTISGARH: CAPACITY BUILDING INITIATIVE ON THE DISPERSAL & RANGING PATTERNS OF ELEPHANTS FOR EFFECTIVE MANAGEMENT OF HUMAN - ELEPHANT INTERACTIONS
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	86,53,963.75	Manpower	987,539.00
		Accommodation & Food	211,452.00
Bank Interest for F.Y. 2019-20	2,09,504.00	Equipment & Field Gears	164,900.00
Advance for Expenses	8,73,335.17	Supplies & Materials	752,681.00
		Telemetry Study	30,42,821.96
		Travel	13,80,974.00
		Capacity Building Workshop	57,606.00
		Total Expenditure	65,97,973.96
		Outstanding:	
		Forest Advance	1,55,000.00
		Tour Advance	25,000.00
		Loan to A/c No.-50629 Gaur Project	5,00,000.00
		Other Advances	8,73,335.17
		Balance as on 31.03.2020 A/C No. 55760	15,85,493.79
Grand Total	**97,36,802.92**	**Grand Total**	**97,36,802.92**

GENETIC ASSESSMENT OF THE NON - DESCRIPT PIG BREEDS ACROSS SELECTED REGIONS OF UTTARAKHAND
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	5,64,714.00	Recurring (General)	
Opening Balance of Advances	10,000.00	Fellowship	3,15,000.00
Bank Interest for F.Y. 2019-20	10,696.00	Consumables	1,07,509.00
		Contingencies	20,782.00
		Travel	22,801.00
		Overhead	54,000.00
		Total Expenditure	5,20,092.00
		Balance as on 31.03.2020 A/C No. 56925	65,318.00
Grand Total	**5,85,410.00**	**Grand Total**	**5,85,410.00**

SERB- NATIONAL POST DOCTORAL FELLOWSHIP (NPDF)- RESOLVING TAXONOMIC UNCERTAINTY AMONG INDIAN GOURAMI (PERCIFORMES: OSPHRONEMIDAE) USING MOLECULAR AND MORPHOLOGICAL APPROACH
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	9,60,000.00	Fellowship	2,75,000.00
Bank Interest for F.Y. 2019-20	17,077.00	Institutional Charges	1,00,000.00
		Total Expenditure	3,75,000.00
		Outstanding:	
		Forest Advance	75,000.00
		Tour Advance	25,000.00
		Balance as on 31.03.2020 A/C No. 57001	5,02,077.00
Grand Total	**9,77,077.00**	**Grand Total**	**9,77,077.00**

PROMOTE GANGA RESTORATION BY INVOLVING GANGA PRAHARIS DURING KUMBH MELA PROGRAMME
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	14,51,559.00	Accommodation	1,18,412.00
Grant Received	49,46,700.00	Documentary Film	34,928.00
Bank Interest	25,352.00	Food of Ganga Prahari & Project Personnel	12,000.00
Advance for Expenses	6,50,000.00	Honorarium Boarding & Lodging of Resource Persons	46,200.00
		Institutional Charges	4,49,700.00
		Printing	5,37,726.00
		Other Expenses	12,29,029.00
		Travel	3,380.00
		Training Kit	1,24,950.00
		Vehicle Hiring	1,73,417.00
		Wages	7,000.00
		Total Expenditure	27,36,742.00
		Refund of Loan to NMCG Part-2 A/c No. 55526	40,00,000.00
		Balance as on 31.03.2020 A/C No. 56944	336,869.00
Grand Total	**70,73,611.00**	**Grand Total**	**70,73,611.00**

A COMPREHENSIVE BIODIVERSITY ASSESSMENT STUDY IN SURGUJA-LEMURU FORESTS WITH REFERENCE TO HASDEO ARAND COAL FIELDS IN THE STATE OF CHHATTISGARH
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	-	Manpower	2,40,023.00
Grant Received	52,43,000.00	Accommodation Food Charges	39,101.00
Bank Interest for F.Y. 2019-20	99,338.00	Camera Trap	24,99,000.00
		Contingency	19,990.00
		Field Assistant	50,000.00
		Field Equipments	1,76,144.00
		Hiring of Field Vehicle	83,930.00
		Memory Card	67,500.00
		TA / DA of WII faculty	22,272.00
		Total Expenditure	31,97,960.00
		Outstanding:	
		Forest Advance	1,40,000.00
		Tour Advance	82,000.00
		Balance as on 31.03.2020 A/C No. 57002	19,22,378.00
Grand Total	**53,42,338.00**	**Grand Total**	**53,42,338.00**

ELEPHANT CELL PROJECT
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT		AMOUNT (In Rs.)
Opening Balance	-	Elephant Cell:		
Grant Rec. from Elephant Cell	1,32,00,000.00	National Coordinator at PE Division		7,70,968.00
Grant Rec. from Elephant Day	8,10,000.00	Scientist at WII		4,52,903.00
Grant Rec. from Elephant Central	7,70,000.00	Veterinarian at WII		4,52,974.00
Bank Interest for F.Y. 2019-20	1,50,716.00	Computer/GIS professional at WII		4,00,000.00
		Office space, furniture, operational expenses (GIS lab)		1,46,178.00
		Travel allowances of staff		47,962.00
		Daily conveyance of National Coordinator		96,371.00
		Equipment		20,89,743.00
		Trainings/Workshops/meetings		15,02,735.00
		Miscellaneous		663,776.00
		Travel (Contractual Staff)		203,813.00
		Total Expenditure (A)		68,27,423.00
		Elephant Day Celebration Fund	(B)	7,90,206.00
		East- Central Landscape project	(C)	98,723.00
		Total Expenditure (A+B+C)		77,16,352.00
		Outstanding:		
		Elephant Cell:		
		Tour Advance		58,781.00
		Forest Advance		26,000.00
		Elephant Day Celebration Fund:		
		Tour Advance		1,500.00
		Balance as on 31.03.2020 A/C No. 57002		71,28,083.00
Grand Total	**1,49,30,716.00**	**Grand Total**		**1,49,30,716.00**

MITIGATION OF HUMAN ELEPHANT CONFLICT IN AND AROUND RAJAJI TIGER RESERVE WITH EMPHASIS ON MITIGATION STRATEGIES DURING KUMBH 2021
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	-		
Grant Received	5,00,000.00	Total Expenditure	-
		Balance as on 31.03.2020 A/C No. 57924	5,00,000.00
Grand Total	**5,00,000.00**	**Grand Total**	**5,00,000.00**

NMCG- BIODIVERSITY CONSERVATION AND GANGA REJUVENATION PHASE - 2
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	-	Manpower	60,43,426.00
Grant Received	26,32,49,800.00	Equipment	3,56,250.94
Bank Interest for F.Y. 2019-20	38,47,753.00	Central Laboratory	1,36,29,612.00
		Operational Expenses	31,38,747.00
		Travels	3,66,720.00
		Other Expenses	1,00,233.00
		Institutional charges	2,39,31,800.00
		Advance	36,33,000.00
		Total Expenditure (A)	5,11,99,788.94
		Loan to DWII Flaura & Fauna Project A/c No: 55350	4,00,000.00
		Balance as on 31.03.2020 A/c No. 57180	21,54,97,764.06
Grand Total	**26,70,97,553.00**	**Grand Total**	26,70,97,553.00

ECOLOGY AND RECOVERY OF CRITICALLY ENDANGERED VULTURE SPECIES IN PONG DAM PROTECTED AREA (PA) AND ITS ECO SENSITIVE ZONE (ESZ) IN HIMACHAL PRADESH (A/C-56901)
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	0.00	Manpower	19,452.00
Grant Received	31,36,000.00		
Interest Received	16,077.00	Total Expenditure	19,452.00
		Balance as on 31.03.2020 A/C No.	31,32,625.00
Grand Total	**31,52,077.00**	**Grand Total**	**31,52,077.00**

SECURING HABITAT FOR THREATENED MOUNTAIN UNGULATES THROUGH ROBUST POPULATION ASSESSMENT AND CONSERVATION PLANNING (A/C-56895)
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	0.00		
Grant Received	40,11,460.00		
Interest Received	21,353.00	Total Expenditure	0.00
		Balance as on 31.03.2020 A/C No.	40,32,813.00
Grand Total	**40,32,813.00**	**Grand Total**	**40,32,813.00**

STAFF WELFARE FUND
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Opening Balance	1,36,661.00	Staff Welfare Funds	1,07,118.00
WII Officals Contribution	54,575.00		
Interest Received	4,493.00	Total Expenditure	1,07,118.00
		Balance as on 31.03.2020 A/C No. 6009	88,611.00
Grand Total	**1,95,729.00**	**Grand Total**	**1,95,729.00**

DEVELOP THE METIC MAPS FOR KOCHI AND DEVELOP POLICY RECOMMENDATION FOR THE CITY AUTHORITIES UNDER THE INTEGRATED SUB.- NATIONAL ACTION FOR BIODEVERCITY
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Grant Received	4,88,750.00		
		Total Expenditure	-
		Balance as on 31.03.2020 A/C No.57845	4,88,750.00
Grand Total	**4,88,750.00**	**Grand Total**	**4,88,750.00**

MONITORING FISH TAXA IN SELECTED LANDSCAPE ACROSS INDIA UNDER THE LONG TERM ECOLOGICAL OBSERVATION (LTEO) INDIA PROGRAMME
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Grant received	60,00,000.00		-
		Balance as on 31.03.2020 A/C No. 57802	60,00,000.00
Grand Total	**60,00,000.00**	**Grand Total**	**60,00,000.00**

RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Grant received	35,83,000.00		
		Total expenditure	-
		Balance as on 31.03.2020 A/C No. 57829	35,83,000.00
Grand Total	**35,83,000.00**	**Grand Total**	**35,83,000.00**

HEM CHAND MAHINDRA FOUNDATION INTERNATIONAL SYMPOSIA -REG.
RECEIPT & PAYMENT
FOR THE PERIOD OF 01 APRIL 2019 TO 31 MARCH 2020

RECEIPT	AMOUNT (In Rs.)	PAYMENT	AMOUNT (In Rs.)
Grant received	5,00,000.00		
		Total Expenditure	-
		Outstanding:	
		Advance for Expenses	50,000.00
		Balance as on 31.03.2020 A/C No. 57913	4,50,000.00
Grand Total	**5,00,000.00**	**Grand Total**	**5,00,000.00**

(Baljeet Kaur)
Finance Officer

(Dr. Dhananjai Mohan)
Director

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